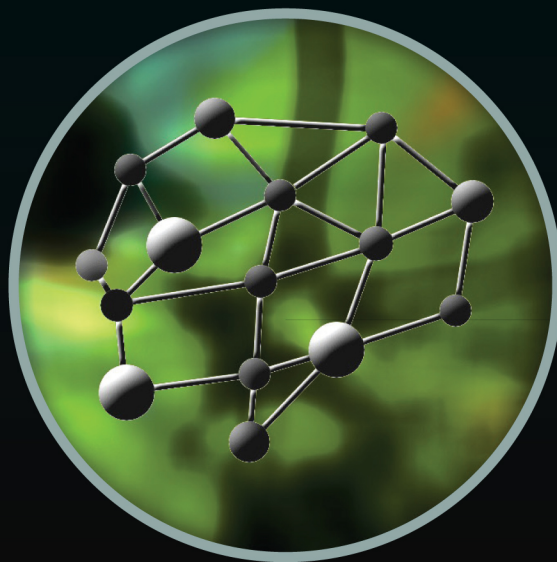


Psychometrics and Psychological Assessment

Principles and Applications



Carina Coulacoglou
Donald H. Saklofske



Psychometrics and Psychological Assessment

Page left intentionally blank

Psychometrics and Psychological Assessment

Principles and Applications

Carina Coulacoglou

Donald H. Saklofske



ACADEMIC PRESS

An imprint of Elsevier

Academic Press is an imprint of Elsevier
125 London Wall, London EC2Y 5AS, United Kingdom
525 B Street, Suite 1800, San Diego, CA 92101-4495, United States
50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States
The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, United Kingdom

Copyright © 2017 Elsevier Inc. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

Library of Congress Cataloging-in-Publication Data

A catalog record for this book is available from the Library of Congress

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library

ISBN: 978-0-12-802219-1

For information on all Academic Press publications visit our website at
<https://www.elsevier.com/books-and-journals>



Publisher: Nikki Levy

Acquisition Editor: Nikki Levy

Editorial Project Manager: Barbara Makinster

Production Project Manager: Caroline Johnson

Designer: Matthew Limbert

Typeset by Thomson Digital

Contents

| | | | |
|---|-----------|---|-----------|
| Preface | xiii | Summary | 19 |
| | | References | 20 |
| Part I | | 2. Classical Test Theory, Generalizability Theory, and Item Response Perspectives on Reliability | |
| Psychometric Foundations of Test Construction and Psychological Assessment | | Basic Concepts of Reliability | 27 |
| 1. Recent Advances in Psychological Assessment and Test Construction | | Sources of Unreliability | 28 |
| Milestones in Psychological Assessment in the 20th Century | 3 | Reliability Estimation in a Multilevel | |
| Advances in Psychological Assessment in the 21st Century | 4 | Confirmatory Factor Analysis Framework | 28 |
| Advances in Reliability | 4 | Single-Level Reliability Estimation Using Structural Equation Modeling | 29 |
| Advances in Validity | 4 | Alpha (α) | 29 |
| Advances in Latent Variable Measures | 6 | Composite Reliability | 29 |
| Advances in Theory of Mind | 6 | Maximal Reliability | 29 |
| Advances in Temperament and Personality | 6 | Multilevel Reliability | 29 |
| Advances in Parenting Research | 7 | Reliability Generalization | 30 |
| Advances in Psychopathology | 8 | Classical Test Theory and the Rasch Model | 30 |
| Advances in Taxonomies and Measures | 8 | Generalizability Theory (GT) | 31 |
| Advances in Violence Risk Assessment | 9 | Examining and Validating Test Dimensionality | 32 |
| Advances in Mental Illness and Violence | 10 | Item Response Theory | 33 |
| Advances in Suicide Research | 10 | MIRT Models | 33 |
| Test Usage | 10 | An Extended Multidimensional IRT Formulation for the Linear Item Factor Analysis Model | 34 |
| Test Construction | 11 | Advantages of IRT | 34 |
| Data Collection and Administration | 11 | IRT Models | 35 |
| Nomothetic Versus Idiographic Approaches to the Analysis of Clinical Data | 13 | Empirical Studies Using IRT | 36 |
| Types of Tests | 14 | Developments and Types of Reliability | 36 |
| Maximum Performance Tests | 14 | Internal Consistency | 37 |
| Typical Performance Tests | 15 | Consistency in Scoring | 38 |
| Test Domain | 16 | Summary | 40 |
| Using Focus Groups and Rasch Item Response Theory to Improve Response Format | 17 | References | 40 |
| Psychometric Properties | 18 | 3. Validity | |
| Measurement Invariance | 18 | Historical and Theoretical Developments of Validity | 45 |
| Tests of Aspects of Measurement Invariance | 18 | Assessing Measurement Invariance | 47 |
| Tests of Aspects of Structural Invariance | 19 | Construct Validity and Messick's Unified Approach | 47 |
| Bias in Psychological Assessment | 19 | Models Against the Unitary Conceptualization of Validity | 48 |

| | | | |
|--|-----------|---|------------|
| Types of Evidence-Based Validity | 52 | Potential Causes of Measurement Noninvariance | 79 |
| Validity Evidence Based on Consequences for Testing | 52 | Considerations When Testing Measurement Invariance | 79 |
| Validity Evidence Based on Test Content | 54 | Assessing Model Fit | 79 |
| Face Validity | 55 | Assessing Measurement Invariance of Scales | 80 |
| Validity Evidence Based on Associations with Other Variables | 55 | Assessing MI/DIF with Multiple Groups Models | 80 |
| Empirical Applications of the Validity with Other Variables | 56 | Key Concepts in Network Analysis | 80 |
| Validity Evidence Based on Internal Structure | 57 | Network Analysis and Psychopathology | 81 |
| Factor Analysis | 58 | Summary | 82 |
| Interpretations and Naming of Factors | 59 | References | 82 |
| Empirical Applications of Internal Structure Validity | 59 | | |
| Validity Evidence Based on Response Processes | 60 | | |
| The Special Case of Cultural Validity | 62 | | |
| Summary | 63 | | |
| References | 63 | | |
| | | Part II | |
| | | Metacognitive, Cognitive, Social | |
| | | Cognitive, Memory, and Behavioral | |
| | | Implications of Neurodevelopmental | |
| | | Disorders | |
| 4. Advances in Latent Variable Measurement Modeling | | 5. Executive Function, Theory of Mind, and Adaptive Behavior | |
| Latent Variable Mixture Modeling | 67 | Executive Function | 91 |
| Growth Mixture Modeling: A General Framework | 68 | The Assessment of Executive Function | 93 |
| Latent Growth Curve Models | 68 | Cognitive Flexibility and Set Shifting | 94 |
| Latent Change Score Models | 69 | Measures of Cognitive Flexibility/Set Shifting | 94 |
| Growth Mixture Models | 69 | Response Inhibition | 95 |
| The Unique Means GMM: The Latent Class Growth Model | 69 | Working Memory | 95 |
| The Unique Means Shared Variance GMM | 70 | Comprehensive Measures of Executive Function | 97 |
| The Unique Means, Variances, and Patterns GMM | 70 | Empirical Research on Executive Function | 99 |
| Latent Class Analysis | 70 | Theory of Mind and Mindblindness Theory | 101 |
| LCA for Developmental Research | 71 | The Relationship Between Theory of Mind and Relational Frame Theory | 102 |
| Studying Personality Longitudinally: Different Conceptions of Change | 71 | Developmental Functions of ToM | 102 |
| Multitrait-Multimethod Analysis in Longitudinal Research | 72 | ToM Across the Life Span Advancement | 103 |
| Longitudinal CFA-MTMM Models | 72 | The Reciprocal Relationship Between Executive Functions and Theory of Mind | 106 |
| Exploratory Factor Analysis and Confirmatory Factor Analysis | 73 | The Assessment of ToM | 106 |
| Exploratory Structural Equation Modeling | 73 | ASD and ToM | 109 |
| Applying Bifactor Statistical Indices in the Evaluation of Psychological Measures | 74 | ToM as a Severity Index in ASD | 109 |
| An Integrative Framework to Investigate Sources of Construct-Related Multidimensionality | 75 | ToM Assessment Measures for ASD Disorders | 110 |
| Factor Mixture Models | 75 | Historical Background of Adaptive Behavior | 111 |
| Factor Mixture Models in Examining the Latent Structure of Personality Disorders | 76 | Meanings of Intelligence and Adaptive Behavior | 112 |
| Mediation Analysis in Clinical Psychology | 77 | Adaptive Behavior, Executive Function, and ASD | 113 |
| Mediation Models for Longitudinal Data | 78 | Measures of Adaptive Behavior | 114 |
| Testing Measurement Invariance | 78 | Adaptive Behavioral Assessment System, 2nd Edition | 114 |
| Comparing Latent Factor Means and Structural Coefficients | 79 | Scales of Independent Behavior–Revised | 114 |
| | | Vineland Adaptive Behavior Scales, 2nd Edition (VABS-II) | 115 |
| | | The Diagnostic Adaptive Behavior Scale (DABS) | 115 |
| | | Behavior Assessment System for Children | 115 |
| | | Performance Measures | 116 |

| | | | |
|---|------------|---|------------|
| Empirical Studies | 116 | Models and Measures of Temperament | 160 |
| Conceptual Reasoning, Problem Solving, and Adaptive Ability in ASD | 116 | Traditional Models of Temperament | 161 |
| Association Between ADHD and ASD | 117 | The Behavioral Styles Approach | 161 |
| Comparison of Adaptive Behavior Measures for Children with HFASDs | 117 | The Criterial Approach | 161 |
| Longitudinal Studies of Adaptive Behavior and Executive Functions in ASD | 118 | The Emotion Regulation Model | 161 |
| Adaptive Functioning and IQ in Schizophrenia Spectrum Disorders | 118 | The Tridimensional Temperament Model | 163 |
| Summary | 118 | The Neurobiological Developmental Approach | 163 |
| References | 119 | Kagan's Behavioral Inhibition Model | 166 |
| | | Contemporary Models of Temperament | 167 |
| 6. Metacognition, Empathy, and Cognitive Biases in Schizophrenia and OCD | | Regulative Theory of Temperament | 167 |
| Metacognition and Social Cognition | 131 | Akiskal Affective Temperaments Model | 167 |
| The Interplay Between Social Cognition and Schizophrenia | 132 | Functional Ensemble of Temperament Model | 168 |
| Metacognitive Models and Assessment Measures in OCD | 133 | Temperament and Culture | 169 |
| Empathy | 135 | Temperament and Psychopathology | 170 |
| The Neuroscience of Empathy | 136 | Attachment, Temperament, and Personality Disorders | 171 |
| Measures of Empathy | 137 | Depression, Temperament, and Cognition | 171 |
| Cognitive Biases | 137 | Temperament/Character Traits of ODD and ADHD | 173 |
| Cognitive Biases as Departures from Normative Models of Rationality | 137 | Temperament and Parenting Practices and ADHD | 173 |
| Types and Patterns of Cognitive Biases | 138 | Temperament and Autism Spectrum Disorders | 174 |
| Theoretical Models of Delusions and Cognitive Biases in Psychotic Disorders | 138 | Temperament and its Relation to Schizophrenia | 174 |
| Hostile Attributional Bias | 140 | Temperament, Coping, and Resilience | 175 |
| Attributional Style or Bias | 140 | Summary | 176 |
| Cognitive Processes in OCD | 141 | References | 176 |
| Cognitive Biases in OCD | 142 | | |
| Attentional Bias in Euthymic BD | 143 | | |
| Cognitive Bias and Metacognitive Training in Schizophrenia | 143 | 8. The Assessment of Family, Parenting, and Child Outcomes | |
| Summary | 146 | The Significance of Family Context | 187 |
| References | 146 | Family Assessment Models and Their Measures | 188 |
| | | Process Model | 188 |
| | | McMaster Model | 189 |
| | | Circumplex Model of Marital and Family Systems | 189 |
| | | Beavers System Model of Family Functioning | 190 |
| | | Darlington Family Assessment System | 190 |
| | | The Assessment of Parenting | 191 |
| | | Advances in Parenting Research | 191 |
| | | A Historical Overview of Parenting Dimensions | 192 |
| | | Parenting Styles and Behaviors | 192 |
| | | Affective Dimensions of Parenting | 193 |
| | | Aspects of Parenting | 194 |
| | | Dyadic Interactions Between Parent and Child | 194 |
| | | Parental Stress and Maternal Depression | 199 |
| | | Family Resilience | 199 |
| | | Positive Adaptation in Children and Families | 201 |
| | | | |
| Part III | | | |
| Temperament, Personality and Their Clinical Implications | | | |
| | | | |
| 7. The Role of Temperament in Development and Psychopathology | | | |
| Temperament and Personality in Childhood | 157 | | |
| Basic Temperament Traits and Types | 158 | | |
| The Relationship Between Temperament and the Big Five Factors | 159 | | |

| | | | |
|---|------------|--|------------|
| Methods of Family Assessment | 202 | Personality and Resilience | 248 |
| Observational Procedures | 202 | Measures of Resilience | 250 |
| Interviews, Self-Reports, and Other Report Inventories | 202 | The Role of Humor in Coping and Adaptation | 251 |
| Measures of Parenting Behavior | 203 | Summary | 252 |
| Marital Inventories | 204 | References | 252 |
| Measures of Dyadic Interactions | 205 | | |
| Measures for Predicting Child Abuse | 205 | 10. Measures of Personality | |
| The Assessment of Externalizing and Internalizing Problems | 208 | Personality Assessment | 267 |
| Measures for Assessing Externalizing Behavior | 208 | Self-Report Inventories | 268 |
| Internalizing Problems | 211 | The Big Five in Personality Questionnaires | 268 |
| Measures | 212 | The Sixteen Personality Factor Questionnaire Fifth Edition | 269 |
| Summary | 213 | The Myers–Briggs Type Indicator | 269 |
| References | 213 | Multidimensional Personality Questionnaire | 270 |
| | | Severity Indices of Personality Problems | 271 |
| | | Cross-Cultural Measures | 272 |
| 9. Perspectives and Advances in Personality | | The Cross-Cultural (Chinese) Personality Assessment Inventory | 272 |
| Recent Advances in Personality Research Integrating Personality, Intelligence, and Cognitive Abilities | 223 | Multicultural Personality Questionnaire | 273 |
| The Cognitive Implications of Personality and Related Models | 225 | Sources of Bias in Testing | 274 |
| The Situation Construal Model | 226 | Respondent Bias | 274 |
| Causes and Evaluation Models of Personality Stability and Change | 227 | Examiner Bias | 275 |
| Stability and Social Personality Models | 229 | Researcher Bias | 275 |
| Continuity and Stability of Personality Traits Across the Life-Span | 229 | Performance-Based Tests | 276 |
| Intraindividual Change in Personality Stability | 231 | Rorschach Inkblot Method: New Interpretation Systems, Developments in Psychometric Properties, and Criticisms | 277 |
| Subjective Age and Personality Development | 232 | Thematic Apperception Test and the SCORS-G Assessment System | 279 |
| The Five-Factor Model—A Landmark in Personality Trait Models | 232 | The Fairy Tale Test: A Novel Personality Test for Children | 280 |
| Origins and Descriptions of the FFM | 232 | Summary | 283 |
| Criticisms of the Big Five | 235 | References | 283 |
| Alternative Personality Trait Models | 236 | | |
| Personality and Culture | 238 | Part IV | |
| Cross-Cultural Variability in Levels of Personality Traits | 239 | Developments in the Domains of Psychopathology, Psychiatric Taxonomies and Assessment of Clinical Disorders | |
| Cultural Issues Regarding Relatedness and Self-Definitions | 239 | | |
| Etic and Emic Approaches | 240 | 11. Advances in Theoretical, Developmental, and Cross-Cultural Perspectives of Psychopathology | |
| When Personality Goes Astray: From Personality to Personality Disorders | 242 | Theoretical Developments, Modifications, and Accomplishments in Psychopathology | 293 |
| Models of Psychopathology and Personality Traits | 243 | Emotion Regulation and Psychopathology | 294 |
| Hierarchical Models of Personality and Psychopathology | 244 | The Temporal Dynamics of Emotions | 294 |
| The General Factor of Personality | 245 | The Process Model of Emotion Regulation | 295 |
| Etiological Models of Personality and Psychopathology | 245 | Distress Tolerance and Emotion (Dys)Regulation | 296 |
| Two-Polarities Models of Personality Development | 247 | Metaanalytic Studies of Emotion Regulation | 296 |
| | | Cognitive Emotion Regulation | 296 |
| | | Cognitive Emotion Regulation Across Cultures | 298 |

| | | | |
|--|------------|---|------------|
| The Psychopathology of Intellectual Disabilities | 300 | Alternative Models For Psychiatric Taxonomies | 350 |
| The Assessment for Dual Diagnosis | 300 | <i>DSM-5</i> Alternative Personality Disorder Model | |
| Developmental Behavior Checklist | 300 | Traits Using Item-Response Theory Analysis | 350 |
| Diagnostic Assessment for the Severely Handicapped | 300 | Research Domains Criteria Project | 351 |
| Nisonger Child Behavior Rating Form | 301 | The <i>Psychodynamic Diagnostic Manual</i> Version 2 | 353 |
| Psychiatric Assessment Schedule for Adults with a Developmental Disorder | 301 | A Psychodynamic or Structural Model of Psychopathology | 355 |
| Psychopathology Instrument for Adults with Mental Retardation | 301 | Cognitive-Affective Processing System | 356 |
| Reiss Screen for Maladaptive Behavior | 302 | A Network Approach to Environmental Impact in Psychotic Disorders | 357 |
| Developmental Psychopathology | 302 | General Psychopathology Factor (<i>p</i> Factor) | 359 |
| Advances in Mental Health Issues in Infancy | 303 | Developments in Clinical Assessment | 360 |
| Recent Achievements in Developmental Psychopathology | 307 | Interviews | 361 |
| Assessment Methods of Infants and Preschoolers | 309 | The Diagnostic Interview Schedule for Children | 361 |
| Exploring the Psychosis Continuum | 313 | Computerized Diagnostic Interview Schedule for Children | 362 |
| Childhood Adversities and Psychosis: The Traumagenic Neurodevelopmental Model | 314 | The Structured Clinical Interview for <i>DSM-5</i> | 362 |
| Existential Anxiety and Unusual Subjective Experience | 314 | The Diagnostic Interview for <i>DSM-IV</i> Personality Disorders | 364 |
| Death Anxiety as a Transdiagnostic Construct | 314 | The Structured Interview for <i>DSM-IV</i> Personality Disorders | 364 |
| Existential Anxiety and the Phenomenon of Psychotic-Like Experiences | 315 | Self-Report Assessment | 364 |
| Recent Advances in Schizophrenia Spectrum Disorders and Other Psychotic Disorders | 317 | Minnesota Multiphasic Personality Inventory-2 Restructured Form | 364 |
| The Neurological Substrate of Psychiatric Disorders | 317 | Millon Clinical Multiaxial Inventory | 365 |
| The Role of Schizotypy in the Schizophrenia Spectrum Disorder | 318 | The Personality Assessment Inventory | 365 |
| Personality Disorders and Schizotypal Traits in Daily Life | 318 | The Shedler–Westen Assessment Procedure | 366 |
| Cognitive Assessment in Schizophrenia | 319 | Dimensional Assessment of Personality Pathology: Basic Questionnaire, Short Form, and DAPP-90 | 367 |
| Cross-Cultural Perspectives and Advances in Mental Illness | 320 | The Schedule for Nonadaptive and Adaptive Personality and SNAP Youth | 368 |
| The Cultural Context of Psychopathology | 320 | The Personality Inventory for the <i>DSM-5</i> | 369 |
| The Role of Culture in the Development of Specific Disorders | 322 | The Child Problematic Traits Inventory | 369 |
| Coping and Psychopathology | 323 | The Personality Psychopathology Five | 370 |
| Models of Coping | 323 | Summary | 371 |
| Coping Strategies | 324 | References | 371 |
| Resilience and Self-Compassion | 324 | | |
| Summary | 325 | | |
| References | 326 | | |
| 12. Psychiatric Taxonomies and Corresponding Measures | | Part V | |
| Traditional Psychiatric Taxonomies and Alternative Perspectives | 343 | Aggression and Violence: Efforts to Predict their Outcomes | |
| A Historical Review on the Metastructure of Mental Disorders | 343 | | |
| <i>DSM</i> —Recent Evaluations, Criticisms, and Proposals | 346 | 13. Theoretical Perspectives of Criminal Behaviors and Developmental Criminology | |
| Psychiatric Diagnosis Across Cultures | 349 | Introduction | 383 |
| | | Antisocial Thinking, Attitudes and Criminal Thinking | 384 |
| | | Theories of Criminal Behavior | 385 |
| | | Biological and Trait Theories | 385 |
| | | Personality Theories of Criminal Behavior | 386 |

| | | | |
|---|------------|--|------------|
| An Overview of Developmental Criminology | 387 | Reporting Risk Assessment | 419 |
| Developmental Theories of Criminal Behavior | 388 | Specialized Measures for Dangerousness Risk Assessment | 420 |
| Moffitt's Developmental Taxonomy | 389 | General Violence | 420 |
| Sampson and Laub's Age-Graded Theory of Informal Social Control and Cumulative Disadvantage | 390 | Violence Risk Assessment Guide | 420 |
| Farrington's Integrated Cognitive Antisocial Potential Theory | 390 | Structured Assessment of Protective Factors for Violence Risk | 421 |
| Catalano and Hawkins Social Development Model | 391 | The Classification of Violence Risk | 422 |
| Intelligence and Criminal Behavior | 391 | The Historical Clinical Risk Management-20—3rd Edition | 422 |
| High IQ and Crime | 392 | Level of Service Inventory Revised | 423 |
| Risk and Protective Factors | 393 | The Short-Term Assessment of Risk and Treatability | 423 |
| Measures | 394 | Two-Tiered Violence Risk Estimates | 424 |
| Summary | 398 | Sexual Violence | 424 |
| References | 399 | Sex Offender Risk Appraisal Guide | 424 |
| | | Static-99, Static-99R, Static-2002R | 425 |
| | | Sexual Violence Risk-20 | 425 |
| | | The Violence Risk Scale—Sexual Offender Version | 426 |
| 14. General Overview of Violence Risk Assessment and Corresponding Measures | | Youth Violence | 426 |
| Historical Overview and Violence Risk Assessment Framework | 405 | Structured Assessment for Violence Risk in Youth | 426 |
| Developments in Assessment Approaches of Risk Prediction | 406 | Personality Measures | 427 |
| Unstructured Clinical Judgment Approach | 406 | Personality Assessment Inventory | 427 |
| Actuarial Risk Assessment Approach | 406 | The Rorschach Performance Assessment System in Risk Assessment | 428 |
| Structured Professional Clinical Judgment Approach | 407 | Summary | 430 |
| The Dynamic-Actuarial Approach | 407 | References | 430 |
| The Integrated-Actuarial Approach | 407 | | |
| The 4 Generations Theory of Instrument Development | 408 | 15. The Aggressive Implications of Suicide | |
| Risk Factors | 408 | An Overview of Suicide | 439 |
| Causes of Offending | 409 | Aggressive Suicide | 440 |
| Promotive and Protective Factors | 409 | Risk Factors of Suicide | 441 |
| Risk–Need–Responsivity Model | 410 | Personality and Suicidality | 443 |
| The Eight Central Classification | 411 | Suicide, Aggression, and Impulsivity | 443 |
| Issues in the Accuracy of Violence Risk Assessment | 412 | Studies on the Relationship Between Aggression, Self-Harm, and Suicide | 444 |
| Predictive Validity of Violence Risk Assessment | 413 | Theories of Suicide and Corresponding Measures | 445 |
| Issues in the Prediction and Assessment of Violence | 414 | Psychological Pain Theories | 445 |
| Metaanalytic Studies of Violence Risk Assessment | 415 | Suicide as an Escape From Self | 446 |
| Cross-Cultural Applications of Risk Assessment: The Case of China | 417 | Arrested Flight Model (Cry of Pain) | 446 |
| Overview of Violence Risk Assessment Measures | 417 | Cognitive Theories | 446 |
| Purpose, Structure and Validation of Instruments | 418 | Hopelessness Theory and the Comprehensive Cognitive Model | 446 |
| Selecting an Instrument | 419 | Fluid Vulnerability Theory | 448 |
| | | Schematic Appraisal Model of Suicide | 449 |
| | | Diathesis Stress Theories | 449 |
| | | Clinical Biological Models of Suicidal Behavior | 450 |
| | | Interpersonal Theory | 450 |

| | | | |
|--|------------|--|------------|
| Integrated Motivational-Volitional Model of Suicidal Behavior | 451 | Stream Analogy for Lethal Violence | 456 |
| Three-Step Theory | 452 | The Assessment of Suicide | 456 |
| The Cultural Model of Suicide and Suicide Risk Assessment | 452 | Challenges to Suicide Assessment | 457 |
| The Cultural Assessment of Risk for Suicide Measure | 453 | Review of Measures of Suicide | 457 |
| Principles and Theories of Homicide-Suicide | 453 | Measures of Suicide Ideation and Behaviors | 457 |
| Psychoanalytic Theories of Homicide-Suicide | 454 | Protective Factors and Resilience | 459 |
| Two-Stage Model of Outward and Inward Directed Aggression | 455 | Measures of Resiliency Against Suicide Ideation | 460 |
| Strain Theories | 455 | Summary | 463 |
| | | References | 463 |
| | | Index | 473 |

Page left intentionally blank

Preface

Test development is a compound, demanding, and challenging field. There is a continuous burgeoning of instrument development in a coordinated effort to grasp the manifold and unpredictable human nature. A comprehensive psychological assessment comprises a variety of psychological instruments, and therefore test development is of fundamental importance. The ultimate goal of psychological assessment is to predict, impede, or moderate the alarming outcomes of mental illness.

This current book is a comprehensive volume on recent developments in the fields of psychometric and psychological assessment. Topics are examined from a broad spectrum of theoretical perspectives or models. Most of the proposed models are supported by metaanalytic studies and a plethora of psychometric tools. More specifically, this book explores the cognitive and social cognitive aspects of neurodevelopmental disorders, with special emphasis on executive functions, theory of mind, and cognitive biases; the role of temperament in personality and psychopathology; the impact of parenting and family on child development and, in particular, on internalizing and externalizing problems; and finally, an entire part is allocated to the assessment of risk for violence and the development of measures to estimate the degree of risk for violence. A developmental perspective on violence is also examined in the section on developmental criminology. Of special interest is the chapter on the aggressive implications of suicide.

A unique feature of this book is the highlighting of the role of cognitive abilities in the assessment of personality and psychopathology. In addition, the roles of coping and resilience, their novel methods of assessment, and their contributions to treatment planning are detailed. Furthermore, this book illustrates the role culture has in attaining an accurate psychological assessment. An accurate psychological assessment magnifies the chances for successful therapeutic interventions.

While writing this book I sometimes strayed from my original design, carried away by intellectual curiosity and an explorative nature. My scientific Odyssey proved fascinating and rewarding, as at every turn there was a revelation.

I hope that readers will have a similar experience.

Many thanks to my coauthor Don Saklofske whose help in conceptualizing the book and editing the chapters helped bring it to its finished state.

Carina Coulacoglou

Page left intentionally blank

Part I

Psychometric Foundations of Test Construction and Psychological Assessment

| | | | |
|--|----|---|----|
| 1. Recent Advances in Psychological Assessment and Test Construction | 3 | 3. Validity | 45 |
| 2. Classical Test Theory, Generalizability Theory, and Item Response Perspectives on Reliability | 27 | 4. Advances in Latent Variable Measurement Modeling | 67 |

Page left intentionally blank

Chapter 1

Recent Advances in Psychological Assessment and Test Construction

Chapter Outline

| | | | |
|---|-----------|--|-----------|
| Milestones in psychological assessment in the 20th century | 3 | Nomothetic versus idiographic approaches to the analysis of clinical data | 13 |
| Advances in psychological assessment in the 21st century | 4 | Types of tests | 14 |
| Advances in reliability | 4 | Maximum performance tests | 14 |
| Advances in validity | 4 | Typical performance tests | 15 |
| Advances in latent variable measures | 6 | Test domain | 16 |
| Advances in theory of mind | 6 | Using focus groups and Rasch item response theory to improve response format | 17 |
| Advances in temperament and personality | 6 | Psychometric properties | 18 |
| Advances in parenting research | 7 | Measurement invariance | 18 |
| Advances in psychopathology | 8 | Tests of aspects of measurement invariance | 18 |
| Advances in taxonomies and measures | 8 | Tests of aspects of structural invariance | 19 |
| Advances in violence risk assessment | 9 | Bias in psychological assessment | 19 |
| Advances in mental illness and violence | 10 | Summary | 19 |
| Advances in suicide research | 10 | References | 20 |
| Test usage | 10 | | |
| Test construction | 11 | | |
| Data collection and administration | 11 | | |

MILESTONES IN PSYCHOLOGICAL ASSESSMENT IN THE 20TH CENTURY

The early origins of psychological testing may be traced in ancient times, when the Chinese emperors had their officials examined to determine their mental state. Focusing on the origins of testing in the early part of the 20th century, Alfred Binet (1859–1911) pioneered the development of the first intelligence scale, the Binet–Simon Scale published in 1905. In collaboration with Lewis Terman (1877–1956) they adapted the test, which became known as the Stanford–Binet Intelligence Scale. The Stanford–Binet Intelligence Scale is a direct descendent of the Binet–Simon Scale and was published in 1916.

The prototype of projective methods is the Rorschach Inkblot Method developed by Hermann Rorschach in 1918. The Rorschach was designed to assess Jung’s psychological types as these were reflected on a series of inkblots, whereby the patient was asked to provide a concrete description to an abstract design (inkblot).

Another classic projective measure is the Thematic Apperception Test (TAT; Murray, 1938). The TAT consists of 31 cards that depict black and white drawings of everyday life activities. The Rorschach became the paradigm of what Lindzey (1959) called association techniques and the TAT became the paradigm of thematic techniques.

Two years later David Wechsler published the first edition of the Wechsler Intelligence Scales (Wechsler, 1939). The Wechsler–Bellevue Intelligence Scale contained several innovations and improvements in comparison to the Binet Scales (Terman, 1916). Wechsler’s tool yielded two scales with corresponding IQs: the Verbal and the Performance Scales and a Total IQ.

Another contribution to modern assessment was provided by Emil Kraepelin (Zilboorg & Henry, 1941). Kraepelin classified individuals with psychological disorders into several dozen different types of diagnostic categories. The DSM III-R (APA, 1987) is the current version of Kraepelin’s late 19th-century system.

A new era in structured personality testing began with the advent of the Minnesota Multiphasic Personality Inventory (MMPI) in 1943. The MMPI along with its updated version the MMPI-2RF (Ben-Porath & Tellegen, 2008) is the most widely used and referenced personality test (Wise, Streiner, & Walfish, 2010). During the same period, many personality measures were developed based on factor analysis, such as the 16 Personality Factor (16PF), a self-report questionnaire developed by R.B. Cattell in the 1940s (Cattell, 1943).

The late 1940s and 1950s were considered as the golden period in psychological assessment, particularly in the USA. The statistical method of factor analysis was widely applied in test construction and validity studies. By the 1950s the major forms of psychological tests aimed at the assessment of behavioral differences.

During the 1950s and 1960s, new tests were designed primarily of the self-report inventory and behavior scale types, which addressed other domains apart from intelligence and personality, such as attitudes, achievement, temperament, or aggression. Moreover, during the same time the first cross-cultural adaptations of well-known tests emerged, as well as the developments and adaptations of instruments for younger populations.

The period between 1960 and 1990 focused more on the assessment of cognitive, memory, and related neuropsychological functions (e.g., the Wechsler Intelligence and Memory Scales and the Luria and Halstead–Reitan Batteries were developed). In the 1970s computers were introduced in test administration and interpretation of results. Generalizability theory (Cronbach, Rajaratnam, & Gleser, 1963) was conceptualized as a means to evaluate the reliability of behavioral measures, while factor and confirmatory analysis were applied to test construction and in particular to the study of construct validity. In the 1980s emphasis was placed in item selection and item development. As a result item response theory (IRT) was formulated. With IRT a person's responses to a set of items are used to estimate his or her level on a particular latent trait (Lindhiem, Kolko, & Yu, 2013).

In the decade of the 1980s the Achenbach System of Empirically Based Assessment system was developed through the pioneering work of Thomas Achenbach and his colleagues. These researchers developed behavioral dimensions to classify behavioral problems through the use of refined rating scales with empirically derived factor structures. During the same time the development of instruments that assessed aspects of family functioning were developed in conjunction with the development of family functioning models. Some of the most popular instruments included the Family Environment Scale (May, 1986) and the McMaster Family Assessment Device (Epstein, Baldwin, & Bishop, 1983). Another major advent of the 1980s was the formulation of the five factor model. The big five factor model (Digman, 1990) predominated in the field and became a landmark in its ability to conceptualize personality as a hierarchical structure. The most popular self-report inventory that operationalized the big five factor model is the NEO-PI (Costa & McCrae, 1985) and its more recent versions the NEO-PI-R (Costa & McCrae, 1992) and the NEO-PI-3 (McCrae & Costa, 2010) (Table 1.1).

ADVANCES IN PSYCHOLOGICAL ASSESSMENT IN THE 21ST CENTURY

Advances in reliability

Methodological developments have bridged the concept of reliability between the IRT and classical test theory (CTT) frameworks and discussed concepts that have traditionally been reserved for IRT. Culpepper (2013) further elaborates the relationship between CTT and IRT. Rasch model theory methods assess the extent to which observed clinical outcome assessment data “fit” with predictions of those ratings from the Rasch model (Andrich, 2011).

An extensive body of research has investigated the effect of the number of scales categories on the corresponding reliability of total scores using empirical data (e.g., Adelson & McCoach, 2010), Monte Carlo simulations (e.g., Aguinis et al., 2010), and analytic derivations (Krieg, 1999). Methodological advances have bridged the concept of reliability between the IRT and CTT frameworks (e.g., Culpepper, 2013). In a seminal article Vacha-Haase (1998) proposed the concept of reliability generalization as an extension of validity generalizability (Schmidt & Hunter, 1977; Hunter & Schmidt, 1990). A topic that has attracted the attention of researchers is Cronbach's alpha (e.g., Sijtsma, 2009). More recently, Zumbo, Gadermann, and Zeisser (2007) introduced an ordinal alpha.

Advances in validity

Developments have occurred in the various types of validity. For example, in criterion-related validity we may have two types of criteria, observable (e.g., high grades) and unobservable (e.g., school phobia). In the case of an unobservable criterion, the validity coefficient is referred to as an index of construct validity (Bornstein, 2011). Sireci and Faulkner-Bond (2014) employ the terms “validity evidence-based on test content” and “content validity evidence.” Other ratings are employed as an add-on to criterion validity as a method in predictive validity and in accuracy assessment or may also serve as a useful index in the study of concurrent validity.

TABLE 1.1 A Detailed Historical Account of Psychological Assessment

| | |
|------|---|
| 1890 | The term “mental test” was first used by James McKeen Cattell. |
| 1905 | Alfred Binet & Theodore Simon create the first test of intelligence for use with children. |
| 1914 | Stern introduces the Intelligence Quotient (IQ): the mental age divided by chronological age. |
| 1916 | Lewis Terman publishes the Stanford–Binet test, based on the pioneering work of Binet–Simon. |
| 1917 | Robert Woodworth develops the first self-report personality questionnaire—the Army Alpha and Army Beta tests were developed for selection of military service in the USA. |
| 1920 | The Rorschach Inkblot test is published. |
| 1927 | The first version of the Strong Vocational Interest Blank is published. |
| 1935 | Henry Murray publishes the Thematic Apperception Test (TAT). |
| 1936 | The nonverbal cognitive test, Raven Progressive Matrices is published. |
| 1938 | Oscar Buros publishes the first compendium of psychological tests, the Mental Measurements Yearbook. |
| 1939 | David Wechsler develops an individual test of adult intelligence—the Wechsler–Bellevue Intelligence Scale. |
| 1943 | The Minnesota Multiphasic Personality Inventory (MMPI) is published to assist the differential diagnosis of psychiatric disorder. |
| 1945 | The Wechsler Memory Scale is published. |
| 1949 | The Wechsler Intelligence Scale for Children is published. |
| 1949 | The 16PF Questionnaire is published by Raymond Cattell. |
| 1957 | The California Psychological Inventory (CPI) is published by Gough. |
| 1961 | The Beck Depression Inventory is published. |
| 1962 | The Meyers Briggs Type Indicator published by K. Briggs and I. Briggs. |
| 1967 | The Wechsler Preschool and Primary Scale of Intelligence (WPPSI) developed by David Wechsler. |
| 1969 | The Bayley Scales of Infant Development are published. |
| 1975 | The Eysenck Personality Questionnaire (EPQ) is published. |
| 1976 | Dyadic Adjustment Scale (DAS) is developed by Spanier. |
| 1977 | The Millon’s Clinical Multiaxial Inventory is published. |
| 1978 | Establishment of the International Test Commission. |
| 1980 | Costa & McCrae developed the NEO Personality Inventory. |
| 1982 | Multidimensional Personality Questionnaire (MPQ) developed by Tellegen. |
| 1983 | The Achenbach System of Empirically Based Assessment is developed. |
| 1984 | The Vineland Adaptive Behavior Scales (VABS) is published. |
| 1984 | The Child Adaptive Behavior Inventory is published. |
| 1985 | Publication of the first edition of the <i>Standards for Educational and Psychological Testing</i> . |
| 1985 | The NEO-PI is published by Costa & McCrae. |
| 1988 | Beck Hopelessness Scale is developed by A.T. Beck. |
| 1990 | The Big Five Factor Model is published by Digman. |
| 1991 | The Hope Scale is developed by Snyder, Anderson, Holleran, Irving, Sigmon, Yoshinobu, Gibb, Langelle, and Hamey. |
| 1991 | The Personality Assessment Inventory is created by Morey. |
| 1996 | Reuven Bar-On introduced the Emotional Quotient. |
| 1996 | The Chinese Personality Assessment Inventory (CPAI) is published by Cheung and Cheung. |
| 1996 | The Beck Depression Inventory–II is developed by Beck, Steer, & Brown. |
| 1998 | The Implicit Association Test (IAT) is introduced. |
| 2000 | The Multicultural Personality Questionnaire (MPQ) by Van Oudenhoven and Van der Zee. |
| 2000 | The Behavior Rating Inventory of Executive Function developed by Gioia, Isquith, Guy, and Kenworthy. |
| 2003 | The Connor-Davidson Resilience Scale developed by Connor and Davidson. |
| 2008 | The Minnesota Multiphasic Personality Inventory-2-Restructured Form published. |
| 2009 | The Trait Emotional Intelligence Questionnaires developed by K.V. Petrides. |
| 2009 | The Research Domain Criteria Project (RDoC) was launched. |
| 2012 | The Personality Inventory for DSM-5 (PID-5) is published by Krueger, Derringer, Markon, Watson, and Skodol. |

Another development in the domain of validity concerns the burgeoning of various modes to enrich or refute a unitary view of validity (e.g., [Messick, 1989](#)). [Messick \(1998\)](#) adopted a unified view of construct validity “as an integrative evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of inferences and actions based on test scores” (p. 13).

[Borsboom, Mellenbergh, and van Heerden \(2004\)](#) conceptualized an attribute variation approach highlighting that changes in an attribute can be linked directly to changes in scores on a test designed to measure that attribute. Bornstein’s process-focused model conceptualized validity as the degree to which respondents can be shown to engage in a predictable set of psychological processes during testing. [Hubley and Zumbo \(2011\)](#) reframed Messick’s unified model.

Advances in latent variable measures

The study of latent variables or factors underlying important psychological constructs, such as personality and psychopathology have captured the attention of researchers for several decades. However, the systematic study of constructs has become more complex and refined since the early 2000s.

A recent development in the study of latent variables is growth mixture models (GMMs). [Masyn, Henderson, and Greenbaum \(2010\)](#) organized factor mixture models (FMMs) along a dimensional categorical spectrum, with factor analysis, a dimensional model, at one end and latent class analysis at the other. GMMs are special cases of the FMM with repeated measures and growth parameterizations. The most basic form of GMMs is the latent growth curve model. In this model two latent factors, intercept and change, are defined from a series of repeated measures. GMMs are valuable in longitudinal studies of personality and psychopathology and in particular in the evaluation of heterogeneity of personality disorders (e.g., [Hallquist & Lenzenweger, 2013](#)).

In addition to GMMs, multitrait-multimethod (MTMM) also enhances the quality of longitudinal research. [Koch, Schultze, Eid, and Geiser \(2014\)](#) introduced a multilevel structural equation model for the analysis of longitudinal MTMM data, the latent state combination of methods model. It was recently observed that measures assessing multidimensional constructs rarely achieve reasonable fit within the independent clusters model of the confirmatory factor analysis approach (e.g., [Marsh, Morin, Parker, & Kaur, 2014](#)).

Another new model of latent structure is mediation analysis, a technique that is commonly employed to establish causality between the predictor and mediator variables (e.g., [MacKinnon & Pirlott, 2015](#)). A novel approach is network analysis, which examines patterns of symptoms dynamics and thus provides insights into the dynamics of psychopathology (e.g., [Bringmann et al., 2013](#)).

Advances in theory of mind

There is an increasing interest in how theory of mind (ToM) is expressed across the life-span. Cumulative evidence indicates that older adults show marked declines in aspects of fluid intelligence. Those aspects include skills, such as working memory, processing speed, and numerical ability. On the other hand, adults show preservation of crystallized aspects of intelligence, such as verbal memory, general knowledge, and vocabulary ([Hedden & Gabrieli, 2004](#)).

Advances in the assessment of ToM include the development of more sophisticated methods. Special attention has been given in the understanding of emotional states by reading the eyes or other facial features. The Reading the Mind in Eyes Test is the most representative task for the decoding of mental states ([Baron-Cohen, Wheelright, Hill, Raste, & Plumb, 2001](#)). Additionally, more comprehensive instruments (instead of single task measures) emerged. Such tools include the ToM battery of [Happé \(1994\)](#), the ToM Test of [Steerneman, Meesters, and Muris \(2002\)](#), the ToM tasks of [Wellman and Liu \(2004\)](#), the ToM tasks of [Tager-Flusberg \(2003\)](#), the Theory of Mind Inventory-II ([Hutchins, Bonazinga, Prelock, & Taylor, 2008](#)), and the Theory of Mind Assessment Scale ([Bosco et al., 2009](#)).

ToM has demonstrated potential as a severity index in autism spectrum disorder. Better ToM scores are associated with improved behavior toward social rules, better social interaction skills, and increased language use.

Advances in temperament and personality

Some of the most widely used temperament scales include the following.

The Early Childhood Behavior Questionnaire ([Putnam, Garstein, & Rothbart, 2006](#)) is a widely used parent-report temperament questionnaire for young children aged 18–36 months. The Toddler Behaviour Assessment Questionnaire ([Goldsmith, 1996](#)) includes 108 items that address five aspects of temperament: Activity Level, Pleasure, Social Fearfulness, Anger Proneness, and Interest/Persistence.

The Children's Behaviour Questionnaire (Rothbart, Ahadi, Hershey, & Fisher, 2001) was developed to provide a highly differentiated caregiver report assessment of temperament in children 3–8 years of age. Domains included in the instrument include positive and negative emotion, motivation, activity level, and attention. Computerized self-report and paper-and-pencil parent-report versions of the Temperament in Middle Childhood Questionnaire (7–10 years) (Simonds & Rothbart, 2004) were used to measure surgency and other temperament constructs.

The Adult Temperament Questionnaire (Evans & Rothbart, 2007) was adapted from the Physiological Reactions Questionnaire developed by Derryberry and Rothbart (1988), and includes general constructs of effortful control, negative affect, extraversion/surgency, and orienting sensitivity.

The Inventory of Children's Individual Differences-Short Form (Deal, Halverson, Martin, Victor, & Baker, 2007) is a 50-item parent report questionnaire measuring childhood personality dimensions.

The Temperament Evaluation of Memphis, Pisa, Paris, and San Diego Autoquestionnaire (TEMPS-A; Akiskal, Akiskal, Haykal, Manning, & Connor, 2005) is a widely used measure of affective temperaments that was translated and validated in many countries over the five continents (e.g., Vazquez, Tondo, Mazzarini, & Gonda, 2012). The TEMPS-A is thought to measure five affective temperaments that define the bipolar spectrum.

In recent years special emphasis has been given to the continuity and stability of personality traits. To investigate *differential stability* longitudinal designs are required, whereas mean-age stability can be examined through longitudinal data (Roberts, Walton, & Viechtbauer, 2006). In addition, mean traits scores from cross-sectional age cohorts can be employed for mean-level stability comparisons (McCrae et al., 2000). *Structural continuity* refers to the invariance of the covariance structure across time and is a prerequisite for the assessment of mean-level stability (Biesanz, West, & Kwok, 2003). *Individual-level change* refers to the magnitude of increase or decrease exhibited by a person on any given trait. *Ipsative stability* refers to the continuity of the configuration of traits within the individual and provides information on the stability of the patterning of traits within a person across time, hence facilitating a person-centered approach to personality development (Robins & Tracy, 2003).

Alternative five factor models include the six-factor HEXACO model (Lee & Ashton, 2005). It comprises the factors of Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience. HEXACO has been operationalized through the design of the HEXACO Personality Inventory (HEXACO-PI and HEXACO-PI-R; Lee & Ashton, 2004) and a shorter, 60-item version, HEXACO-60 (Ashton & Lee, 2008).

The cybernetic big five theory (CB5T) attempts to provide a comprehensive, synthetic, and mechanistic explanatory model of personality (DeYoung, 2015). The fundamental tenet of CB5T is that any comprehensive personality theory should be based on cybernetics, the study of goal-directed, self-regulating systems (DeYoung, 2010; Van Egeren, 2009).

Cheung, van de Vijver, and Leong (2011) argue that a combined emic-etic perspective is needed to expand our understanding of universal personality constructs. To make conceptual advances, the field of personality should illustrate both the universal and culture specific aspects of personality.

Advances in parenting research

The central role that parents play has been emphasized since a long time ago. However, there is an increasing interest in parenting styles, values, and behaviors in specific developmental issues or problems. Theory and research have identified several family factors that play a formative role in children's emotional regulation, including parental responses to the child's affect, the family emotional climate, and interparental functioning (Morris, Silk, Steinberg, Myers, & Robinson, 2007). It is increasingly recognized that the impact of parenting may be moderated by children's biologically based characteristics (e.g., Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011). Findings revealed that children at higher biobehavioral risk were affected by parenting variability (e.g., Kochanska, Brock, Chen, Aksan, and Anderson, 2015).

A recent assessment tool is the Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson, Mandlco, Olsen, & Hart, 2001).

Crooks and Wolfe (2007) suggest a conceptual model to guide assessments of child abuse and neglect. They propose that assessments should be comprehensive and should address the following objectives: (1) identify the general strengths and needs of the family system, (2) assess parental responses to the demands of child rearing, (3) identify the needs of the child, and (4) assess child relationship and abuse dynamics.

Inadequate or problematic parenting may affect children's externalizing or internalizing behavior. New or updated measures of externalizing behavior include the Behavioral and Emotional Screening System (Kamphaus & Reynolds, 2007), the Behavior Assessment System for Children, second edition (Reynolds & Kamphaus, 2004) and the Conners' Scales for Teachers and Parents (Conners, 2008) and the Reactive/Proactive Questionnaire Impulsive/Pre-meditated Aggression Scale (Raine et al., 2006).

New or updated measures for internalizing problems include the Reynolds' Children Depression scale, second edition (Reynolds, 2010) and the Revised Children's Manifest Anxiety Scale, second edition (Reynolds & Richmond, 2008).

Advances in psychopathology

During the last 2 decades there have been systematic efforts in understanding the concept of psychosis continuum (Beer, 1996). The concept of psychosis continuum was triggered by the discovery that a large number of individuals experience psychotic symptoms (van Os, Hanssen, Bijl, & Ravelli, 2000; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009).

Within the domain of developmental psychopathology, the dimensional personality symptom item pool (De Clercq, De Fruyt, & Mervielde, 2003) is the first hierarchically organized and empirically based proposal for describing early personality difficulties. It encompasses developmental equivalents for each of the four adult higher-order dimensions of personality pathology. De Clercq, Van Leeuwen, van den Noortgate, de Bolle, and de Fruyt (2009) extend this dimensional stability perspective toward an earlier developmental stage. Moreover, Wakschlag et al. (2012) proposed a four-dimension developmentally informed model of disruptive behavior disorder in early childhood.

The traumagenic neurodevelopmental model of psychosis (Read, Perry, Moskowitz, & Connolly, 2001) attempts to integrate biological and psychological process in explaining psychotic disorder.

In recent years there is an increasing understanding of the causes and manifestations of cognitive deficits in schizophrenia. Cognitive deficits have been recognized as being fundamentally intertwined with functional outcomes (Kahn & Keefe, 2013).

In particular, cognitive assessment of schizophrenia was largely influenced by the reviews of an exponential research project launched by the NIMH titled "Measurement and Treatment to Improve Cognition in Schizophrenia" (MATRICS). MATRICS identified seven cognitive domains that formed the core factors in the MATRICS Consensus Cognitive Battery (Nuechterlein et al., 2004).

The role of emotion regulation has shed light on psychopathology. The recent extended process model of emotion regulation (Gross, 2015) attempts to delineate central regulatory stages and examines their relation to psychopathology. The Cognitive Emotion Regulation Questionnaire (Garnefski, Kraaij, & Spinhoven, 2001, 2002) evaluates nine cognitive strategies of emotional regulation. The Difficulties of Emotion Regulation Scale (Gratz & Roemer, 2004) assesses emotion regulation deficits.

Advances in psychopathology also include a variety of coping strategies and resilience. Researchers have highlighted the role of self-compassion as an effective resilience mechanism against psychopathology. The Self Compassion Scale (Neff, 2003) assesses trait levels of self-compassion.

Another advancement in the domain of psychopathology concerns the role of culture in the development of specific disorders, such as psychotic and affective disorders and culture-bound syndromes.

Advances in taxonomies and measures

Advances in the domain of psychiatric taxonomies primarily concerns the development of alternative proposals of psychiatric classifications to the DSM-5. One of the most prominent approaches is the Research Domain Criteria Project (RDoC) which was formally launched by the National Institute of Mental Health in 2009. The aim of the RDoC was to transform the current psychiatric framework into an explicitly biological system (Cuthbert, 2014a, 2014b; Insel et al., 2010; Sanislow et al., 2010).

Other alternative proposals include the *Psychodynamic Diagnostic Manual* (PDM) (PDM Task Force, 2006), which is currently preparing its second edition (Huprich et al., 2015). The authors of this model sought to create a diagnostic manual that captured both the functional and the descriptive aspects of psychopathology.

The Psychodynamic Diagnostic Prototypes (Gazzillo, Lingiardi, & DelCorno, 2012) consists of 19 prototypic descriptions of personality disorders, 1 for each disorder included on the P Axis of the PDM and thus help clinicians to use the P Axis even without a previous knowledge of the PDM.

Another approach is the structural model of psychopathology (Trimboli, Marshall, & Keenan, 2013) Adopting Kernberg's framework of psychopathology, the authors divided psychopathology into three levels of ego development: neurotic, borderline, and psychotic.

The network approach to environmental impact in psychotic disorders (Isvoranu, Borsboom, van Os, & Guloksuz, 2016) consists of a condensed pattern of connections between dimensions of psychopathology, and suggests that three environmental risk factors are differentially linked to specific symptoms in this network. These factors include developmental trauma, cannabis, and urbanicity.

Caspi et al. (2014) used confirmatory factor models to test a hierarchical bifactor model that derives a general factor from the correlation matrix between different mental disorders and found that depression, anxiety, substance use, and conduct/antisocial disorders all loaded strongly on a single factor, in addition to specific internalizing and externalizing spectra, which is referred to as the general psychopathology factor or p factor.

An integrated psychological assessment is commonly required to obtain valid and accurate results. This approach is imperative in the assessment of mental disorders. In addition to the standard neurological and psychiatric evaluations patients are commonly examined through interviews and the completion of self-reports (taking into account, the individuals mental state, intellectual capacity and level of motivation, age and sociocultural background).

With respect to interview methods new additions include the following.

The Computerized Diagnostic Interview Schedule for Children (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) is a comprehensive structured interview that covers 36 mental health disorders for children and adolescents, using DSM-IV criteria.

The Structured Clinical Interview for DSM-5 Disorders, Clinician Version (First, Williams, Karg, & Spitzer, 2015b). The SCID-5 is a semistructured interview that supplements or supports the DSM-5. The most comprehensive version, the Research Version (First, Williams, Karg, & Spitzer, 2015c), contains more disorders than the Clinician Version.

The Structured Clinical Interview for DSM-5 Disorders, Clinical Trials Version (First, Williams, Karg, & Spitzer, 2015d) is a modified version of the Research Version that has been reformatted and adapted for use in clinical trials.

The Structured Clinical Interview for DSM-5 Personality Disorders (First, Williams, Benjamin, & Spitzer, 2015a) is a semistructured interview for the assessment of the 10 DSM-5 personality disorders across clusters A, B, and C.

Minnesota Multiphasic Personality Inventory-2-Restructured Form (Ben-Porath & Tellegen, 2008) builds on the Restructured Clinical Scales (Tellegen et al., 2007) with an exponential goal of improved discriminant validity, the test's ability to differentiate between clinical syndromes or diagnoses.

The Shedler–Westen Assessment Procedure (SWAP; Shedler & Westen, 2007) and its revised version, the SWAP-II, is a comprehensive set of 200 items capturing both personality pathology and aspects of adaptive functioning.

The Dimensional Assessment of Personality Pathology (Livesley & Jackson, 2009) was designed to assess and contribute to the treatment of personality disorders.

The Schedule for Nonadaptive and Adaptive Personality, second edition, and SNAP Youth (Clark, Simms, Wu, & Casillas, 2008) are dimensional measures of maladaptive traits.

The Personality Inventory for the DSM-5 (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012) assesses the maladaptive traits proposed in Section III of DSM-5.

Versions of the PID-5 include the PID-5 Informant Report Form (Markon, Quilty, Bagby, & Krueger, 2013) and the PID-5 Brief Form (Krueger, Derringer, Markon, Watson, & Skodol, 2013).

The PID-5 was also adapted for children aged 11–17 (Krueger et al., 2013).

The Child Problematic Traits Inventory (Colins et al., 2014) was recently developed to provide a reliable assessment of interpersonal, callous-unemotional, and behavioral/lifestyle psychopathic traits from early childhood onward.

The Personality Psychopathology 5 (Harkness, Finn, McNulty, & Shields, 2012) included broad dimensions labeled aggression, psychoticism, disconstraint, negative emotionality/neuroticism, and introversion/low positive emotionality. Recently, Harkness, Reynolds, and Lilienfeld (2014) propose that five major systems allow dynamic adaptation to the external environment: reality modeling for action, short-term danger detection, long-term cost/benefit protection, resource acquisition, and agenda protection. Disruption in any of these systems can lead to maladaptive interactions with the environment.

The General Assessment of Personality Disorder (Livesley, 2006) is a self-report measure operationalizing the two core components of personality pathology proposed in Livesley's (2003) adaptive failure model.

Advances in violence risk assessment

Within a few decades the field of violence risk assessment (e.g., Andrews & Bonta, 2006; Singh, Grann, Lichtenstein, Långström, & Fazel, 2012; Monahan & Skeem, 2015). The majority of risk assessment tools evaluate two types of risk factors: static and dynamic. Recently, Monahan and Skeem (2014) proposed a different classification of risk factors: fixed marker (unchangeable), variable marker (unchangeable by intervention), variable risk factor (changeable by intervention), and causal risk factor (changeable by intervention; when changed recidivism is reduced).

Determining an individual's promotive and protective factors can buffer or diminish the impact of risk factors. Specifically, protective factors reduce the problem of reoffending, whereas promotive factors reduce the problem of reoffending among individuals exposed to risk factors (Farrington, Loeber, & Tfofi, 2012). A recent development is the risk-need-responsivity model (Bonta & Andrews, 2007), which proposes a diversion in focus toward a more individualized approach and the rehabilitation of offenders.

Advances in the field of risk assessment have also addressed the issue of accuracy of violence risk assessment. The risk of violent reoffending should be accurately measured and managed with causal interventions to reduce the risk for relapse. Constantinou, Freestone, Marsh, Fenton, and Coid (2015) have developed a Bayesian network model for this purpose, which they termed the Decision Support for Violence Management–Prisoners.

Advances in mental illness and violence

An interesting finding in recent research is that only a small proportion of violence committed by people with mental illness is directly caused by symptoms (Skeem, Manchak, & Peterson, 2011). Research on the association between serious mental illness (SMI) and violence produced controversial findings whereby empirical literature demonstrated that individuals with SMI as a group are at higher risk of violence than individuals without SMI (e.g., Elbogen & Johnson, 2009; Fazel, Lichtenstein, Grann, Goodwin, & Långström, 2010).

In contrast, it has been argued that the majority of people with SMI do not engage in violence in a consistent manner, and when it occurs it is not necessarily triggered by mental illness (e.g., Appelbaum, 2013). Research indicates that psychotic symptoms in SMI rarely precede perpetration of violent behavior (Skeem, Kennealy, Monahan, Peterson, & Appelbaum, 2016).

In a recent study, Elbogen, Dennis, and Johnson (2016) examined the association between SMI and violence. Results demonstrated that SMI is only one of a multitude of factors that may contribute to violent behavior.

Most people with mental illness share leading risk factors for violence with their relatively healthy counterparts. There is a controversy regarding the purpose of risk assessment, with some arguing that the purpose is to predict recidivism while others maintain that the goal is violence prevention and risk management (Douglas & Kropp, 2002).

Advances in suicide research

Advances in suicide research include the link between suicide and aggression. In particular cross-sectional studies highlight the cooccurrence of self-harm and aggression (e.g., Renaud, Berlim, McGirr, Tousignant, & Turecki, 2008).

Cognitive malfunctioning that has been found to underlie suicidality (e.g., Rudd, 2000) has led to the development of new assessment instruments, such as the Suicide Cognitions Scale (Rudd et al., 2010).

In recent times research focused on the relation between cultural factors in suicide and the development of new measures, such as the Cultural Assessment of Risk for Suicide measure based on the cultural model of suicide (Chu, Goldblum, Floyd, & Bongar, 2010). Another measure examines suicidality through indirect ways, such as through respondents' evaluation of their life meaning. One popular instrument is the Meaning of Life Questionnaire (Steger, Frazier, Oishi, & Kaler, 2006).

TEST USAGE

Reasons for using psychological tests include:

1. *Making decisions*, such as selection and placement, deciding on the individual's need for treatment or rehabilitation, in personnel selection and evaluating child special needs.
2. *Psychological research*, which commonly includes cross-sectional, longitudinal, and metaanalytic studies. Both *cross-sectional* and the *longitudinal studies* are observational studies. This means that researchers record information about their subjects without manipulating the study environment. The defining feature of a cross-sectional study is that it can compare different population groups at a single point in time. A *longitudinal study* (or follow-up study), like a cross-sectional one, is observational. However, in a longitudinal study, researchers conduct several observations of the same subjects over a period of time, sometimes lasting many years. One advantage for researchers during long studies is the ability to detect developments or changes in the characteristics of the target population at both the group and the individual level. One frequently applied method to clarify conceptualizations of newly identified constructs is *metaanalysis*. Metaanalysis refers to the statistical integration of the results of independent studies, leading to conclusions that are more reliable than those derived in independent studies or in a theoretical review. Mullen, Muellerleile, and Bryant (2001) defined cumulative metaanalysis as “the procedure of performing a new metaanalysis at every point during the history of a research domain” (p. 1451).
3. *Diagnostic purposes*. The diagnostic procedure is a significant and delicate stage before the decision of intervention or treatment. The initial steps for a diagnostic appraisal rests primarily on the clinical or psychiatric interview. Where young children are concerned diagnostic formulations are mostly based on parental interviews and child observations.

Psychometric tools often coordinate and enhance the clinical findings from interviews and behavioral observations. Advances in psychological assessment include a multiinformant assessment approach and the use of multiple measures aiming in more accurate clinically appropriate conclusions.

4. *Risk assessment*, which is the process where you identify hazards, analyze or evaluate them, and determine appropriate ways to diminish or control them. A risk assessment is a thorough look to identify situations, processes, and so on that may cause harm. Common types of risk assessment are related to violent prediction (violence risk assessment), suicide prevention (suicide risk assessment), and prevention of neglect and abuse (maltreatment risk assessment).

TEST CONSTRUCTION

Data collection and administration

The test construction process is a complicated one, whether it is a maximum performance or a typical performance test. I will try to present my own experience on the issue, having constructed a projective personality test for children (Coulacoglou, 2013). Apart from formulating a good test design, a most challenging stage in test construction is data collection (i.e., having a large enough sample and representative of the population one wants to test). For example, if we want to test a personality construct and its behavioral manifestations in the general population (i.e., which usually reflects the population of the specific country), then we need to collect a large sample that represents the population in terms of major characteristics, such as age, sex, socioeconomic status, geographical regions, ethnicity, or race (especially in polyethnic and multicultural countries like the United States), and religion (especially in countries that have multiple religious confessions or castes like India).

The size of the sample is a relevant issue as it relates to such factors as the population and multiethnicity of the country at hand. On the other hand, even if the country is small (i.e., a population of 2,500,000 inhabitants the size of a sample should not be less than 600 participants). The reason for having a standard in sample size has to do with the applied statistical analyses and in particular factor analytic studies. Apart from data collection and sample size, another significant factor in the process of data collection is administration. Once again, depending on the target group and the objectives, administration conditions may vary. For example, the administration instructions and administration procedure should be adapted to individuals' level of comprehension, including the type of measure used, duration, and type of administration method (e.g., open-ended questions, narrations, stimulus material). For example, intelligence or achievement tests usually require a longer attention span and higher concentration level than performance or screening tests. Similarly, the assessor should take into account the examinees' level of motivation for taking the test.

Children are usually more difficult to handle and their levels of attention, concentration, and motivation are more variable than those of adults. If the sample is a clinical one, note should be taken of the participants' mental state during administration, attention span, and concentration level. Self-report inventories like the MMPI require a high level of concentration and a good mental state to respond to the 567 statements in a relatively objective manner.

When the tool targets a young population, the test constructor should consider the role of the examiner as the rapport between examiner and child is crucial for the quality of responses. The level of motivation and involvement in the process (e.g., the reward is a fee or she/he will earn extra bonus for passing an examination completing a thesis) may affect the interaction and the outcome (e.g., the child's level of concentration). An indifferent examiner is more likely to induce a similar reaction from the subject.

Administration training is particularly important. Another factor that can affect a participant's attitude and reaction toward the test is the location where the administration takes place, as well as the circumstances during the administration process. For example, test administrations often take place during school hours. Especially, individual administrations presuppose missing a class or a favorite activity that may affect the child's motivation in responding to a questionnaire.

Having said that, there are no ideal administration conditions and thus this should be taken into account when developing a measure. Moreover, the more complicated a measure is (e.g., unstructured interview, open-ended questions that last for almost an hour) the more difficult to control all the factors that might influence the response. Similar complications may arise when we want to adapt a psychological measure to other cultures. Administration conditions can never be replicated in an exact manner (Table 1.2).

Standards in Test Development

According to van de Vijver (2016) standards and guidelines for assessment "are typically meant to enhance levels of professionalism, to increase transparency and to make the profession more accountable" (p. 23).

TABLE 1.2 Test Construction

| |
|--|
| Data Collection |
| <ul style="list-style-type: none"> - >600 subjects despite size of population - Factors to be taken into account, such as religion, birth order, family situation (e.g., single parent, adoption) |
| Administration |
| <ul style="list-style-type: none"> • Training of examiners • Motive of examiners (reward fee, thesis) • Education background • Experience with children • Location of administration (e.g., school, home, institution) • Specific circumstances of administration • Child's level of motivation • Child's attention span and concentration • Examiner-child interaction and communication during administration |

The latest version of the *Standards for Educational and Psychological Testing* (SEPT) was published in 2014. Since the launch of SEPT in 1955 many more standards have been developed. The history of SEPT reveals its emphasis on such issues as the definition of norms regarding development, and administration and interpretation of tests as a means to assist in the advancement of quality in the field of psychological assessment.

SEPT covers three domains. The description of each domain starts with a general presentation of the context. Important concepts are defined, and an overview of the main issues in the domain is presented (Tables 1.3 and 1.4).

Test Adaptation

Special sections of the *European Journal of Psychological Assessment* (van de Vijver, 1999) and the *International Journal of Testing* (Gregoire & Hambleton, 2009) were devoted to test adaptations and the ITC Guidelines for International Testing.

The ITC (2005a, 2005b; Coyne, 2006; Coyne & Bartram, 2006) has also developed guidelines for Internet-based assessment. The Guidelines for Computer-based and Internet Testing is targeted at three groups: test users, test developers, and test publishers.

Compared with conventional assessment based on the interaction of a tester and test-taker, the supervision of computer-based testing can take several forms: the open-mode form where no direct human supervision is required; the controlled mode available only to known test takers where the administration is unsupervised; the supervised mode. Test users have to log on a participant and confirm that the testing was administered and completed successfully; the last mode is the managed mode, which resembles the conventional testing procedure.

TABLE 1.3 Overview of Topics Covered in 1999 Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999/2014)

| | |
|--------------------------------|---|
| Aim and Domains | |
| Aim | To promote the sound and ethical use of tests and to provide a basis for evaluating the quality of testing practices |
| Domains covered | Foundations; operations; testing applications |
| Guidelines | |
| Part I: Foundations | Validity; reliability/precision and errors of measurement; fairness in testing |
| Part II: Operations | Test design and development; scores, scales, norms, score linking, and cut scores; test administration, scoring, reporting, and interpretation; supporting documentation for tests; the rights and responsibilities of test takers; the rights and responsibilities of test users |
| Part III: Testing Applications | Psychological testing and assessment; workplace testing and credentialing; educational testing and assessment; uses of tests for program evaluation, policy studies, and accountability |

TABLE 1.4 International Test Commission Guidelines for Translating and Adapting Tests (ITC, 2005a)

| | |
|-----------------|---|
| Aim and Domains | |
| Aim | The objective was to produce a detailed set of guidelines for adapting psychological and educational tests for use in various different linguistic and cultural contexts |
| Domains covered | Cultural context; technicalities of instrument development and adaptation; test administration; documentation and interpretation |
| Guidelines | |
| Context | Effects of cultural differences which are not relevant or important to the main purposes of the study should be minimized to the extent possible. The amount of overlap in the construct measured by the test or instrument in the populations of interest should be assessed |

In addition to the aforementioned Guidelines, the ITC has developed additional guidelines for other purposes, such as *International Guidelines for Test Use* (Bartram, 2002; ITC, 2000, 2001) that involve the fair and ethically responsible use of tests. Moreover, the ITC (2011) has developed a list of guidelines to support the quality control of assessment processes.

Nomothetic versus idiographic approaches to the analysis of clinical data

The traditional approach to statistical analysis in all psychological science is nomothetic. A nomothetic approach aims to provide general predictions about the population by exploring interindividual variables (Molenaar, 2004; Molenaar & Campbell, 2009). Moreover, it allows pooling across participants (e.g., member of a control or clinical group who share a disorder, risk factor, or treatment profile) for data collected in both cross-sectional and longitudinal designs.

In the idiographic approach the aim is to make specific predictions about an individual by examining intraindividual variation, that is, variation within a person over time (Molenaar, 2004; Molenaar & Campbell, 2009). Because this approach assumes heterogeneity over time, typically each individual is assessed at multiple time points, that is, time series analyses are applied (Lütkepohl, 2005).

Despite its advantages for heterogeneous and time-varying data and its potential for personalized treatment, the idiographic approach has been criticized. One critique that is particularly relevant to clinical applications is that concentration on the individual level undermines generalization (Spencer & Schöner, 2003). In other words, person-specific analyses provide detailed results that do not apply to other individuals or even to the same individual in a different situation. Other critiques stem from questions concerning the practicality of implementing an idiographic approach.

These critiques of the idiographic approach are overcome by Group Iterative Multiple Model Estimation (GIMME) and a detailed discussion of its implementation. GIMME addresses the substantive critiques because it integrates the nomothetic and idiographic approaches by mapping directed relations among a set of variables according to their temporal covariation, creating individual-level networks that include some group-level relations, that is, directed relations shared for everyone in the sample. Specifically, GIMME links nomothetic and idiographic analyses for data that is heterogeneous across people and time (Gates & Molenaar, 2012). Statistically, this is achieved by mapping directed relations among a set of variables according to their temporal covariation, formulating individual-level networks that include some group-level relations.

GIMME generates a graph for each participant that can be conceptualized as a person-specific network or connectivity map. The graphs, networks, or maps can be behavioral (e.g., explaining associations among self-reported personality facets), biological (e.g., explaining links between cortisol and substance use), or neural (e.g., explaining connections among brain regions). They take advantage of the temporal ordering of measurements to show how one variable linearly affects or is affected by another.

The Standardization Process

According to Kingston, Scheuring, and Kramer (2013), a good test design incorporates several features. Among the most important are the following:

- a definition of the construct to measure
- a detailed description of the target population

- gender balance
- socioeconomic status distribution
- educational background
- administration requirements (e.g., individual vs. group, time limits, and stopping rules)
- test delivery options to be made available (e.g., online, paper, and pencil)
- underlying psychometric model
- item ordering (e.g., linear, testlet, item by item, self-adaptive, matrix, or mixed models)
- content range, number, and type of each item to be included on the test (e.g., multiple choice, short answer, essay, performance tasks)
- item-scoring approach (e.g., answer key, latent semantic analysis, human application of rubrics)
- a schedule for pilot testing, field testing of items, and norming of forms (if required)
- a proposed strategy for improving or replacing items and forms over time [e.g., standalone (explicit) or embedded field testing]
- a plan for equating test forms over time

Regardless of the type of test being constructed, an effective test development strategy begins with a coherent test design. Coherent test designs require incorporation of information across multiple disciplines including psychometrics, technology, content development, finance, and project management.

For a test design to be effective, the test developer should be able to answer questions concerning the purpose of the test—predictive or descriptive, score reporting, test interpretation—as well as issues concerning the social and political environment in which testing occurs.

The questions that follow are organized around four categories. Question 1 concerns the purpose of the test: predictive or descriptive? Questions 2–7 concern score reporting. Although reporting is the end of the testing process, considering it early helps to clarify many decisions that need to be made. Questions 8 and 9 concern test administration. Administration can place constraints on a testing program that need to be considered early. Questions 10 and 11 consider the social and political environment in which testing occurs (Kingston et al., 2013).

1. Will the test be used to predict or to describe?
2. How many scores will the test support?
3. Will the reports compare test takers' performance with each other's, with a specific set of goals (standards), or with their own?
4. Will scores be reported for individual examinees, groups, or both?
5. Will the test be used to report growth or change in the examinees' performance over time?
6. Who will get reports? Which reports will they receive? How will performance data be categorized for each audience?
7. How soon will reports need to be made available after testing is completed?
8. Should this testing program be administered on computer or on paper?
9. Should examinees have limited time to take the test?
10. What are the stakes? How likely is cheating?
11. How transparent should the testing program be?

TYPES OF TESTS

Maximum performance tests

Maximum performance tests are aimed at assessing the participants' topmost level of aptitude or performance on a specified field of knowledge or ability. These tests are often referred to as "ability tests" and include achievement tests, skills tests, and speed and power tests. A general guideline for administering maximum performance tests is to encourage the participant to attempt to answer or respond to as many items as possible, as best they can. Maximum performance tests usually include multiple-choice questions, open-ended questions, or a combination of both.

Ability tests consist of both achievement tests and skills tests. Achievement tests assess a participant's acquired set of skills or knowledge, while skills tests evaluate the extent to which a participant can acquire new skills or knowledge.

In most cases, ability tests are usually designed to differentiate between test subjects on the basis of either the number of correct answers given within an allotted amount of time (speed tests) or their performance on specific complex questions, regardless of the time taken to respond to them (power tests). In speed tests, the level of the items' difficulty is relatively low and homogeneous across the test (i.e., not increasing as the test progresses) and the focus is on assessing the number of

items responded to correctly within a specified time limit. Examples of such tests are typing speed tests and reading speed tests. In power tests, item difficulty varies throughout the test and there is no specific time limit for test completion, while the focus, in this case, is on establishing not only the number of items responded to correctly but also which items in particular are answered correctly. Subjects' scores on power tests reflect the difficulty level of the items responded to correctly (Friedenberg, 1995; ForsterLee, 2007; Lim & Ployhart, 2004).

Typical performance tests

Typical performance tests measure participants' emotions, thoughts, and behaviors. These tests commonly incorporate interval scales and include personality tests, interests questionnaires, and attitude tests.

Personality tests are divided into two groups: personality questionnaires and projective tests (performance measures). Personality tests usually measure an individuals' mood, emotions, and thoughts, as well as assessing more specific personality traits, such as aggression, anxiety, extroversion, and sensitivity, toward the environment.

Similar to the ability tests and aptitude tests, personality tests often incorporate various types of items or questions. The most distinctive difference between personality tests is that between items used in objective personality tests and items used in projective tests. In most projective tests (particularly tests containing images) the term "item" is substituted with the term "stimulus."

In objective personality tests (commonly referred to as "self-report" questionnaires) each question is accompanied by a series of possible responses, as is the case with multiple-choice questions used in ability tests. Common types of items used in self-report questionnaires are displayed in Table 1.5.

Attitude tests are used to retrieve information regarding participants' beliefs and opinions. Attitudes refer to the ways in which one may respond, whether it be positively or negatively, toward a certain subject, population, or situation. Similarly to other aspects of personality, attitudes cannot be measured with great precision. Additionally, as is the case with self-report questionnaires, attitude tests contain true-or-false items or interval-scaled responses.

Interests questionnaires, as the term itself indicates, provide a more systematic insight into individuals' interests. These questionnaires can provide support for individuals' professional ambitions, can be useful in providing information regarding career options, or can provide a framework for understanding career interests and the job market (Holland, 1986). Similarly to attitude tests, interests questionnaires contain true-or-false items or interval-scaled responses.

TABLE 1.5 Possible Answers for Multiple-Choice Questions

| | | |
|-----------------------------------|----------------------------|----------------------------|
| <i>Interval-scaled responses:</i> | | |
| I like to travel: | | |
| Never | Sometimes | A lot |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <i>Forced-choice item:</i> | | |
| When I finish work, I like to: | | |
| (a) Meet with friends | <input type="checkbox"/> | |
| (b) Go home | <input type="checkbox"/> | |
| <i>True/false item:</i> | | |
| I like to make new friends: | T <input type="checkbox"/> | F <input type="checkbox"/> |

Test domain

Abilities Domain

Prior to the construction of a test's items, test developers must first develop an *outline* of the assessment. Test outlines usually provide information regarding the domains covered by the test, as well as the relative items used for the measurement of each domain, in addition to corresponding behaviors required to respond to each item correctly. A test's outline consists of the test's content goals and behavior goals (Carlson, 1985). Content goals determine the information and abilities covered and examined by a test. Behavior goals refer to response-statements that will determine the type of responses elicited by the test's items.

When designing the outline of a test, in most cases, test developers are aware that certain categories within the test's domain are more important than others. Specifically, the test's domain is characterized not only by a specific content but also by a specific structure. As a result, the test outline should include information regarding the necessary emphasis that is to be applied to each category within the test's domain. Depending on the significance placed on each category, test developers must decide on the number of items that will be used to measure each category, as well as on how each category will be scored.

Deciding on which category is more important to the objectives of a given test is directly related to the overall domain covered by the test. This decision is often influenced by the test developer's theoretical background experience and convictions.

Ability tests attempt to assess the following categories of cognitive processes (adapted from Bloom, 1956; McMahan & Forehand, 2005):

Knowledge: Subject recalls instructed material, such as specific events and terminology.

Comprehension: Subject comprehends the instructed curriculum, can explain it, summarize it, and translate it.

Application: Subject can apply acquired knowledge to new contexts and situations.

Analysis: Subject can separate material into component parts, distinguish said parts, and discuss the relationship between each part.

Synthesis: Subject can organize material into separate sections, combine each section into a subsequent whole, or devise a new concept or structure.

Evaluation: Subject can implement internal indications and external criteria to assess the value of ideas or materials.

Behavior Domain

Tests measuring or predicting behaviors require a different form of test outline. In order for such tests to be valid, the test's items must correspond to the underlying behavioral parameters under assessment. In this case, the process of determining the content of the given test is called *operational analysis* or *task analysis* (Bersoff, DeMatteo, & Foster, 2012). When carrying out an operational or task analysis, the operation or task is broken down into a series of constituent elements that are used to determine the content of the test.

The majority of a behavioral test's items should reflect the most important manifestations of the behavior of interest, that is, the domains or areas where the behavior of interest may be expressed in everyday life. For example, when developing a scale measuring children's social relations (sociability level), test developers should decide the relevant behaviors. For example, sociability in children is expressed in initiating contact with other children, group play, conversing with others, sharing toys, and so on.

Concepts Domain

Measuring concepts is often a complicated task under measurement. A common practice is for test developers to consult analyses and studies on subject areas relevant to their concept(s) of interest to determine a number of initial behaviors corresponding to the concepts of interest. Information regarding the existence of concepts can be accessed through the assessment of such related behaviors. This process is usually referred to as *concept analysis* (Murphy & Davidshofer, 2004). Concept analysis requires that the test developers list a number of behaviors, beliefs, and attitudes assumed to confirm the existence of a given concept in addition to a similar list of behaviors, beliefs, and attitudes that disprove the existence of the same concept.

Item Traits

When designing test items, it is usually assumed that all respondents will understand an item in the same manner. However, evidence has suggested that respondents may interpret them differently (Baker & Brandon, 1990). These individual differences complicate things even more when taking into account the ambiguity of items used in self-report questionnaires. According to Helfrich (1986), factors influencing the way in which items may be comprehended are ambiguity, the presence of refutations within the wording of an item, the use of past tense, and respondent's age.

In self-report questionnaires, participants are asked to respond to dichotomous or attitude questions on a Likert scale containing three or more possible responses. Increasing the number of possible responses for an item may increase the amount of mental effort required of the participant in order for them to respond. This may increase the length of the test, as well as the probability that individuals will respond at random.

Another concern for classification scales is whether items used in such tests are worded ambiguously. Classification tests tend to contain a multitude of items worded ambiguously with regard either to their content or their structure (Murphy & Davidshofer, 2004).

According to Stone, Stone, and Gueutal (1990), the extent to which individuals comprehend the instructions of a given test, the content of the items used, and the corresponding optional responses is often ignored when designing a test. Furthermore, Stone et al. (1990) suggest that if a respondent's level of cognitive ability does not allow them to fully comprehend the items of a test, then their motivation to complete the test will be significantly lower. These factors may be discovered prospectively by comparing the performance of individuals from groups of different levels of cognitive ability on the same test.

Item Development and Test Scoring

Test scoring typically begins with scores on individual test items. Item scores can be correct or incorrect, can involve multiple score points, or can indicate an examinee's level of agreement with an idea (Kolen & Hendrickson, 2013).

An examinee's raw score is a function of his/her item scores. Raw scores can be as simple as a sum of the items scores or be so complex that they rely on the whole pattern of item responses. Raw scores have two major limitations as primary score scales for tests: (1) they are dependent on test items and therefore they cannot be meaningfully compared when examinees take different test forms and (2) they do not contain normative meaning and thus are difficult to relate to generalizations to a content or psychological domain. For these reasons, raw scores are transformed into scale scores.

According to Kolen (2006) scale scores are meaningful when we have a norm group. For example, the MMPI (Hathaway & McKinley, 1989) was administered to a national norm group of nonpatient subjects intended to be representative of adults in the United States. These data were used to establish linear T scores with a mean of 50 and standard deviation of 10. By knowing the mean and standard deviation of the scales scores, test users are able to quickly ascertain, for example, that a test taker with a T score of 60 on the Depression scale is 1 standard deviation above the mean. This information is relevant on the basis of the representative sampling of the norm group. Kolen (2006, pp. 163164) provided equations for linearly transforming raw scores to scale scores with a particular mean and standard deviation.

Nonlinear transformations are also used to develop score scales. To normalize scores, percentile ranks of raw scores are found and then transformed, using an inverse normal transformation.

Normalized scale scores can be used by test users to determine the percentile rank of an examinee's score, using information about the normal distribution. For example, the scale scores of all six psychological scales of the Wechsler Adult Intelligence Scale (Wechsler, 2008) are normalized scores set to have a mean of 100 and a standard deviation of 15 (Kolen, 2006, pp. 164–165).

Using focus groups and Rasch item response theory to improve response format

Hoyt and Mallinckrodt (2012) proposed that in instrument development the initial item pool should contain a sufficient number of items to capture critical aspects of the construct under study. Furthermore, the researchers proposed the use of focus groups to improve content validity, especially when the researchers themselves have had limited knowledge or experience of the target construct. Mallinckrodt, Miles, and Recabarren (2016) recommend a sequential mixed method (SMM) research approach for instrument development (Hanson, Creswell, Clark, Petska, & Creswell, 2005). The SMM design integrates qualitative and quantitative components (Castro, Kellison, Boyd, & Kopak, 2010).

Researchers must also give careful attention to selecting an appropriate response format or formats for the item pool. Likert-type, semantic differential, and frequency-based formats (e.g., never, sometimes, often) are among the most frequently used in counseling psychology research. A discussion of the unique advantages and disadvantages of each format is beyond the scope of this article. However, an essential ingredient of any format is that the steps between all neighboring pairs of responses should represent equal measurement intervals. Thus, in a frequency format if “rarely” and “occasionally” are neighboring pairs, this interval must be equivalent to the difference typical respondents assign to other neighboring pairs, such as “sometimes” and “always.” Recent research suggests that the assumption of equidistant measurement intervals may be questionable for many frequency-based response formats (Bocklisch, Bocklisch, & Krems, 2012). The number of response categories to present is also a critical methodological choice. In general, additional categories increase reliability, but only up to the point that respondents can make meaningful distinctions among them (Bond & Fox, 2007). Instrument developers typically generate both positively and negatively worded items to prevent response-set bias (Paulhus, 1991).

However, recent IRT research suggests that negatively worded items may not assess the same latent construct as positively worded items, and can introduce an independent confounding dimension, as well as inflate estimates of scale reliability (Wang, Chen, & Jin, 2015).

After careful editing, revision, and removal of obviously redundant and otherwise undesirable items, a large item pool may still remain. The richness and variety of items created through the focus group process presents a dilemma. In choosing how many items to retain for presentation to survey participants, researchers must balance (1) consideration of coverage and range in the number of items retained for presentation, versus (2) having a sufficient sample size to support exploratory factor analysis with a separate sample for confirmatory factor analysis.

Psychometric properties

In evaluating the psychometric properties of psychological measures, we are interested in addressing the degree to which an assessment instrument provides an accurate and precise measure of the targeted construct (Haynes, 2001). More specifically, we are particularly interested in evaluating two related concepts that underlie all test construction: reliability and validity. It has become a universally accepted truth that psychological assessment measures must be reliable and valid if they are to be of any use. Although reliability and validity are related concepts, they also have some distinct features: *Reliability* refers to the consistency of the test scores obtained from a measure across time, observers, and samples (e.g., Garb, Fowler, & Lilienfeld, 2008). In psychometric terms, reliability refers to the extent to which measurement results are precise and unaffected by random error (Wasserman & Bracken, 2013). *Validity*, on the other hand, according to the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999), is defined as “the degree to which evidence and theory support the interpretations of test scores” (p. 9).

If test scores are consistent (e.g., across raters or time), then reliability is assessed as “good,” regardless of whether validity has also been demonstrated (that two raters agree on a diagnosis for a patient says nothing about whether the diagnosis is accurate). As such, a judgment may be consistent (reliable), but not valid (both raters may agree, but both may be wrong). Although a test can be reliable but not valid, a test cannot be valid but unreliable. Test score reliability sets an upper limit on validity, such that test validity is constrained by reliability, so that an unreliable test score is an invalid test score (Wasserman & Bracken, 2013).

MEASUREMENT INVARIANCE

Testing for equivalence of measures (or measurement invariance) has gained increasing attention in recent years (e.g., Chen, 2008; Cheung & Rensvold, 1999, 2000; van de Vijver & Fischer, 2009). Measurement invariance is especially useful in cross-cultural research as it evaluates if members of different groups (e.g., male/female) or cultures attribute the same meanings to scale items (e.g., Fischer et al., 2009; Gouveia, Milfont, Fonseca, & Coelho, 2009; Milfont, Duckitt, & Wagner, 2010).

In the cross-cultural literature, four levels of equivalence have been identified (Fontaine, 2005; van de Vijver & Leung, 1997): functional equivalence (Does the construct exist in all groups studied?), structural equivalence (Are indicators related to the construct in a nontrivial way?), metric equivalence (Are loading weights identical across groups?), and full score or scalar equivalence (Are intercepts the origin of measurement scales-identical across groups?).

Measurement invariance is best assessed within the framework of structural equation modeling. Specifically, multidimensional scaling, principal component analysis, exploratory factor analysis, and confirmatory factor analysis are the four principal methods used for assessing equivalence of psychological measures (Fischer & Fontaine, 2010).

Tests of aspects of measurement invariance

Models that assess relationships between measured variables and latent constructs are measurement invariance tests. There are four common models that fall in this category: configural, metric, scalar, and error variance.

Configural Invariance

This model is the first step to establish measurement invariance, and is satisfied if the basic model structure is invariant across groups, indicating that participants from different groups conceptualize the constructs in the same way. Configural invariance can be tested by running individual confirmatory factor analyses in each group. However, even if the model fits well in each group, it is still necessary to run this step in multiple group confirmatory factor analysis, since it serves as the comparison standard for subsequent tests (also known as the baseline model). This model is tested by constraining the factorial structure to be the same across groups.

Metric Invariance

This model tests if different groups respond to the items in the same way, that is, if the strengths of the relations between specific scale items and their respective underlying construct are the same across groups. If metric invariance is satisfied, obtained ratings can be compared across groups and observed item differences will indicate group differences in the underlying latent construct. Research has suggested that at least partial metric invariance must be established before continuing in the sequence of tests (Vandenberg & Lance, 2000). This model is tested by constraining all factor loadings to be the same across groups.

Scalar Invariance

Scalar, or intercept, invariance is required to compare (latent) means. Establishing scalar invariance indicates that observed scores are related to the latent scores, that is, individuals who have the same score on the latent construct would obtain the same score on the observed variable regardless of their group membership. This model is tested by constraining the intercepts of items to be the same across groups. This is the last model necessary to compare scores across groups. All additional tests are optional and may be theoretically meaningful in specific contexts.

Error Variance Invariance

To test if the same level of measurement error is present for each item between groups, all error variances are constrained to be equal across groups.

Tests of aspects of structural invariance

Models concerning only the latent variables are structural invariance tests. There are three common models that fall in this category: factor variance, factor covariance and factor mean invariance.

Factor Variance Invariance

Invariance of factor variance indicates that the range of scores on a latent factor do not vary across groups. This model is tested by constraining all factor variances to be the same across groups.

Factor Covariance Invariance

The stability of the factor relationships across groups is assessed in this model. The model thus implies that all latent variables have the same relationship in all groups. This model is tested by constraining all factor covariances to be the same across groups.

Factor Mean Invariance

Invariance of latent factor mean indicates that groups differ on the underlying constructs. This model is tested by constraining the means to be the same across groups.

Bias in psychological assessment

Bias refers to systematic error in the estimation of a value. For researchers, test bias is a deviation from examinees real level of performance. Bias goes by many names and has many characteristics but it always involves scores that are too low or too high to represent or predict an individual's characteristics. Estimates of scores are required to reveal bias. Types of test bias include social desirability bias (self-enhancement and impression management; Paulhus & Trapnell, 2008), acquiescence, and cultural bias. A newly discovered type of bias is examining process bias (Baldini, Parker, Nelson, & Siegel, 2014).

SUMMARY

This chapter comprises two parts: the first part charts the milestones in psychological assessment during the 20th century and reports the major achievements in major domains of psychological assessment during the 21st century. The second part taps the critical topic of test construction. Among other things emphasis is placed on the important role that administration plays in retrieving the right type of responses and in the analysis of results. Further, information is provided with regards to the standards of test development, the guidelines proposed by ITC, types of tests and test domain item development, psychometric properties, and measurement invariance.

REFERENCES

- Adelson, J. L., & McCoach, D. B. (2010). Measuring the mathematical attitudes of elementary students: the effects of a 4-point or 5-point Likert-type scale. *Educational and Psychological Measurement, 70*(5), 796–807.
- Aguinis, H., Werner, S., Abbott, J. L., Angert, C., Park, J. H., & Kohlhausen, D. (2010). Customer-centric science: reporting research results with rigor, relevance, and practical impact in mind. *Organizational Research Methods, 13*(3), 515–539.
- Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005). TEMPS-A: progress towards validation of a self-rated clinical version of the temperament evaluation of the Memphis, Pisa, Paris, and San Diego autoquestionnaire. *Journal of Affective Disorders, 85*, 3–16.
- American Educational Research Association, American Psychological Association, & National Council of Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: AERA.
- Andrews, D. A., & Bonta, J. (2006). *The psychology of criminal conduct* (4th ed.). Newark, NJ: LexisNexis.
- Andrich, D. (2011). Rating scales and Rasch measurement. *Expert Review of Pharmacoeconomics & Outcomes Research, 11*(5), 571–585.
- American Psychiatric Association (APA). (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised). Washington, DC: Author.
- Appelbaum, P. S. (2013). Public safety, mental disorders, and guns. *JAMA Psychiatry, 70*(6), 565–566.
- Ashton, M. C., & Lee, K. (2008). The prediction of Honesty-Humility-related criteria by the HEXACO and Five-Factor Models of personality. *Journal of Research in Personality, 42*(5), 1216–1228.
- Baker, T. B., & Brandon, T. H. (1990). Validity of self-reports in basic research. *Behavioural Assessment, 12*(1), 33–51.
- Baldini, L. L., Parker, S. C., Nelson, B. W., & Siegel, D. J. (2014). The clinician as neuroarchitect: the importance of mindfulness and presence in clinical practice. *Clinical Social Work Journal, 42*(3), 218–227.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of child psychology and psychiatry, 42*(2), 241–251.
- Bartram, D. (2002). International guidelines for test use. *International Journal of Testing, 1*, 2001.
- Beer, M. D. (1996). Psychosis: a history of the concept. *Comprehensive Psychiatry, 37*(4), 273–291.
- Ben-Porath, Y. S., & Tellegen, A. (2008). *MMPI-2-RF: Manual for administration, scoring and interpretation*. Minneapolis, MN: University of Minnesota Press.
- Bersoff, D. N., DeMatteo, D., & Foster, E. E. (2012). Assessment and testing. In S. J. Knapp, M. C. Gottlieb, M. M. Handelsman, M. Mitchell, & L. D. VandeCreek (Eds.), *APA handbook of ethics in psychology, Vol. 2: Practice, teaching, and research* (pp. 45–74). Washington, DC: American Psychological Association.
- Biesanz, J. C., West, S. G., & Kwok, O. M. (2003). Personality over time: methodological approaches to the study of short-term and long-term development and change. *Journal of Personality, 71*(6), 905–942.
- Bloom, B. S. (1956). *Taxonomy of educational objectives, the classification of educational goals—Handbook I: Cognitive domain*. New York, NY: McKay.
- Bocklisch, F., Bocklisch, S. F., & Krens, J. F. (2012). Sometimes, often, and always: exploring the vague meanings of frequency expressions. *Behavior Research Methods, 44*(1), 144–157.
- Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences* (2nd ed.). London: Lawrence Erlbaum.
- Bonta, J., & Andrews, D. A. (2007). *Risk-need-responsivity model for offender assessment and rehabilitation*. Ottawa, ON: Public Safety Canada.
- Bornstein, R. F. (2011). Toward a process-focused model of test score validity: improving psychological assessment in science and practice. *Psychological Assessment, 23*(2), 532–544.
- Borsboom, D., Mellenbergh, G. J., & Van Heerden, J. (2004). The concept of validity. *Psychological Review, 111*(4), 1061–1071.
- Bosco, F. M., Colle, L., De Fazio, S., Bono, A., Ruberti, S., & Tirassa, M. (2009). Th.o.m.a.s.: an exploratory assessment of Theory of Mind in schizophrenic subjects. *Consciousness & Cognition, 18*(1), 306–319.
- Bringmann, L. F., Vissers, N., Wichers, M., Geschwind, N., Kuppens, P., Peeters, F., Borsboom, D., & Tuerlinckx, F. (2013). A network approach to psychopathology: new insights into clinical longitudinal data. *PLoS One, 8*(4), e60188.
- Carlson, S. B. (1985). *Creative classroom testing*. Princeton, NJ: Educational Testing Service.
- Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., & Moffitt, T. E. (2014). The p factor one general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science, 2*(2), 119–137.
- Castro, F. G., Kellison, J. G., Boyd, S. J., & Kopak, A. (2010). A methodology for conducting integrative mixed methods research and data analyses. *Journal of Mixed Methods Research, 4*(4), 342–360.
- Cattell, R. B. (1943). The description of personality: basic traits resolved into clusters. *Journal of Abnormal and Social Psychology, 38*(4), 476–506.
- Chen, F. F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology, 95*(5), 1005–1018.
- Cheung, G. W., & Rensvold, R. B. (1999). Testing factorial invariance across groups: a reconceptualization and proposed new method. *Journal of Management, 25*(1), 1–27.
- Cheung, G. W., & Rensvold, R. B. (2000). Assessing extreme and acquiescence response sets in cross-cultural research using structural equations modeling. *Journal of Cross-Cultural Psychology, 31*(2), 187–212.
- Cheung, F. M., van de Vijver, F. J., & Leong, F. T. (2011). Toward a new approach to the study of personality in culture. *American Psychologist, 66*(7), 593–603.
- Chu, J. P., Goldblum, P., Floyd, R., & Bongar, B. (2010). A cultural theory and model of suicide. *Applied and Preventive Psychology, 14*(1–4), 25–40.
- Clark, L. A., Simms, L. J., Wu, K. D., & Casillas, A. (2008). *Manual for the schedule for adaptive and nonadaptive personality*. Minneapolis, MN: University of Minnesota Press.

- Collins, O. F., Andershed, H., Frogner, L., Lopez-Romero, L., Veen, V., & Andershed, A. K. (2014). A new measure to assess psychopathic personality in children: the child problematic traits inventory. *Journal of Psychopathology and Behavioral Assessment, 36*(1), 4–21.
- Conners, C. K. (2008). *Conners 3rd edition manual*. Toronto, ON: Multi-Health Systems.
- Constantinou, A. C., Freestone, M., Marsh, W., Fenton, N., & Coid, J. W. (2015). Risk assessment and risk management of violent reoffending among prisoners. *Expert Systems with Applications, 42*(21), 7511–7529.
- Costa, P. T., & McCrae, R. R. (1985). *The NEO personality inventory: Manual, form S and form R*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Coulacoglou, C. (2013). *The fairy tale test* (2nd ed.). Goettingen, Germany: Hogrefe Publishing.
- Coyne, I. (2006). International guidelines on computer-based and internet-delivered testing. *International Journal of Testing, 6*, 143–171.
- Coyne, I., & Bartram, D. (2006). Design and development of the ITC guidelines on computer-based and Internet-delivered testing. *International Journal of Testing, 6*, 133–142.
- Cronbach, L. J., Rajaratnam, N., & Gleser, G. C. (1963). Theory of generalizability: a liberalization of reliability theory. *British Journal of Statistical Psychology, 16*(2), 137–163.
- Crooks, C. V., & Wolfe, D. A. (2007). Child abuse and neglect. In E. J. Mash, & R. A. Barkley (Eds.), *Assessment of childhood disorders* (4th ed., pp. 639–684). New York, NY: Guilford Press.
- Culpepper, S. A. (2013). The reliability and precision of total scores and IRT estimates as a function of polytomous IRT parameters and latent trait distribution. *Applied Psychological Measurement, 37*(3), 201–225.
- Cuthbert, B. N. (2014a). The RDoC framework: facilitating transition from ICD/DSM to dimensional approaches that integrate neuroscience and psychopathology. *World Psychiatry, 13*(1), 28–35.
- Cuthbert, B. N. (2014b). Response to Lilienfeld. *Behaviour Research and Therapy, 62*, 140–142.
- De Clercq, B., De Fruyt, F., & Mervielde, I. (2003). *Construction of the Dimensional Personality Symptom Item Pool (DIPSI)*. Ghent, Belgium: Ghent University.
- De Clercq, B., van Leeuwen, K., van den Noortgate, W., de Bolle, M., & de Fruyt, F. (2009). Childhood personality pathology: dimensional stability and change. *Development and Psychopathology, 21*(3), 853–869.
- Deal, J. E., Halverson, C. F., Martin, R., Victor, J., & Baker, S. (2007). The Inventory of Children's Individual Differences: development and validation of a short version. *Journal of Personality Assessment, 89*(2), 162–166.
- Derryberry, D., & Rothbart, M. K. (1988). Arousal, affect, and attention as components of temperament. *Journal of Personality and Social Psychology, 55*(6), 958–966.
- DeYoung, C. G. (2010). Toward a theory of the big five. *Psychological Inquiry, 21*(1), 26–33.
- DeYoung, C. G. (2015). Cybernetic big five theory. *Journal of Research in Personality, 56*, 33–58.
- Digman, J. M. (1990). Personality structure: emergence of the five-factor model. *Annual Review of Psychology, 41*(1), 417–440.
- Douglas, K. S., & Kropp, P. R. (2002). A prevention-based paradigm for violence risk assessment: clinical and research applications. *Criminal Justice and Behavior, 29*(5), 617–658.
- Elbogen, E. B., Dennis, P. A., & Johnson, S. C. (2016). Beyond mental illness: targeting stronger and more direct pathways to violence. *Clinical Psychological Science, 4*(5), 747–759.
- Elbogen, E. B., & Johnson, S. C. (2009). The intricate link between violence and mental disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry, 66*(2), 152–161.
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2011). Differential susceptibility to the environment: an evolutionary–neurodevelopmental theory. *Development and Psychopathology, 23*(1), 7–28.
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy, 9*(2), 171–180.
- Evans, D. E., & Rothbart, M. K. (2007). Development of a model for adult temperament. *Journal of Research in Personality, 41*(4), 868–888.
- Farrington, D. P., Loeber, R., & Tfofi, M. M. (2012). Risk and protective factors for offending. In B. C. Welsh, & D. P. Farrington (Eds.), *The Oxford handbook of crime prevention* (pp. 46–69). New York, NY: Oxford University Press.
- Fazel, S., Lichtenstein, P., Grann, M., Goodwin, G. M., & Långström, N. (2010). Bipolar disorder and violent crime: new evidence from population-based longitudinal studies and systematic review. *Archives of General Psychiatry, 67*(9), 931–938.
- First, M. B., Williams, J. B. W., Benjamin, L. S., & Spitzer, R. L. (2015a). *Structured Clinical Interview for DSM-5 Personality Disorder (SCID-5-PD)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015b). *Structured Clinical Interview for DSM-5 Disorders, Clinician Version (SCID-5-CV)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015c). *Structured Clinical Interview for DSM-5 Disorders, Research Version (SCID-5-RV)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015d). *Structured Clinical Interview for DSM-5 Disorders, Clinical Trials Version (SCID-5-CT)*. Arlington, VA: American Psychiatric Association.
- Fischer, R., Ferreira, M. C., Assmar, E., Redford, P., Harb, C., Glazer, S., & Kärtner, J. (2009). Individualism–collectivism as descriptive norms development of a subjective norm approach to culture measurement. *Journal of Cross-Cultural Psychology, 40*(2), 187–213.
- Fischer, R., & Fontaine, J. R. J. (2010). Methods for investigating structural equivalence. In D. Matsumoto, & F. J. R. Van de Vijver (Eds.), *Crosscultural research methods* (pp. 179–215). New York, NY: Oxford University Press.
- Fontaine, J. R. J. (2005). Equivalence. In K. Kempf-Leonard (Ed.), *Encyclopedia of social measurement* (pp. 803–813). San Diego, CA: Academic Press.

- ForsterLee, R. (2007). Personality, interest, and motivational determinants of maximal and typical performances on a verbal knowledge task. *Human Performances*, 20(3), 287–292.
- Friedenberg, L. (1995). *Psychological testing: Design, analysis and use*. Boston, MA: Allyn & Bacon.
- Garb, H., Fowler, K. A., & Lilienfeld, N. G. (2008). *Handbook of assessment and treatment planning for psychological disorders* (2nd ed.). New York, NY: Guilford Press.
- Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences*, 30(8), 1311–1327.
- Garnefski, N., Kraaij, V., & Spinhoven, P. (2002). *Manual for the use of the Cognitive Emotion Regulation Questionnaire*. Leiderdorp, the Netherlands: DATEC.
- Gates, K. M., & Molenaar, P. C. (2012). Group search algorithm recovers effective connectivity maps for individuals in homogeneous and heterogeneous samples. *Neuroimage*, 63(1), 310–319.
- Gazzillo, F., Lingardi, V., & Del Corno, F. (2012). Towards the validation of three assessment instruments derived from the PDM P Axis: the Psychodynamic Diagnostic Prototypes, the Core Preoccupations Questionnaire and the Pathogenic Beliefs Questionnaire. *Bollettino di psicologia applicata*, 265(58), 31–45.
- Goldsmith, H. H. (1996). Studying temperament via construction of the Toddler Behaviour Assessment Questionnaire. *Child Development*, 67(1), 218–235.
- Gouveia, V. V., Milfont, T. L., Da Fonseca, P. N., & de Miranda Coelho, J. A. P. (2009). Life satisfaction in Brazil: testing the psychometric properties of the satisfaction with life scale (SWLS) in five Brazilian samples. *Social Indicators Research*, 90(2), 267–277.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Gregoire, J., & Hambleton, R. K. (2009). Advances in test adaptation research: a special issue. *International Journal of Testing*, 9(2), 75–77.
- Gross, J. J. (2015). Emotion regulation: current status and future prospects. *Psychological Inquiry*, 26(1), 1–26.
- Hallquist, M. N., & Lenzenweger, M. F. (2013). Identifying latent trajectories of personality disorder symptom change: growth mixture modeling in the Longitudinal Study of Personality Disorders. *Journal of Abnormal Psychology*, 122(1), 138–155.
- Hanson, W. E., Creswell, J. W., Clark, V. L. P., Petska, K. S., & Creswell, J. D. (2005). Mixed methods research designs in counseling psychology. *Journal of Counseling Psychology*, 52(2), 224.
- Happé, F. G. E. (1994). An advanced test of theory of mind: understanding of story characters' thoughts and feelings by able autistic, mentally handicapped and normal children and adults. *Journal of Autism and Developmental Disorders*, 24(2), 129–154.
- Harkness, A. R., Finn, J. A., McNulty, J. L., & Shields, S. M. (2012). The Personality Psychopathology-Five (PSY-5): recent constructive replication and assessment literature review. *Psychological Assessment*, 24(2), 432–443.
- Harkness, A. R., Reynolds, S. M., & Lilienfeld, S. O. (2014). A review of systems for psychology and psychiatry: adaptive systems, personality psychopathology five (PSY-5), and the DSM-5. *Journal of Personality Assessment*, 96(2), 121–139.
- Hathaway, S., & McKinley, J. C. (1989). *Minnesota Multiphasic Personality Inventory (MMPI-2)*. Columbus, OH: Merrill/Prentice-Hall.
- Haynes, S. N. (2001). Clinical applications of analogue behavioral observation: dimensions of psychometric evaluation. *Psychological Assessment*, 13(1), 73–85.
- Hedden, T., & Gabrieli, J. D. (2004). Insights into the ageing mind: a view from cognitive neuroscience. *Nature*, 5(2), 87–96.
- Helfrich, H. (1986). On linguistic variables influencing the understanding of questionnaire items. In A. Angleitner, & J. S. Wiggins (Eds.), *Personality assessment via questionnaires: Current issues in theory and measurement* (pp. 178–188). New York, NY: Springer-Verlag.
- Holland, P. W. (1986). Statistics and causal inference. *Journal of the American Statistical Association*, 81(396), 945–960.
- Hoyt, W. T., & Mallinckrodt, B. (2012). Improving the quality of research in counseling psychology: conceptual and methodological issues. In N. Fouad (Ed.), *APA handbook of counseling psychology* (pp. 59–91). Washington, DC: American Psychological Association.
- Hubley, A. M., & Zumbo, B. D. (2011). Validity and the consequences of test interpretation and use. *Social Indicators Research*, 103(2), 219–230.
- Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage.
- Huprich, S. K., McWilliams, N., Lingardi, V., Bornstein, R. F., Gazzillo, F., & Gordon, R. M. (2015). The Psychodynamic Diagnostic Manual (PDM) and the PDM-2: opportunities to significantly affect the profession. *Psychoanalytic Inquiry*, 35(1), 60–73.
- Hutchins, T. L., Bonazinga, L. A., Prelock, P. A., & Taylor, R. S. (2008). Beyond false beliefs: the development and psychometric evaluation of the Perceptions of Children's Theory of Mind Measure-Experimental Version (PCToMM-E). *Journal of Autism and Developmental Disorders*, 38(1), 143–155.
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., & Wang, P. (2010). Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, 167(7), 748–751.
- Isvoranu, A. M., Borsboom, D., Van Os, J., & Guloksuz, S. (2016). A network approach to environmental impact in psychotic disorder: brief theoretical framework. *Schizophrenia Bulletin*, 42(4), 870–873.
- International Test Commission. (2000). *International guidelines for test use*. Available from: <http://www.intestcom.org>
- International Test Commission. (2001). *International guidelines on test use*. *International Journal of Testing*, 1, 95–114.
- International Test Commission. (2005a). *International guidelines on test adaptation*. Available from: <http://www.intestcom.org>
- International Test Commission. (2005b). *International guidelines on computer-based and internet delivered testing*. Available from: <http://www.intestcom.org>
- International Test Commission. (2011). *ITC guidelines for quality control in scoring, test analysis, and reporting of test scores*. Available from: <http://www.intestcom.org>
- Kahn, R. S., & Keefe, R. S. (2013). Schizophrenia is a cognitive illness: time for a change in focus. *JAMA Psychiatry*, 70(10), 1107–1112.

- Kamphaus, R. W., & Reynolds, C. R. (2007). *Behavioural and emotional screening system manual*. Bloomington, MN: Pearson.
- Kingston, N. M., Scheuring, S. T., & Kramer, L. B. (2013). Test development strategies. In K. F. Geisinger, B. A. Bracken, J. F. Carlson, J. C. Hansen, N. R. Kuncel, S. P. Reise, & M. C. Rodriguez (Eds.), *APA handbook of testing and assessment in psychology, Vol. 1: Test theory and testing and assessment in industrial and organizational psychology* (pp. 165–184). Washington, DC: American Psychological Association.
- Koch, T., Schultze, M., Eid, M., & Geiser, C. (2014). A longitudinal multilevel CFA-MTMM model for interchangeable and structurally different methods. *Frontiers in Psychology, 5*, 311.
- Kochanska, G., Brock, R. L., Chen, K. H., Aksan, N., & Anderson, S. W. (2015). Paths from mother-child and father-child relationships to externalizing behaviour problems in children different in electrodermal reactivity: a longitudinal study from infancy to age 10. *Journal of Abnormal Child Psychology, 43*(4), 721–734.
- Kolen, M. J. (2006). Scaling and norming. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 155–186). Westport, CT: American Council on Education/Praeger.
- Kolen, M. J., & Hendrickson, A. B. (2013). Scaling, norming, and equating. In K. Geisinger (Ed.), *APA handbook of testing and assessment in psychology*. Washington, DC: American Psychological Association.
- Krieg, E. F. (1999). Biases induced by coarse measurement scales. *Educational and Psychological Measurement, 59*, 749–766.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for DSM-5. *Psychological Medicine, 42*(9), 1879–1890.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2013). *The personality inventory for DSM-5 (PID-5)*. Washington, DC: APA.
- Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research, 39*(2), 329–358.
- Lee, K., & Ashton, M. C. (2005). Psychopathy, Machiavellianism, and narcissism in the Five-Factor Model and the HEXACO model of personality structure. *Personality and Individual Differences, 38*(7), 1571–1582.
- Lim, B. C., & Ployhart, R. E. (2004). Transformational leadership: relations to the five-factor model and team performance in typical and maximum contexts. *Journal of Applied Psychology, 89*(4), 610–621.
- Lindhiem, O., Kolko, D. J., & Yu, L. (2013). Quantifying diagnostic uncertainty using item response theory: the Posterior Probability of Diagnosis Index. *Psychological Assessment, 25*(2), 456–466.
- Lindzey, G. (1959). On the classification of projective techniques. *Psychological Bulletin, 56*(2), 58–168.
- Livesley, W. J. (2003). *Practical management of personality disorder*. New York, NY: Guilford Press.
- Livesley, W. J. (2006). The dimensional assessment of personality (DAPP) approach to personality disorder. In S. Strack (Ed.), *Differentiating normal and abnormal personality* (2nd ed., pp. 401–430). New York: Springer.
- Livesley, W. J., & Jackson, D. N. (2009). *Manual for the dimensional assessment of personality problems-basic questionnaire (DAPP-BQ)*. London: Sigma Assessment Systems.
- Lütkepohl, H. (2005). *New introduction to multiple time series analysis*. Berlin, Germany: Springer Science & Business Media.
- MacKinnon, D. P., & Pirlott, A. G. (2015). Statistical approaches for enhancing causal interpretation of the M to Y relation to mediation analysis. *Personality and Social Psychology Review, 19*(1), 30–43.
- Mallinckrodt, B., Miles, J. R., & Recabarren, D. A. (2016). Using focus groups and Rasch item response theory to improve instrument development. *Counseling Psychologist, 44*(2), 146–194.
- Markon, K. E., Quilty, L. C., Bagby, R. M., & Krueger, R. F. (2013). The development and psychometric properties of an informant-report form of the Personality Inventory for DSM-5 (PID-5). *Assessment, 20*(3), 370–383.
- Marsh, H. W., Morin, A. J. S., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modelling: an integration of the best features of exploratory and confirmatory factor analyses. *Annual Review of Clinical Psychology, 10*, 85–110.
- Masyn, K. E., Henderson, C. E., & Greenbaum, P. E. (2010). Exploring the latent structures of psychological constructs in social development using the dimensional–categorical spectrum. *Social Development, 19*(3), 470–493.
- May, M. J. (1986). The factor structure of the Family Environment Scale. *Dissertation Abstracts International, 46*(12), 4407–4408.
- McCrae, R. R., & Costa, P. T. (2010). *NEO Inventories for the NEO Personality Inventory-3 (NEO PI-3), NEO Five-Factor Inventory-3 (NEO-FFI-3) and NEO Personality Inventory-revised (NEO PI-R): Professional Manual*. Odessa, FL: Psychological Assessment Resources.
- McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., & Saunders, P. R. (2000). Nature over nurture: temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78*(1), 173–186.
- McMahon, R. J., & Forehand, R. L. (2005). *Helping the noncompliant child: Family based treatment for oppositional behaviour*. New York, NY: Guilford Press.
- Messick, S. (1989). Meaning and values in test validation: the science and ethics of assessment. *Educational Researcher, 18*(2), 5–11.
- Messick, S. (1998). Test validity: a matter of consequence. *Social Indicators Research, 45*(1–3), 35–44.
- Milfont, T. L., Duckitt, J., & Wagner, C. (2010). The higher order structure of environmental attitudes: a cross-cultural examination. *Interamerican Journal of Psychology, 44*(2), 263–273.
- Molenaar, P. C. (2004). A manifesto on psychology as idiographic science: bringing the person back into scientific psychology, this time forever. *Measurement, 2*(4), 201–218.
- Molenaar, P. C., & Campbell, C. G. (2009). The new person-specific paradigm in psychology. *Current Directions in Psychological Science, 18*(2), 112–117.
- Monahan, J., & Skeem, J. L. (2014). The evolution of violence risk assessment. *CNS Spectrums, 19*(5), 419–424.
- Monahan, J., & Skeem, J. L. (2015). Risk assessment in criminal sentencing. *Annual Review of Clinical Psychology, 12*, 489–513.

- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*(2), 361–388.
- Mullen, B., Muellerleile, P., & Bryant, B. (2001). Cumulative meta-analysis: a consideration of indicators of sufficiency and stability. *Personality and Social Psychology Bulletin, 27*(11), 1450–1462.
- Murphy, K. R., & Davidshofer, C. O. (2004). *Psychological testing: Principles and applications* (6th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Murray, H. A. (1938). *Explorations in personality: A clinical and experimental study of 50 men of college age*. Oxford: Oxford University Press.
- Neff, K. D. (2003). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101.
- Nuechterlein, K. H., Barch, D. M., Gold, J. M., Goldberg, T. E., Green, M. F., & Heaton, R. K. (2004). Identification of separable cognitive factors in schizophrenia. *Schizophrenia Research, 72*(1), 29–39.
- Paulhus, D. L. (1991). Measurement and control of response bias. *Measures of Personality and Social Psychological Attitudes, 1*, 17–59.
- Paulhus, D. L., & Trapnell, P. D. (2008). Self-presentation of personality: an agency communion framework. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality psychology: Theory and research* (3rd ed., pp. 492–517). New York, NY: Guilford Press.
- PDM Task Force. (2006). *Psychodynamic diagnostic manual*. Silver Spring, MD: Alliance of Psychoanalytic Organizations.
- Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: the early childhood behaviour questionnaire. *Infant Behaviour and Development, 29*(3), 386–401.
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., Stouthamer-Loeber, M., & Liu, J. (2006). The reactive-proactive aggression questionnaire: differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behaviour, 32*(2), 159–171.
- Read, J., Perry, B. D., Moskowitz, A., & Connolly, J. (2001). The contribution of early traumatic events to schizophrenia in some patients: a traumagenic neurodevelopmental model. *Psychiatry, 64*(4), 319–345.
- Renaud, J., Berlim, M. T., McGirr, A., Tousignant, M., & Turecki, G. (2008). Current psychiatric morbidity, aggression/impulsivity, and personality dimensions in child and adolescent suicide: a case–control study. *Journal of Affective Disorders, 105*(1–3), 221–228.
- Reynolds, W. M. (2010). *Reynolds Children Depression Scale* (2nd ed.). Lutz, FL: Psychological Assessment Resources.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *BASC-2: Behaviour assessment system for children* (2nd ed.). Circle Pines, MN: American Guidance Service.
- Reynolds, C. R., & Richmond, B. O. (2008). *Revised Children's Manifest Anxiety Scale (RCMAS-2)* (2nd ed.). Los Angeles, CA: Western Psychological Services.
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. *Psychological Bulletin, 132*(1), 1–25.
- Robins, R. W., & Tracy, J. L. (2003). Setting an agenda for a person-centered approach to personality development. *Monographs of the Society for Research in Child Development, 68*(1), 110–122.
- Robinson, C. C., Mandlco, B., Olsen, S. F., & Hart, C. H. (2001). The Parenting Styles and Dimensions Questionnaire (PSQD). In B. F. Perlmutter, J. Toulaiatos, & G. W. Holden (Eds.), *Handbook of family measurement techniques: Vol. 3 Instruments & index* (pp. 319–321). Thousand Oaks, CA: Sage.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at 3–7 years: the Children's Behaviour Questionnaire. *Child Development, 72*(5), 1394–1408.
- Rudd, M. D. (2000). The suicidal mode: a cognitive-behavioural model of suicidality. *Suicide and Life Threatening Behaviour, 30*(1), 18–33.
- Rudd, M. D., Schmitz, B., McClenen, R., Joiner, T., Elkins, G., & Claassen, C. (2010). The Suicide Cognitions Scale: a suicide-specific measure of hopelessness. *Journal of Abnormal Psychology, 119*(4), 631.
- Sanislow, C. A., Pine, D. S., Quinn, K. J., Kozak, M. J., Garvey, M. A., Heinssen, R. K., & Cuthbert, B. N. (2010). Developing constructs for psychopathology research: research domain criteria. *Journal of Abnormal Psychology, 119*(4), 631.
- Schmidt, F. L., & Hunter, J. E. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology, 62*(5), 529.
- Shaffer, D., Fisher, P., Lucas, C., Dulcan, M., & Schwab-Stone, M. (2000). NIMH Diagnostic Interview Schedule for Children, Version IV (NIMH DISC-IV): description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 28–38.
- Shedler, J., & Westen, D. (2007). The Shedler–Westen Assessment Procedure (SWAP): making personality diagnosis clinically meaningful. *Journal of Personality Assessment, 89*(1), 41–55.
- Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika, 74*(1), 107–120.
- Simonds, J., & Rothbart, M. K. (2004). *Temperament in Middle Childhood Questionnaire*. In Poster Sess Present Occas Temperament Conf Athens, GA.
- Singh, J. P., Grann, M., Lichtenstein, P., Långström, N., & Fazel, S. (2012). A novel approach to determining violence risk in schizophrenia: developing a stepped strategy in 13,806 discharged patients. *PLoS One, 7*(2), e31727.
- Sireci, S., & Faulkner-Bond, M. (2014). Validity evidence based on test content. *Psicothema, 26*(1), 100–107.
- Skeem, J., Kennealy, P., Monahan, J., Peterson, J., & Appelbaum, P. (2016). Psychosis uncommonly and inconsistently precedes violence among high-risk individuals. *Clinical Psychological Science, 4*(1), 40–49.
- Skeem, J. L., Manchak, S., & Peterson, J. K. (2011). Correctional policy for offenders with mental illness: creating a new paradigm for recidivism. *Law and Human Behavior, 35*(2), 110–126.
- Spencer, J. P., & Schöner, G. (2003). Bridging the representational gap in the dynamic systems approach to development. *Developmental Science, 6*(4), 392–412.
- Steeneman, P., Meesters, C., & Muris, P. (2002). *ToM-test*. Leuven-Apeldoorn, Belgium: Garant.

- Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53*(1), 80–93.
- Stone, E. F., Stone, D. L., & Gueutal, H. G. (1990). Influence of cognitive ability on responses to questionnaire measures: measurement precision and missing response problems. *Journal of Applied Psychology, 75*(4), 418–427.
- Tager-Flusberg, H. (2003). Exploring the relationships between theory of mind and social-communicative functioning in children with autism. In B. Reppacholi, & V. Slaughter (Eds.), *Individual differences in theory of mind: Implications for typical and atypical development* (pp. 197–212). London: Psychology Press.
- Tellegen, A., Ben-Porath, Y. S., McNulty, J. L., Arbisi, P. A., Graham, J. R., & Kaemmer, B. (2007). *MMPI-2 Restructured Clinical (RC) Scales: Development, validation, and interpretation*. Minneapolis, MN: University of Minnesota Press.
- Terman, L. M. (1916). *The measurement of intelligence: An explanation of and a complete guide for the use of the Stanford revision and extension of the Binet-Simon Intelligence Scale*. Boston, MA: Houghton Mifflin.
- Trimboli, F., Marshall, R. L., & Keenan, C. W. (2013). Assessing psychopathology from a structural perspective: a psychodynamic model. *Bulletin of the Menninger Clinic, 77*(2), 132–160.
- Vacha-Haase, T. (1998). Reliability generalization: exploring variance in measurement error affecting score reliability across studies. *Educational and Psychological Measurement, 58*(1), 6–20.
- van de Vijver, F. J. R. (1999). Testing the ITC guidelines for adapting educational and psychological tests. *European Journal of Psychological Assessment, 15*(3), 257.
- van de Vijver, F. J. R. (2016). The use of standards in test development. In K. Schweizer, & C. DiStefano (Eds.), *Principles and methods of test construction: Standards and recent advancements* (pp. 7–25). Goettingen, Germany: Hogrefe.
- van de Vijver, F. J. R., & Fischer, R. (2009). Improving methodological robustness in cross-cultural organizational research. In R. S. Bhagat, & R. M. Steers (Eds.), *Handbook of culture, organizations, and work* (pp. 491–517). New York, NY: Cambridge University Press.
- van de Vijver, F. J. R., & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Thousand Oaks, CA: Sage.
- Van Egeren, L. F. (2009). A cybernetic model of global personality traits. *Personality and Social Psychology Review, 13*(2), 92–108.
- van Os, J., Hanssen, M., Bijl, R. V., & Ravelli, A. (2000). Strauss (1969) revisited: a psychosis continuum in the general population? *Schizophrenia Research, 45*(1), 11–20.
- van Os, J., Linscott, R. J., Myin-Germeys, I., Delespaul, P., & Krabbendam, L. (2009). A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness–persistence–impairment model of psychotic disorder. *Psychological Medicine, 39*(02), 179–195.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*, 4–70.
- Vazquez, G. H., Tondo, L., Mazarini, L., & Gonda, X. (2012). Affective temperaments in general population: a review and combined analysis from national studies. *Journal of Affective Disorders, 139*(1), 18–22.
- Wakschlag, L. S., Choi, S. W., Carter, A. S., Hullsiek, H., Burns, J., McCarthy, K., & Briggs-Gowan, M. J. (2012). Defining the developmental parameters of temper loss in early childhood: implications for developmental psychopathology. *Journal of Child Psychology and Psychiatry, 53*(11), 1099–1108.
- Wang, W. C., Chen, H. F., & Jin, K. Y. (2015). Item response theory models for wording effects in mixed-format scales. *Educational and Psychological Measurement, 75*(1), 157–178.
- Wasserman, J. D., & Bracken, B. A. (2013). Fundamental psychometric considerations in assessment. In J. R. Graham, J. A. Naglieri, & I. B. Weiner (Eds.), *Handbook of psychology, Vol. 10: Assessment psychology* (2nd ed., pp. 50–80). Hoboken, NJ: Wiley.
- Wechsler, D. (1939). *Wechsler-Bellevue Intelligence Scale*. New York, NY: Psychological Corporation.
- Wechsler, D. (2008). *Wechsler Adult Intelligence Scale* (4th ed.). San Antonio, TX: Pearson Education.
- Wellman, H. M., & Liu, D. (2004). Scaling of theory of mind tasks. *Child Development, 75*(2), 523–541.
- Wise, E. A., Streiner, D. L., & Walfish, S. (2010). A review and comparison of the reliabilities of the MMPI-2, MCMI-III- and PAI presented in their respective test manuals. *Measurement and Evaluation in Counseling and Development, 42*(4), 246–254.
- Zilboorg, G., & Henry, G. W. (1941). *A history of medical psychology*. New York, NY: W. W. Norton.
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods, 6*(1), 4.

Chapter 2

Classical Test Theory, Generalizability Theory, and Item Response Perspectives on Reliability

Chapter Outline

| | | | |
|--|----|--|----|
| Basic concepts of reliability | 27 | Examining and validating test dimensionality | 32 |
| Sources of unreliability | 28 | Item response theory | 33 |
| Reliability estimation in a multilevel confirmatory factor analysis framework | 28 | MIRT models | 33 |
| Single-level reliability estimation using structural equation modeling | 29 | An extended multidimensional IRT formulation for the linear item factor analysis model | 34 |
| Alpha (α) | 29 | Advantages of IRT | 34 |
| Composite reliability | 29 | IRT models | 35 |
| Maximal reliability | 29 | Empirical studies using IRT | 36 |
| Multilevel reliability | 29 | Developments and types of reliability | 36 |
| Reliability generalization | 30 | Internal consistency | 37 |
| Classical test theory and the Rasch model | 30 | Consistency in scoring | 38 |
| Generalizability theory (GT) | 31 | Summary | 40 |
| | | References | 40 |

BASIC CONCEPTS OF RELIABILITY

According to classical test theory (CTT) (or true score theory) (Lord & Novick, 1968), reliability is defined as the ratio of true-score variance to observed score variance (Lord & Novick, 1968). The observed score is the score that is obtained by the measure itself. The true score is the hypothetical amount of the variable of interest that is specific to the test taker. Measurement error is the difference between the amount of true score and the observed score. The most common conceptualization of reliability is that it is the proportion of observed score variance that is attributable to true score variance:

$$R_{xx} = s_1^2 / s_0^2$$

Where R_{xx} is the reliability coefficient.

Furthermore, observed score variance is the sum of true score variance and error variance.

$$S_0^2 = S_1^2 + S_e^2$$

The size of the reliability coefficient indicates the value of the tests' reliability. Reliability ranges from 0 to 1. The closer the value is to 1, the more satisfactory the reliability. In psychometric language, as R_{xx} increases, a larger proportion of the differences among true scores can be attributed to differences among true scores. Both $R_{xx} = 0$ (every test taker has the same true score) and $R_{xx} = 1$ (there is absolutely no measurement error affecting observed scores) do not exist as these values are unrealistic. Although there is no standard cut-off value separating satisfactory from unsatisfactory reliability correlations between .70 and .80 reflect high reliability.

Reliability can also be seen as the degree to which observed scores are uncorrelated with error scores. Thus,

$$R_{xx} = 1 - r_0^2 e$$

Where $r_0^2 e$ is the squared correlation between observed scores and error scores.

The standard error of measurement (SEM) is the most important concept in measurement theory as it represents the average size of the error scores (Furr & Bacharach, 2008). The larger the standard error of measurement, the greater the average difference between observed scores and true scores and the less reliable the test. We can use reliability (R_{xx}) to find the standard error of measurement:

$$SEM = S_o \sqrt{1 - R_{xx}}$$

Where S_o is the standard deviation of the observed scores.

According to Furr and Bacharach (2008), there are four approaches to understand reliability that reflect two distinctions in the conceptualization of reliability: the first distinction relates to whether an approach conceptualized reliability in terms of proportion of variance or in terms of correlations. The second distinction is whether an approach conceptualized reliability in terms of observed scores as related to true scores or to measurement error.

Sources of unreliability

Some sources of unreliability are the following:

1. The *appropriateness or relevance of the item content*. Because of potential item irrelevance, internal consistency analyses are used to eliminate invalid items in scale development. The *coefficient α* has proven most useful in this domain.
2. *Item content heterogeneity* reveals whether the items in a scale cover many different aspects of a trait or focus on only a few.
3. Retest reliability is affected by a third property of scales; their state variation over time is called *transient error* (Schmidt, Le, & Ilies, 2003). Fleeson (2001) argued that the state perception of traits varies around a central tendency that represents the trait level. It is possible that some traits show intrinsically higher state variation than others.
4. Unreliability is often characterized as an indication of *error of measurement*. A common source of random error is respondent's test-taking behavior. α Coefficient will likely be reduced if examinees have limited literacy or intelligence (Allik, Laidra, Realo, & Pullmann, 2004). Random responding will also affect retest reliability.
5. A fifth source of unreliability is *item ambiguity*. Items that are difficult to comprehend because of complex vocabulary, ambiguous or double-barreled phrasing, or the use of negations or complex sentence structure may confuse respondents and thus affect both the internal consistency and the retest reliability of scores.
6. Characteristics of the sample may affect both reliability and validity coefficient, most notably trait variance.

RELIABILITY ESTIMATION IN A MULTILEVEL CONFIRMATORY FACTOR ANALYSIS FRAMEWORK

Reliability estimates are as trustworthy as the information used to estimate them. Estimating reliability from data collected through multistage sampling can confound within and between cluster item variance (i.e., within-group variance and between group variance). Thus, *multistage sampling* may lead to biased reliability estimates when the assumption of independent residuals is violated (e.g., Snijders & Bosker, 1999). Multistage sampling occurs when cases are randomly sampled from higher-order units that are themselves collected from a larger population of such units. For example, a researcher might recruit several schools, select a sample of classrooms from each school, and then obtain samples of students from each classroom (e.g., Connor et al., 2010).

Multistage sampling occurs when cases are randomly sampled from higher-order units that are themselves sampled from a larger population of such units. For example, an education researcher might recruit several schools, select a sample of classrooms from each school, and then obtain samples of students from each classroom (e.g., Connor et al., 2010). Multistage sampling results in hierarchically structured data (e.g., students nested within classrooms), making residuals dependent in the presence of between-cluster variation. Scores on key variables from children in a given classroom might be more alike than those of children in different classrooms, for instance. Neglecting hierarchical data structures can bias estimates of interitem relationships, thus biasing reliability estimation for a desired level of analysis. Single-level reliability estimates therefore do not necessarily reflect true scale reliability at any single level of analysis (Geldhof, Preacher, & Zyphur, 2014).

Geldhof et al. (2014) offer researchers a conceptual and operational foundation of understanding reliability at multiple levels of analysis and examine the way multilevel, confirmatory factor analysis (MCFA) can be employed to differentially estimate reliability within and between clusters of a multilevel model.

Single-level reliability estimation using structural equation modeling

Researchers commonly estimate various reliability coefficients in the framework of confirmatory factor analysis (CFA) and structural equation modeling. The most commonly utilized reliability estimates are α , ω , and H.

Alpha (α)

Traditional methods of reliability estimation rely on the general linear model (GLM) and are easy to utilize in GLM-based frameworks, such as SEM and CFA. For example, Cronbach's Equation 16 for computing α (Cronbach, 1951) specifies α as a function of the average interitem covariance within a scale, the variance of the scale score, and the number of items included in the scale.

While it has long been known that α is in most cases an inconsistent estimator of reliability (e.g., Novick & Lewis, 1967), it remains the most common reliability estimate used in psychological research and consequently an important statistic in the study of issues related to scale reliability.

Composite reliability

The average interitem covariance provides a limited estimate of a scale's true score variance, as evidenced by the fact that is a consistent estimate of reliability only when all items load on a single underlying construct and when all items represent that construct equally well (i.e., essential tau equivalence; Novick & Lewis, 1967). CFA allows for heterogeneous correlations between indicators and their underlying common factor(s) (i.e., heterogeneous factor loadings), and *composite reliability* (ω) as calculated from factor loadings, produces more precise estimates of reliability than those provided by α .

Composite reliability has been explored by several scholars (e.g., Bentler, 2007) and is conceptually similar to α in that it represents the ratio of a scale's estimated true score variance relative to its total variance. Unlike α , however, ω acknowledges the possibility of heterogeneous item-construct relations and estimates true score variance as a function of item factor loadings in a matrix.

Maximal reliability

One alternative to comparing true score variance to the variance of a unit-weighted scale is presented as *maximal reliability* (H; e.g., Bentler, 2007; Raykov, 2004), which represents the reliability of a scale's optimally weighted composite.

The coefficients α , ω , and H therefore provide point estimates of a scale's reliability (although H represents the reliability of optimally weighted composite).

Multilevel reliability

A significant body of research has focused on reliability estimation for multilevel models, but research has mainly focused on how reliably group means of a dependent variable represent the larger distribution of group means in a population (e.g., Raykov & Marcoulides, 2006; Raykov & Penev, 2010). While informative for multilevel models in general, the reliability of group means as estimates of the distribution of group means in a population is different than measurement reliability.

Of greater present interest is the estimation of a scale's reliability under two-stage random sampling (i.e., multilevel data). Approached from a multilevel perspective, two-stage sampling leads to observed scores (y_{ik}) that contain both true score and measurement error variance at both the within-cluster and between-cluster levels. Thus, an MCFA approach to multilevel data allows researchers not only to model data for which a scale represents the same construct at each level but also to model data for which only a between-cluster construct is meaningful (e.g., Kozlowski & Klein, 2000) or for which only within-level heterogeneity is meaningful (e.g., Fitzmaurice, Laird, & Ware, 2011). Further, MCFA allows for qualitatively different constructs at each level such that a single scale may contain items that possess different factor structures within versus between clusters.

Reliability generalization

Score reliability estimates the degree to which scores measure “something” as opposed to “nothing” (i.e., responses are completely random). Random variations in data, including the random variations linked to measurement error, weaken the relationships among measured variables. Thus, the score reliabilities for the scores in hand should be the first prior to conducting any further analyses.

Given the importance of score reliability in all quantitative analyses and the fluctuations in reliabilities across test administrations, [Vacha-Haase and Thompson \(2011\)](#) propose ways to explore systematically the variabilities in reliabilities. In a seminal article [Vacha-Haase \(1998\)](#) proposed reliability generalization as an extension of validity generalization developed by [Schmidt and Hunter \(1977\)](#) and [Hunter and Schmidt \(1990\)](#). [Vacha-Haase \(1998\)](#) described reliability generalization as a method to examine in an empirical way: (1) the typical reliability of scores for a given test across studies, (2) the amount of variables in reliability coefficients for given measures, and (3) the sources of reliability coefficients across “studies” (p. 6).

To date, several dozen reliability generalization metaanalyses have been reported across an impressive array of measures. For example, reliability generalization studies have been conducted on literatures for measures involving state–trait anxiety ([Barnes, Harp, & Jung, 2002](#)), locus of control ([Beretvas, Suizzo, Durham, & Yarnell, 2008](#)), psychopathology ([Campbell, Pulos, Hogan, & Murry, 2005](#)), learning styles ([Henson & Hwang, 2002](#)), substance abuse propensities ([Miller, Woodson, Howell, & Shields, 2009](#)), or life satisfaction ([Wallace & Wheeler, 2002](#)).

CTT provides several ways of estimating reliability, mainly by distinguishing true scores from error scores. The true score of a person can be obtained by calculating the average of the scores that the person would receive on the same test if the person took the test an infinite number of times. Because it is impossible to obtain an infinite number of test scores, the true score is by definition hypothetical ([Kline, 2005](#)). CTT estimates of reliability are useful in detecting the general quality of the test scores in question. However, these estimates have a number of limitations: (1) each CTT estimate can only address one source of estimate error at a time. Thus, CTT cannot provide information about the effects of multiple sources of error and how these differ, (2) CTT treats all errors to be random or “unidimensional” ([Baker, 1997](#)). Thus, CTT reliability estimates do not distinguish systematic measurement error from random measurement error. Finally, CTT has a single estimate of SEM for all participants ([Weir, 2005](#)). These limitations of CTT are addressed by item response theory (IRT).

Sources of error scores might be random sampling error, internal inconsistencies among items or tasks within the test, inconsistencies over time, inconsistencies across different forms of the test, or inconsistencies within and across raters. Under CTT, reliability can be estimated by calculating the correlation between two sets of scores, or by calculating Cronbach’s α , which is based on the variance of different sets of scores ([Bachman, 1990](#)). The higher the value of Cronbach’s α is, the better the consistency level of the test will be. While, under CTT the internal consistency reliability is usually measured by calculating Cronbach’s α , the interrater reliability is estimated by calculating Cohen’s κ if the data is interval scale or Spearman correlation coefficient if the data is rank ordered scale.

Classical test theory and the Rasch model

In CTT it is difficult to specify the point at which a correlation becomes too high. However, from the perspective of the Rasch model, the paradox is eliminated in the following way. In the Rasch model, all items (restricted to the dichotomous case) are required to have the same discrimination: when the item analysis is carried out, the relative locations of the items and persons are estimated with respect to the geometric mean of the item discriminations. That is, a single common discrimination is defined for all the items. Items are identified as misfitting the Rasch model when they discriminate more or less than the common item characteristic curve. The implication is that to sharpen the test, which is to maximize the reliability and the validity with a subset of the original items and with respect to the original intention of the variable, it is necessary to eliminate both the extremely negative discriminating items and the extremely positive discriminating items.

A resolution of the attenuation paradox has been hinted at from time to time in the Rasch measurement literature ([Andrich, 1988](#)) but is not incorporated in the mainstream of educational and psychological measurement. The key point is that the Rasch model, in which items are constrained to have a common discrimination, maximizes the validity for a specified number of items. Another implication is that items that correlate most highly with other items, and therefore show a higher discrimination relative to the common latent trait, are the most redundant, and those that discriminate poorly are the least relevant.

Interrater Reliability

In CTT, an intraclass correlation coefficient is typically used to assess interrater reliability, or the consistency of judges’ ratings across people, events, or tasks ([Shrout & Fleiss, 1979](#)). Beyond interpreting the intraclass correlation coefficient, no

further information is provided. The Rasch model, however, provides more detailed output on the basis of rater severity and consistency to better understand judge rating behavior and judge bias in ratings (Schumacker & Lunz, 1997).

Alternate-Forms Reliability

CTT alternate-forms (or parallel-forms) reliability involves correlating the test scores on two different versions of a test given to the same examinees. The Rasch model once again uses the anchoring technique to obtain a reliability estimate and also provides additional information.

Generalizability theory (GT)

The concept of reliability, so fundamental to CTT, is replaced by the broader and more flexible concept referred to as generalizability (Table 2.1). GT (Cronbach, Gleser, Nanda, & Rajaratnam, 1972) is a psychometric framework appropriate for complex measurement strategies. Instead of asking how accurately observed scores reflect their corresponding true scores, GT examines the accuracy that observed scores allow us to generalize about person's behavior in a defined universe of situations (Shavelson, Webb, & Rowley, 1989). Generalizability studies attempt to identify the amount of variability produced by several factors (error variance), such as the characteristics of the examiners or the examinees, testing conditions, item content, or time restrictions. GT posits that we are interested in the "reliability" of an observation or measurement because we wish to generalize from this observation to some other class of observations. For example, we might want to investigate well scores on an attribute scale developed under specific procedures, generalize to another scale constructed according to different procedures, or evaluate the generalizability of memory test originally developed in the United Kingdom to a Turkish cultural context.

Whereas CTT tries to estimate the portion of variance that is attributable to "error," GT aims to estimate the extent to which specific sources of variance contribute to test scores under carefully defined conditions. Therefore, instead of the traditional reliability coefficient we should employ more general estimates, such as intraclass correlation coefficients, to explore particular aspects of the dependability of measures.

Despite its theoretical foundations (e.g., Shavelson et al., 1989), GT is not used as widely as it should be (John & Benet-Martinez, 2000). However, GT is employed in growing research on determinants of consensus among personality raters (Kashy & Kenny, 2000) and in the investigation of other agreement (John & Robins, 1993).

Some major advantages of GT are the following: (1) It recognizes multiple sources of measurement error, estimates each source separately, and provides a mechanism for optimizing the reliability; (2) although GT provides a relative coefficient, the theory focuses on variance components that indicate the magnitude of each source of error; (3) GT distinguishes

TABLE 2.1 Reliability: Facets of Generalizability, Traditional Definitions of Reliability Coefficients, and Estimation Procedures

| Facet of Generalizability | Major Sources of Error | Traditional Reliability Coefficient | Procedure | Statistical Analysis |
|---------------------------|--|--|---|--|
| Times | Change of participant's responses over time; change in testing situation | Retest (or stability) | Test participants at different times with same form | Pearson or intraclass correlation |
| Forms | Differences in content sampling across "parallel" forms | Equivalence | Ten participants at one time with two forms covering same content | Pearson or intraclass correlation |
| Items | Content heterogeneity and low content saturation in the items | 1. Split-half 2. Internal consistency | Test participants with multiple items at one time | 1. Correlation between test halves (Spearman-Brown corrected) 2. Coefficient α |
| Judges or observers | Disagreement among judges | Internal consistency | Obtain ratings from multiple judges on one fm and occasion | 1. Pairwise interjudge correlation 2. Coefficient α 3. Intraclass correlation |

Source: Reprinted from John, O. P. & Benet-Martinez, V. (2000). Measurement, scale construction and reliability. In H. T. Reis & C. M. Judd (Eds). *Handbook of research methods in social and personality psychology*. (pp. 339–369). New York, NY: Cambridge University Press, with permission. Copyright 2000 Cambridge University Press.

between *relative* (where interest focuses on the dependability of the differences among individuals) and *absolute* (scores are interpreted without reference to the performance of others) decisions; and (4) GT distinguishes between generalizability and decision studies. Generalizability studies estimate as many potential sources of measurement error as possible. Decision studies (D studies) use information from generalizability studies to design a measure that minimizes error for a particular purpose.

GT and CTT are fundamentally concerned with reliability of scores. The main difference between the two is that GT allows for separation of individual sources of measurement error. Quantification of measurement error and derivation of associated reliability coefficients in GT are based on variance components typically taken from within-subject analyses of variance (ANOVAs). In a GT ANOVA design, persons usually represent the object of measurement, and sources of measurement error (content units, occasions, raters, etc.) represent the facets of interest. These facets in turn define the context within which results are generalized, leading to the terms universe score and generalizability coefficient (G-coefficient) in GT replacing the terms true score and reliability coefficient in CTT. As with factors in conventional ANOVAs, facets in GT designs can be treated as either random or fixed effects. With random facets, conditions are assumed to be sampled from theoretically infinite universes to allow for generalization to those universes.

When items or parallel splits are the sole random facets of interest, G-coefficients will be identical to α and Rulon (1939) split-half coefficients, respectively. Similarly, when variances for forms or occasions are the same, G-coefficients will equal corresponding conventional parallel-form and test-retest coefficients. However, a serious limitation of these G-coefficients and their conventional counterparts is that they do not take all relevant sources of measurement error into account. With objectively scored clinical assessments, three primary types of measurement error can affect scores: random-response, specific-factor, and transient (Becker, 2000; Reeve, Heggstad, & George, 2005; Schmidt et al., 2003).

In a recent study, Vispoel, Morris, and Kilinc (2016) applied a new approach to GT involving parallel splits and repeated measures to evaluate common uses of the Paulhus Deception Scales based on polytomous and four types of dichotomous scoring. GT indices of reliability and validity accounting for specific-factor, transient, and random-response measurement error supported use of polytomous over dichotomous scores as contamination checks; as control, explanatory, and outcome variables; as aspects of construct validation; and as indexes of environmental effects on socially desirable responding.

Results indicate ways in which the new GT design can enhance evidence of reliability and validity for objectively scored clinical assessments. Inclusion of parallel splits rather than items within this design provided better representation of content effects, and together with occasion effects yielded more informative indices of overall reliability, dependability of cut-scores, and convergent/discriminant validity. Combining GT results with those for conventional indices of distributional characteristics, reliability, and validity produced strong evidence supporting polytomous over dichotomous scoring.

EXAMINING AND VALIDATING TEST DIMENSIONALITY

Under the IRT framework, test dimensionality is one of the major issues explored at the beginning of test development, along with a validity foundation that identifies the test purposes, uses, and the inferences to be made about examinees (Schmeiser & Welch, 2006). Generally, test dimensionality reflects the number of latent traits test developers would like to extract from the test; items are therefore developed and grouped into test forms to align with the intended trait(s) or dimension(s).

Kane (2006) pointed out that the validation of proposed test purposes, uses, and interpretations should be separated into two stages: development and appraisal. Similarly, Schmeiser and Welch (2006) stated that the inextricable link between the test development process and validation serves two functions: (1) to provide support that the test is serving the intended test purposes and dimensionality or (2) to suggest that the test design must be improved through further empirical analysis.

Various methods are used to assess test dimensionality; such methods include linear factor analysis, nonparametric tests for unidimensionality, and the use of multidimensional IRT (MIRT) models. MIRT models were selected in this study as the main method for several reasons. First, as Lane and Stone (2006) stated, one advantage of IRT models over linear factor analytic methods is that information from examinee response patterns is analyzed as opposed to the more limited information from correlation matrices. Second, nonlinear models, such as IRT models may better reflect the relationship between item performance and the latent ability (Hattie, 1985). Third, the nonparametric test proposed by Stout (1990) has limited power to detect divergence from unidimensionality for short test lengths and for small latent trait intercorrelations (e.g., Nandakumar, Yu, Li, & Stout, 1998). This may not be a critical issue because longer tests and moderate to high latent ability correlations are common in operational settings. Fourth, Embretson and Reise (2000) pointed out that MIRT models have been used to assess dimensionality of tests in which items reflect different skills, knowledge, or cognitive processes.

ITEM RESPONSE THEORY

The development of CTT (Spearman, 1904) and common factor theory (Spearman, 1904) led to the now widely held belief that individual traits can be quantified. The introduction of IRT (Lord & Novick, 1968) along with Rasch (1980) treatment of probabilistic models in cognitive testing, contributed to the refinement in psychological measurement (Bock, 1997). The popularity of IRT is attributed to the development of models that can distinguish the characteristics between examinees and tools (Thomas, 2011). Its main target is to provide models that assign concrete values to abstract concepts. IRT is modified on the existence of latent variables: constructs that cannot be measured in a direct way, yet their existence is inferred through the associations among measurable qualities. Latent variables appear to account for all observed covariation between test items.

MIRT and CFA analyses can be used to assess the dimensionality or underlying latent variable structure of a measurement. The choice of statistical procedures raises questions about differences between analyses, whether the results of the two analyses are consistent, and what information can be obtained from one analysis but not the other. IRT addresses two problems inherent in CTT. First, IRT overcomes the problem of item–person confounding found in CTT. IRT analysis yields estimates of item difficulties and person-abilities that are independent of each other, whereas in CTT item difficulty is assessed as a function of the abilities of the sample, and the abilities of respondents are assessed as a function of item difficulty (Bond & Fox, 2001), a limitation that extends to CFA. Second, the use of ordinal level data (i.e., rating scales), which are routinely treated in statistical analyses as averaged over trait levels as in CTT, and the contribution of each item to the overall precision of the measure can be assessed and used in item selection (Hambleton & Swaminathan, 1985).

Both IRT and CFA provide statistical indicators of psychometric performance not available in the other analysis. Using the item information curve, IRT analysis allows the researcher to establish both item information functions (IIF) and test information functions (TIF). The IIF estimates the precision and reliability of individual items independent of other items on the measure; the TIF provides the same information for the total test or measure, which is a useful tool in comparing and equating multiple tests (Embretson & Reise, 2000). IRT for polytomous response formats also provides estimated category thresholds for the probability of endorsing a given response category as a function of the level of underlying trait. These indices of item and test performance and category thresholds are not available in CFA in which item and test performance are conditional on the other items on the measure. Conversely, CFA offers a wide range of indices for evaluating model fit, whereas IRT is limited to the use of the χ^2 deviance statistic. Reise, Widaman, and Pugh (1993) explicitly identified the need for modification indices and additional model fit indicators for IRT analyses as a limitation.

MIRT models

Unidimensional IRT models typically rely on the assessment of a score on a single unidimensional domain at a time. This does not take into account the multidimensional nature of the complex constructs that are assessed in most personality tests. MIRT models account for the multidimensional nature of the complex constructs based on the premise that a respondent possesses a vector of latent person characteristics that describe the person's level of personality on the different traits. In most personality tests, items are designed to measure a single facet.

MIRT are models that explain the relationship between two or more latent variables, conceptualized as constructs or dimensions, and the probability of the examinee who is correctly answering any particular test item by the mathematical model (Ackerman, Gierl, & Walker, 2003). Like unidimensional models, multidimensional models also have some assumptions; these are *monotonicity* and *local independence*. Monotonicity means that as the examinee ability level increases, the probability of the examinee correctly answering any particular test item increases (Smith, 2009). Local independence is defined as the probability of solving any item i is independent of the outcome of any other item, controlling for person parameters and item parameters (Embretson & Reise, 2000).

There are two types of MIRT models, depending on whether compensation of high proficiency on one trait to the low proficiency on other traits is available. These models are *compensatory* and *noncompensatory* MIRT models (Sijtsma & Junker, 2006). In compensatory MIRT models, the latent abilities interact such that a deficiency in an ability can be triggered by an increase in other abilities. By contrast, in noncompensatory MIRT models, sufficient levels of each measured ability are required, and a deficiency in one ability cannot be completely offset through an increase others. Compensatory models may be most appropriate for items having disjunctive component process.

In multidimensional IRT, item characteristic surface (ICS) is used to represent the probability that an examinee with a given ability composite will correctly answer an item. ICS has changed some concepts in MIRT. Reckase (1997) has defined these concepts as multidimensional item difficulty and multidimensional item discrimination.

Many MIRT models exist (Reckase, 2009), such as the multidimensional extension of the generalized partial credit model (GPCM). In practice, results obtained using the GPCM can hardly be distinguished from results obtained using alternative models, such as the graded response model and the sequential model (Verhelst, Glas, & de Vries, 1997). The multidimensional GPCM is a straightforward generalization of the unidimensional GPCM. The multidimensional GPCM extends to cases where examinees can be characterized by their standing on multiple traits, which have a multivariate normal distribution.

MIRT models (e.g., Reckase, 2009), which use information about the correlations between facets to efficiently score test results, provide a framework for administering items adaptively based on the characteristics of the items and information about the test respondent from previous items. This is known as multidimensional computer adaptive testing (MCAT; e.g., Segall, 1996) and is similar to the general idea of computer adaptive testing (CAT; e.g., van der Linden & Glas, 2010) but within a multidimensional framework. MCAT has been found to increase the precision of trait scores compared with CAT and more traditional scoring methods for tests used in ability testing (e.g., Segall, 2010). MIRT and MCAT are methodological developments that may be useful for the field of personality testing where there is a need to assess a large number of correlated personality facets with a high level of precision.

The fundamental goal of MCAT is to locate the respondent's position in a multidimensional latent context with a high level of precision (or low level of error). This can be achieved by administering items adaptively by selecting the next item that is expected to contribute most to the precision of the trait estimates. Three criteria are necessary to administer items adaptively with MIRT: (1) a selection criterion that defines which item should be selected and presented in the next step; (2) a stopping criterion that defines when the test should stop; and (3) a method for estimating scores on the latent traits.

Recent research has successfully investigated the use of MIRT for modeling the relationships of examinees to a set of test items that measure multiple constructs (e.g., de la Torre, 2008; Finch, 2010). In the framework of dichotomous items, MCAT has been found to increase the precision of trait scores compared with CAT and more traditional scoring methods for tests used in ability and achievement testing (e.g., Segall, 2000, 2010). Wang and Chen (2004) adapted CAT to multidimensional scoring of polytomous (e.g., Likert-type scale) items.

An extended multidimensional IRT formulation for the linear item factor analysis model

On the basis of the previous studies mentioned earlier, Ferrando (2008) proposed an alternative parameterization of Spearman's model in which it was explicitly formulated as a dominance-based IRT model. The resulting formulation is similar in form to Lord's standard parameterization of the two-parameter IRT model for binary responses (Lord, 1952), in which the item location or difficulty parameter is on the same scale as the trait that is measured.

Ferrando's proposal has three advantages over the conventional factor analysis formulation. First, it provides more information about item functioning and the relative standing of the individual with respect to the item. Second, it allows the results of the analysis to be interpreted in relation to a specific model of item responding. Third, it allows for further validity extensions with respect to external or auxiliary measures.

Ferrando (2008) also proposed multidimensional extensions to the linear item factor analysis model that were related to similar developments made in MIRT (e.g., Reckase, 2009). In particular, he proposed multidimensional measures of difficulty, discrimination, information, and model appropriateness.

Overall, the proposal was similar to those made in MIRT in which multidimensional indices have been proposed, but the basis parameterization is the standard threshold/slopes parameterization (Reckase, 2009).

Advantages of IRT

The main advantage of IRT is that item location (b) and the person trait level (T) are indexed on the same metric. Therefore, when an individual's trait level is higher than the item location on the trait continuum, that person is more likely than not to provide a trait indicating a positive, or true, response. The opposite is true when the trait level is below the item location. The item location parameter b is commonly referred to as the *item difficulty parameter*.

In contrast with CTT, IRT makes it possible to obtain item difficulty estimates that are invariant across samples. That is, in IRT, increasing levels of item difficulty are examined with regard to the parameters that represent the properties of the items, regardless of the characteristics of the groups that responded to them (Hambleton, Swaminathan, & Rogers, 1991).

IRT is appropriate for evaluating short forms and allows for testing reliability via the TIF, which informs us on how well a test estimates ability across a range of scores. Since the amount of information is defined at the item level, even a small number of good items can warrant adequate reliability of test score, at least for some levels of ability (e.g., De Ayala, 2009; Embretson & Reise, 2000).

Researchers working with psychopathology data are showing increased interest in IRT (Embretson & Reise, 2000) for model-based psychological assessment. The one-, two-, and three-parameter logistic models for binary item responses have dominated research in this area for the last 25 years (1PLM; 2PLM; 3PLM; Birnbaum, 1968). Gradually researchers are starting to implement the option of the four-parameter logistic model (4PLM) in psychopathology data (e.g., Loken & Rulison, 2006).

IRT models are increasingly employed to solve measurement problems in content areas beyond aptitude and achievement testing. A possible explanation for this trend is the belief that IRT offers practical advantages over CTT (Embretson, 1996). Reise, Ainsworth, and Haviland (2005) refer to the following advantages of IRT: (1) provides rigorous methods for testing differential item and test functioning in group comparisons; (2) can place individuals from different groups onto a common measurement scale; (3) produces test scores with acceptable psychometric properties that facilitate the measurement of individual change; and (4) provides a methodology for developing individual tailored tests via computerized adaptive testing (Wainer, 1990). More recently Reise and Waller (2010) discuss the application of 4PLM (Barton & Lord, 1981) to psychopathology data and in particular the MMPI-A. The results from these analyses supported the authors' original assumption that the 4PLM was necessary to accurately characterize item response behavior on some psychopathology items.

One limitation of IRT is the need for large samples. No clear standards exist for minimum sample size, although Embretson and Reise (2000) briefly noted that a sample of 500 respondents was recommended, and cautioned that parameter estimations might become unstable with samples of less than 350 respondents.

IRT models

IRT models rest on the assumption that the probability of an examinee passing an item is the outcome of two sets of parameters: (1) their standing on the latent variables the personality parameter; and (2) the characteristics of the item and the item parameters. Most IRT models fall under the category of general linear mixed models, an extension of linear mixed models to a specific category of nonlinear mixed models (e.g., Molenberghs & Verbeke, 2005).

Item characteristic curves (ICCs) are displayed as graphs of the probability of passing items conditional on specific values of the latent distribution. For most IRT models, *item difficulty* is the value along the latent variables continuum at which an individual has .50 probability of passing or affirming that item. From a clinical perspective "difficulty" may be equivalent to "severity" (e.g., the severity of depression in affirming a statement like "I have often thought of ending my own life"). An item's discrimination parameter is related to the slope of its ICC at its difficulty value. Items with higher discrimination values are more discriminating between distinct levels of the latent variables. Finally, the lower asymptote parameter also known as the pseudo-guessing parameter accounts for the fact that with some types of response formats (e.g., multiple choice) examinees can pass items simply by guessing.

Many-facet Rasch measurement (MFRM; Linacre, 1989) is an extension of the one-parameter Rasch (Rasch, 1980) model, which is a special case of IRT model, namely 1PLM. It enables us to include multiple aspects, or facets, of the measurement procedure in the test results analysis. A facet of measurement refers to a procedure that may affect test scores and, therefore, should be explored further. Examples of facets are *task* or *item difficulty*, *rater severity*, and *rating condition*. All estimates of the facets are expressed on a common measurement scale, which reflects the relative status of elements within a facet, together with interactions between the various facets, as probabilities; the units of probability used on the scale are known as *logits*. This analysis allows us to compensate for differences across the facets.

MFRM also provides information about how well the performance of each test taker, rater, or task matches the expected values predicted by the model generated in the analysis (Sudweeks, Reeve, & Bradshaw, 2004). MFRM allows us to identify particular elements within a facet that are problematic, or "misfitting." Such elements may be a rater who is inconsistent, a task that is difficult, or a subject whose responses are in an inconsistent manner. These "fit statistics" are reflected by infit and outfit mean square in MFRM analysis.

The three most common IRT models are the Rasch or 1PLM, 2PLM, and 3PLM. However, identification of the models and interpretation of their results becomes increasingly complex as parameters are added (Thomas, 2011). Due to its greater flexibility and its alignment with common factor theory, 2PLM is often used in clinical assessment. Although 3PLM is more flexible to analyses, "pseudo-guessing" effects may affect the results. The lower asymptote parameter has at times been considered of as being indicative of a "response style" (e.g., social desirability response bias) (Zumbo, Pope, Watson, & Hubley, 1997).

MIRT or polytomous IRT models are growing rapidly in test item analysis. Despite their overall complexity, multidimensional models have increasingly improved their measurement precision. Multidimensional models have the advantage of offering clinicians a better view into the underlying structure of psychopathology. Mislevy, Levy, Kroopnick, and Rutstein (2008) maintain that "the true value in modern psychometric theory lies in the capacity to communicate increasingly complex

psychological phenomena. Rouse, Finger, and Butcher (1999) fit a 3PLM to scales from the MMPI-2 (Butcher et al., 2001) and found substantial correlations between estimates of lower asymptotes and indices of social desirability. It is worth noting that this strategy assumes uniform response bias among examinees, that “pseudo-guessing” is an item and not a person parameter. However, this strategy cannot differentiate between examinees with different response styles.

Reise and Waller (2003, 2010) expressed doubts about interpreting the lower asymptote parameter as being related to response bias in the measurement of psychopathology. The authors concluded that item extremity and nonsymmetric item ambiguity (i.e., item-level multidimensionality) might be the causal factors of both lower and upper asymptotes in clinical data—a 4PLM. *Item extremity* refers to symptoms of psychopathology, such as delusions, while nonsymmetric item ambiguity results when items take on different meanings for individuals who are high or low on latent variables.

In comparison to CTT, IRT is considered as the standard, if not preferred, method for conducting psychometric evaluations of new and established measures (Embretson & Reise, 2000). The basic unit of IRT is the item response function (IRF) or item characteristic curve. The relationship between a respondent’s performance and the characteristics underlying item performance can be described by a monotonically increasing function called the item characteristic curve (ICC; Henard, 2000).

Test Information Function

The information of an entire measure is called the *test information function*. Unlike reliability, information is additive. The test information function is simply the sum of all item information functions. The standard error of measurement function is inversely related to information. Information functions are used to evaluate the precision of existing items and scales (e.g., Frazier, Naugle, & Haggerty, 2006).

Empirical studies using IRT

Walton, Roberts, Krueger, Blonigen, and Hicks (2008) employed IRT methods to investigate the psychometric properties of psychiatric personality inventories relative to standard personality inventories. The sample consisted of 89 monozygotic pairs, 47 dizygotic pairs, and 81 individuals whose cotwin did not participate (total $N = 353$).

The Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) was employed to assess psychopathology. The Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982) was administered as a measure of “normal” personality. Increasing research focused in the understanding of the relationship between psychopathy and “normal personality traits.” For example, Widiger and Lynam (1998) translated each characteristic of psychopathy (as defined by Hare’s PCL-R; Hare, 1991, 2003) into the language of the five factor model, and Miller and his coworkers (Miller, Lynam, Widiger, & Leukefeld, 2001) consulted a number of psychopathy experts to derive a big five factor model profile of the prototypical psychopath. Furthermore, correlational studies have demonstrated that psychopathy and domains of normal personality correlate in a predictable and consistent manner (Lynam & Derefinko, 2006).

Specifically Walton et al. (2008) examined the similarity between the PPI and MPQ to determine among other things, whether psychopathy inventories contain items tapping more extreme regions of the latent trait spectrum. To this end, the total scale scores from the PPI were correlated with each item from the MPQ.

Combining items from the two instruments proved to yield similarly shaped TIFs and more informative measures. This reflects the fact that the discrimination parameters were not altered much when the items from the two measures were combined, indicating that the PPI and MPQ scales comprise items tapping the same constructs. This also reflects the stability of the difficulty parameters, indicating that when placed on the same scale, the PPI and MPQ items still cover the same region of the latent trait. The increased amount of information obtained by combining the scales would enable better discriminations among individuals at varying levels of the latent trait, would increase scale reliability, and would lead to better predictive validity. These findings suggest that measures of normal range personality capture much of the information being obtained with a “direct” measure of psychopathy. Several of the PPI scales have counterparts in the MPQ, and the PPI scales provide no psychometric information above and beyond that available with the MPQ.

DEVELOPMENTS AND TYPES OF RELIABILITY

Given the importance and the complexities of the reliability concept, there are heated debates on the interpretations and purposes of different types of reliability, on the pros and cons of the various reliability indices on the methods for obtaining them (e.g., Bentler, 2009; Revelle & Zimburg, 2009; Sijtsma, 2009). The reliability is a broad and complicated psychometric construct for the following reasons: there are multiple definitions and types of reliability (e.g., internal consistency, interrater, retest; see Table 2.2) and multiple correlation coefficients or indices and multiple ways of calculating them.

TABLE 2.2 Summary of Reliability Types

| Type of Reliability | Number of Testing Sessions | Number of Test Forms | Sources of Error Variance | Statistical Procedures |
|----------------------|----------------------------|----------------------|-------------------------------------|---|
| Test–retest | 2 | 1 | Administration | Pearson r or Spearman ρ |
| Alternate-forms | 1 or 2 | 2 | Test construction or administration | Pearson r or Spearman ρ |
| Internal consistency | 1 | 1 | Test construction | Pearson r between equivalent test halves with Spearman–Brown correction or Kuder–Richardson for dichotomous items, or coefficient α for multipoint items |
| Interscorer | 1 | 1 | Scoring and interpretation | Pearson r or Spearman ρ |

Source: Reprinted from Ark, T. K., Ark, N., & Zumbo, B. D. (2014). Validation practices of the Objective Structured Clinical Examination (OSCE). In B. D. Zumbo & E. K. H. Chan (Eds.), *Validity and validation in social, behavioral, and health sciences* (pp. 267–288), with permission. Copyright 2014 Springer International Publishing Switzerland.

A topic that has attracted particular attention in the reliability literature is Cronbach's α , which remains one of the most popular reliability indexes (Sijtsma, 2009). Additionally, attention has focused on the availability of alternative coefficients, such as omega (e.g., Revelle & Zimbarb, 2009). According to several researchers (e.g., Gelin, Beasley, Zumbo, & Ochieng, 2003; Maydeu-Olivares, Coffman, & Hartmann, 2007) using any type of reliability coefficient under inappropriate circumstances might lead to deflated reliability estimates. This may eventually affect an accurate estimate of a test's reliability. Zumbo, Gademann, and Zeisser (2007) introduced an ordinal α , which is assumed to estimate reliability more accurately than Cronbach's α , KR-20, and ordinal response scales.

Ordinal α is conceptually equivalent to Cronbach's α . The critical difference between the two is that ordinal α is based on the polychoric correlation matrix rather than the Pearson covariance matrix, and thus more accurately estimates α for measurements involving ordinal (not continuous) data. A characteristic example of ordinal data is related to Likert-type item response format. A tetrachoric/polychoric correlation appears to more accurately estimate the relationship of the underlying variables than the Pearson covariance matrix (Carroll, 1961).

Internal consistency

Split-Half

Internal consistency refers to the degree of uniformity and coherence among the items within a test (Wasserman & Bracken, 2003). High interitem correlations suggest that test items are all measuring the same thing and indicate that the scale is internally consistent. Internal consistency reflects the internal consistency or redundancy of the components of a scale and is conceptually independent of retest reliability, which reflects the extent to which similar scores are obtained when the scale is administered on different occasions. Novick and Lewis (1967) presented the two conditions that are necessary and sufficient for coefficient α to be equal to the test reliability: (1) essential tau equivalence (i.e., when all items have about equal true-score information); and (2) conditional independence among the items (i.e., when controlling for true-score variance, no correlation among the items remains, or errors are uncorrelated in the structural equation modeling). There is no necessary association of internal consistency with long stability. However, internal consistency might affect long stability because it is an index of measurement error. For this reason, Schmidt et al. (2003) proposed that internal consistency and retest reliability should be combined.

The most common type of reliability for estimating internal consistency is split-half. The split-half method involves splitting the items on a test into two equal parts and calculating the correlation between the total score from one half of the measure with the total score from the other half (Kline, 2005). According to Wasserman and Bracken (2003), there are several split-halves that can be formed. Some of the more common splits include a random split of the test items, correlating the first half of the test with the second half, or correlating scores obtained from the odd-numbered items with the even-numbered items.

One side effect of the split-half method is that by reducing the number of items by half, the magnitude of the reliability coefficient is also reduced. The Spearman-Brown formula is a method often utilized to correct for this attenuation by estimating from the obtained reliability coefficient to the original length of the test.

Temporal Stability

Retest Reliability

Retest reliability is the most relevant to longitudinal studies or change. Retest reliability sets an upper limit to longitudinal stability, because stability is reduced both by retest unreliability and by true-score change. There is also an indirect association between internal consistency and longitudinal stability as internal consistency is an index of measurement error, and error might impair observed stability. Personality traits are by definition enduring dispositions, and thus measures that fail to demonstrate long-term stability cannot be valid measures. Poor measurement will consistently attenuate the longitudinal stability, heritability, or cross-observer correlations of traits (McCrae, Harwood, & Kelly, 2011).

This type of reliability is obtained by correlating pairs of scores from the same people on two different occasions. It is more useful when evaluating the stability of certain characteristics, such as personality attributes, developmental differences, the impact of specific life events (e.g., divorce, birth of a sibling, institutionalization) on a child's life, and the effects of therapeutic interventions (i.e., the same test can be administered before and after psychotherapy).

Factors that might affect the retest coefficient are:

1. *Memory/remembrance*, that is, individuals will remember the responses they gave on the second testing. There are at least four factors involved in how memory will affect responses: (1) the time interval between the two administrations; (2) the length of the test; (3) the nature of the test material; and (4) the nature of the targeted construct(s).
2. The *differential practice* effect. It is well known that practice can improve performance.

Aside from the inconvenience of testing the same sample twice, retest reliability has been neglected in the last decades because many researchers apparently assume that different measures of reliability are interchangeable. For example, Gaudiano (2006) used interrater reliability as a substitute. Schmidt et al. (2003) renewed the interest to retest reliability and proposed the use of a general reliability measure that combined internal consistency and retest.

Alternate Forms

Alternate forms reliability also known as parallel form reliability is similar to the retest method. In both methods individuals are tested twice, although the time interval is usually shorter (Geisinger et al., 2013). The two test forms that are used are expected to be parallel. Two tests are considered parallel (1) when they are measuring the same set of true scores; and (2) when they have the same amount of error variance. One difficulty regarding this type of reliability is that we cannot be certain that the two tests measure the same construct. This difficulty may be attributed to the possibility that different forms include different content.

Another possible disadvantage of this type of reliability, which may be also be a drawback in the retest type, is the *carryover* or *contamination* effects; responding to the first form of a measure can have an effect on performance on the second.

Consistency in scoring

Interrater Reliability

Interrater or interobserver reliability (IRR) or interjudge agreement is an important type of reliability and basically reflects whether two raters are consistent in their ratings, observations, or judgments. Establishing and reporting sufficient interrater agreement is essential in behavioral observation and clinical diagnosis studies (Xu & Lorber, 2014).

IRR analysis examines the proportion of the variance in the observed scores and how much of it is attributed to the variance in the true scores, after the variance, due to measurement error between coders, has been removed (Novick, 1966). For example, an IRR estimate of 80 would indicate that 80% of the observed variance is due to true score variance or similarity in ratings between scorers and 20% is attributed to error variance or differences in ratings between raters.

There are several design-related considerations that should be taken into account before a study utilizing behavior observations is conducted. First, it must be decided whether all the subjects in the study will be rated by multiple coders or whether a subset will be rated by multiple coders and the rest will be rated by specific coders. Second, it must be decided whether the subjects that are rated by multiple coders will be rated by the same set of coders (fully crossed design) or whether different subjects are rated by different subsets of coders. Third, the psychometric properties of the coding system used in a study should be examined for possible areas that could affect IRR estimates.

The interrater agreement (IRA) coefficients (Cohen's κ , Holley and Guilford's G , Scott's π , and Gower's AC_1) can best be expressed in a general formulation as a single quantity $(P_1 - P_0) / (1 - P_0)$ where P_0 denotes the observed agreement, which reflects the probability that two raters agreed by chance. The interrater agreement estimate is the ratio of the difference between obtained and chance agreement to the maximum nonchance agreement. Cohen's κ was formulated to

exclusively reflect chance-corrected agreement rather than degree of association and provides a correction for agreement by chance based on the obtained distributions of two raters under a predetermined set of conditions. Holley and Guilford's G is equivalent to several other IRAs that have been proposed over the years (Krippendorff, 2013). In contrast to κ , the calculation of chance agreement in G does not rely on the obtained frequencies but is defined a priori, that is, the chance agreement for G assumes that random ratings would be equally distributed among the coding categories (Xu & Lorber, 2014).

One major limitation is its sensitivity to distributional skew with lower base rate behaviors or diagnoses (e.g., prevalence of manic-depression in an epidemiological study). According to Xu and Lorber (2014), Holley and Guilford's G is the best alternative to κ 's limitations and can thus become endorsed as an index of overall interrater agreement in clinical research.

One's choice of methods is associated to various issues, such as: (1) the number of raters; (2) the nature of the rating scale (e.g., dichotomous or polytomous items for each construct being measured); (3) the level of measurement (e.g., nominal, ordinal, ratio, and so on); (4) the way in which raters are assigned to participants; and (5) the intended use of the rating data (i.e., as "absolute" values or as reflecting the "relative" differences among participants) (Geisinger et al., 2013).

Common Mistakes that Researchers Make in Assessing and Reporting Interrater Reliability

Using percentages of agreement despite being definitively rejected as an adequate measure of IRR (Krippendorff, 1980): Many researchers continue to report the percentage that coders agree in their ratings as an index of coder agreement. For categorical data, this may be expressed as the number of agreements in observations divided by the total number of observations. For ordinal, interval, or ratio data where close-but-not-perfect agreement may be acceptable, percentages of agreement are sometimes expressed as the percentage of ratings that are in agreement within a particular interval.

Not reporting which statistic or variant was used in an IRR analysis: Many studies fail to report which statistic was used to compute IRR (e.g., Cohen's κ , Fleiss's κ , ICCs) or which variant of that statistic was computed (e.g., Siegel & Castellan, 1988; variant of Cohen's κ , two-way consistency average-measures ICC).

Not using the correct statistic for the study design: Many factors must be considered in the selection of the most appropriate statistical test, such as the metric in which a variable was coded (e.g., nominal vs. ordinal, interval, or ratio), the design of the study (e.g., whether all subjects vs. a subset of subjects are rated by multiple coders), and the intended purpose of the IRR estimate (e.g., to estimate the reliability of individual coders' ratings vs. the reliability of the mean ratings from multiple coders).

Not performing IRR analyses on variables in their final transformed form: It is often more appropriate to report IRR estimates for variables in the form that they will be used for model testing rather than their raw form. For example, if a researcher counts the frequency of certain behaviors, then square-root transforms these for use in subsequent hypothesis testing, assessing IRR for the transformed variables, rather than the raw behavior counts, more accurately indicates the relative level of measurement error that is present in the final hypothesis testing.

Finally, many researchers neglect to interpret the effect of IRR estimates on questions of interest to their study. For example, if it is important to show that coders can independently reach similar conclusions about the subjects they observe, it can be helpful to provide qualitative interpretations of IRR estimates by comparing them to previously observed IRR estimates from similar instruments or providing qualitative ratings based on preestablished cutoff points for good, acceptable, and unacceptable IRR.

The Coefficient Alpha (α)

Coefficient α (Cronbach, 1951) is the most commonly used measure of internal consistency. Nunnally and Bernstein (1994) stated that "Coefficient α usually provides a good estimate of reliability because sampling of content is usually the major source of measurement error for static constructs" (p. 282). α 's Below .70 indicate poor reliability and imply poor predictive validity.

Cronbach (1963) had doubts about the sufficiency of coefficient α and endorsed a broader view of reliability embodied in generalizability theory. Schmitt (1996) noted that coefficient α is not a measure of unidimensionality and may underestimate reliability if a scale is multidimensional. For example, an interpretation of α cannot be complete without a consideration of scale length, because as the number of items on a scale increases, α also increases (John & Benet-Martinez, 2000). If a scale is long enough, α can be $>.70$, even when interitem correlations are low (Netemeyer, Bearden, & Sharma, 2003). Similarly, for shorter scales, one should be cautious when interpreting high α coefficient (.80 or .90s) as indicating high reliability as it may instead be indicative of item redundancy or narrowness in item content (John & Soto, 2007).

α is a good option only when a scale is unidimensional (Ayeart & Bagby, 2010). The evaluation of the average interitem correlation has been proposed as an alternative method for estimating internal consistency mainly to overcome the

limitations of α coefficient. That is, rather than trying to obtain a particular level of α , it may be more useful to work toward a target mean interitem correlation. In order to assess the construct in a broad manner, a range of .15–.20 of the average interitem correlations is desirable. On the other hand, accounting for a narrow construct, a higher average interitem correlation is necessary (e.g., .40–.50) (Clark & Watson, 1995). Therefore, the mean interitem correlation provides information concerning how closely the items in the scale are related, as well as how much unique versus redundant variance is estimated. α Coefficient, on the other hand, provides information about the total scale score (John & Soto, 2007).

The magnitude of coefficient α has often been criticized with such comments as “ α underestimates the true reliability of a measure that is not tau equivalent” (Osburn, 2000, p. 344) or that “departure from classical tau equivalence leads to a small downward bias in α when used as a composite reliability measure” (Bacon, Sauer, & Young, 1995, p. 394). Therefore, because coefficient α tends to be viewed as a lower bound on true reliability, numerous alternative estimators have been proposed some of these alternative estimators are known as the *stratified α coefficient* (Cronbach, Schoneman, & McKie, 1965).

One of such estimators consist group of those that are based on *structural equation modeling* (e.g., Green & Yang, 2009). When the reliability is estimated using SEM, the resulting estimate is typically labeled as *composite reliability*. The claimed benefits of a SEM approach include larger estimates of true reliability than is possible with coefficient α . The reason is that with these alternative estimates construct loadings or weights are allowed to vary, whereas the loading or weights for coefficient α are constrained to be equal (e.g., Raykov, 2001; Peterson & Kim, 2013).

Zumbo et al. (2007) introduced *ordinal α* , which was shown to estimate reliability more accurately than Cronbach’s α for binary and ordinal response scales. The main difference between these two reliability coefficients is that ordinal α is based on a polychoric correlation matrix, while Cronbach’s α is based on the Pearson covariance matrix. Using a polychoric matrix for estimating α represents an underlying variable approach to covariance modeling of ordinal data. That is, when employing a polychoric matrix, an item’s observed responses are considered manifestations of respondents exceeding a certain number of thresholds on that item’s underlying continuum (Gadermann, Guhn, & Zumbo, 2012).

SUMMARY

This chapter deals with one of the major psychometric properties, reliability. Definitions and its major constituents (observer score, true scores, random error, measurement) are defined and examples are presented. The three major reliability frameworks are examined and their advantages and limitations are described. The well-known types of reliability are demonstrated along with recent developments and research studies. Reliability’s key estimate, the coefficient of Cronbach’s α , is discussed along with other alternative estimates, such as Cohen’s κ and structural equation modeling. Finally, IRT or latent trait theory is discussed in relation to CTT. IRT is a framework for the design, analysis, and scoring of test items. Common IRT models, especially for dichotomous item responses, are elaborated, and the central advantages of IRT are defined.

REFERENCES

- Ackerman, T. A., Gierl, M. J., & Walker, C. M. (2003). Using multidimensional item response theory to evaluate educational and psychological tests. *Educational Measurement: Issues and Practice*, 22(3), 37–51.
- Allik, J., Laidra, K., Realo, A., & Pullmann, H. (2004). Personality development from 12 to 18 years of age: changes in mean levels and structure of traits. *European Journal of Personality*, 18(6), 445–462.
- Andrich, D. (1988). A scientific revolution in social measurement. In *First meeting of the American Educational Research Association’s Special Interest Group on Rasch Measurement*, New Orleans, LA.
- Ayearst, L. E., & Bagby, R. M. (2010). Evaluating the psychometric properties of psychological measures. In M. M. Antony, & D. H. Barlow (Eds.), *Handbook of assessment and treatment planning for physiological disorders* (2nd ed., pp. 23–61). New York: Guilford Press.
- Bachman, L. F. (1990). *Fundamental considerations in language testing*. Oxford: Oxford University Press.
- Bacon, D. R., Sauer, P. L., & Young, M. (1995). Composite reliability in structural equations modeling. *Educational and Psychological Measurement*, 55(3), 394–406.
- Baker, R. (1997). *Classical test theory and item response theory in test analysis*. Lancaster, United Kingdom: Centre for Research in Language Education, Department of Linguistics and Modern English Language, Lancaster University.
- Barnes, L. L., Harp, D., & Jung, W. S. (2002). Reliability generalization of scores on the Spielberger state-trait anxiety inventory. *Educational and Psychological Measurement*, 62(4), 603–618.
- Barton, M. A., & Lord, F. M. (1981). An upper asymptote for the three-parameter logistic item response model. *ETS Research Report Series*, 1981(1), i–8.
- Becker, G. (2000). How important is transient error in estimating reliability? going beyond simulation studies. *Psychological Methods*, 5(3), 370.
- Bentler, P. M. (2007). Covariance structure models for maximal reliability of unit-weighted composites. In S. Lee (Ed.), *Handbook of computing and statistics with applications: Vol. 1. Handbook of latent variable and related models* (pp. 1–19). New York: Elsevier.
- Bentler, P. A. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika*, 74(1), 137–143.

- Beretvas, S. N., Suizzo, M. A., Durham, J. A., & Yarnell, L. M. (2008). A reliability generalization study of scores on Rotter's and Nowicki-Strickland's locus of control scales. *Educational and Psychological Measurement*, 68(1), 97–119.
- Birnbaum, A. (1968). Some latent trait models and their use in inferring an examinee's ability. In F. M. Lord, & M. R. Novick (Eds.), *Statistical theories of mental scores*. Reading, MA: Addison-Wesley.
- Bock, R. D. (1997). A brief history of item response theory. *Educational Measurement: Issues and Practice*, 16(4), 21–33.
- Bond, T. G., & Fox, C. M. (2001). *Applying the Rasch model: Fundamental measurement in the social sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Butcher, J. N., Graham, J. R., Ben-Porath, Y. S., Tellegen, A., Dahlstrom, W. G., & Kaemmer, B. (2001). *MMPI-2 (Minnesota Multiphasic Personality Inventory-2): Manual for administration and scoring* (Rev. ed.). Minneapolis, MN: University of Minnesota Press.
- Campbell, J. S., Pulos, S., Hogan, M., & Murry, F. (2005). Reliability generalization of the psychopathy checklist applied in youthful samples. *Educational and Psychological Measurement*, 65(4), 639–656.
- Carroll, J. B. (1961). The nature of the data, or how to choose a correlation coefficient. *Psychometrika*, 26(4), 347–372.
- Clark, L. A., & Watson, D. (1995). Constructing validity: basic issues in objective scale development. *Psychological assessment*, 7(3), 309.
- Connor, C. M., Ponitz, C. C., Phillips, B. M., Travis, Q. M., Glasney, S., & Morrison, F. J. (2010). First graders' literacy and self-regulation gains: the effect of individualizing student instruction. *Journal of School Psychology*, 48, 433–455.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.
- Cronbach, L. J. (1963). *Educational Psychology* (2nd ed.). New York: Harcourt, Brace and World, Inc.
- Cronbach, L. J., Gleser, G. C., Nanda, H., & Rajaratnam, N. (1972). *The dependability of behavioral measurements: Theory of generalizability for scores and profiles*. New York: John Wiley & Sons.
- Cronbach, L. J., Schoneman, P., & McKie, D. (1965). Alpha coefficient for stratified-parallel tests. *Educational & Psychological Measurement*, 25(2), 291–312.
- De Ayala, R. J. (2009). *Theory and practice of item response theory*. New York: Guilford Publications.
- de la Torre, J. (2008). Multidimensional scoring of abilities: The ordered polytomous response case. *Applied Psychological Measurement*, 32, 355–370.
- Embretson, S. E. (1996). Item response theory models and spurious interaction effects in factorial ANOVA designs. *Applied Psychological Measurement*, 20(3), 201–212.
- Embretson, S. E., & Reise, S. P. (2000). *Item response theory for psychologists*. Mahwah, NJ: Erlbaum.
- Ferrando, P. J. (2008). Difficulty, discrimination, and information indices in the linear factor analysis model for continuous item responses. *Applied Psychological Measurement*, 33, 9–24.
- Finch, H. (2010). Item parameter estimation for the MIRT model: bias and precision of confirmatory factor analysis based models. *Applied Psychological Measurement*, 34, 10–26.
- Fitzmaurice, G. M., Laird, N. M., & Ware, J. H. (2011). *Applied longitudinal analysis* (2nd ed.). New York: Wiley.
- Fleeson, W. (2001). Toward a structure- and process-integrated view of personality: traits as density distributions of states. *Journal of Personality and Social Psychology*, 80(6), 1011–1027.
- Frazier, T. W., Naugle, R. I., & Haggerty, K. A. (2006). Psychometric adequacy and comparability of the short and full forms of the Personality Assessment Inventory. *Psychological Assessment*, 18(3), 324–333.
- Furr, R. M., & Bacharach, V. R. (2008). *Psychometrics: An introduction*. Thousand Oaks, CA: Sage.
- Gadermann, A. M., Guhn, M., & Zumbo, B. D. (2012). Estimating ordinal reliability for Likert-type and ordinal item response data: a conceptual, empirical and practical guide. *Practical Assessment, Research & Evaluation*, 17(3), 1–13.
- Gaudiano, B. A. (2006). Is symptomatic improvement in clinical trials of cognitive-behaviour therapy for psychosis clinically significant? *Journal of Psychiatric Practice*, 12(1), 11–23.
- Geisinger, K. F., Bracken, B. A., Carlson, J. F., Hansen, J. I. C., Kuncel, N. R., Reise, S. P., & Rodriguez, M. C. (2013). *APA handbook of testing and assessment in psychology, Vol. 1: Test theory and testing and assessment in industrial and organizational psychology*. Washington, DC: American Psychological Association.
- Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, 19(1), 72.
- Gelin, M. N., Beasley, T. M., Zumbo, B. D., Zumbo, I. B., & Ochieng, C. O. (2003). What is the impact on scale reliability and exploratory factor analysis of a Pearson correlation matrix when some respondents are not able to follow the rating scale. In B. D. Zumbo & C. O. Ochieng (Chairs), *The impact of Likert or rating scale mis-responding on commonly used statistical methods*. Symposium conducted at the meeting of the American Educational Research Association (AERA), Chicago, IL.
- Green, S. B., & Yang, Y. (2009). Reliability of summed item scores using structural equation modeling: an alternative to coefficient alpha. *Psychometrika*, 74(1), 155–167.
- Hambleton, R. K., & Swaminathan, H. (1985). *Item response theory: Principles and applications*. Boston, MA: Kluwer-Nijhoff.
- Hambleton, R. K., Swaminathan, H., & Rogers, H. J. (1991). *Fundamentals of item response theory*. Newbury Park, CA: Sage.
- Hare, R. D. (1991). *Manual for the psychopathy checklist-revised*. Toronto: Multi-Health Systems.
- Hare, R. D. (2003). *Manual for the Hare psychopathy checklist* (Rev. 2nd ed.). Toronto, ON: Multi-Health Systems.
- Hattie, J. (1985). Methodology review: assessing unidimensionality of items and items. *Applied Psychological Measurement*, 9, 139–164.
- Henard, D. H. (2000). Item response theory. In L. Grimm, & P. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 67–97). Washington, DC: American Psychological Association.
- Henson, R. K., & Hwang, D. Y. (2002). Variability and prediction of measurement error in Kolb's learning style inventory scores a reliability generalization study. *Educational and Psychological Measurement*, 62(4), 712–727.

- Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage.
- John, O. P., & Benet-Martinez, V. (2000). Measurement, scale construction and reliability. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 339–369). New York, NY: Cambridge University Press.
- John, O. P., & Robins, R. W. (1993). Determinants of interjudge agreement on personality traits: the big five domains. Observability, evaluativeness and the unique perspective of the self. *Journal of Personality*, *61*(4), 521–551.
- John, O. P., & Soto, C. J. (2007). The importance of being valid: Reliability and the process of construct validation. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 461–494). New York: Guilford Press.
- Kane, M. (2006). Content-related validity evidence in test development. In S. M. Downing, & T. M. Haladyna (Eds.), *Handbook of test development* (pp. 131–153). Mahwah, NJ: Lawrence Erlbaum Associates.
- Kashy, D. A., & Kenny, D. A. (2000). The analysis of data from dyads and groups. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 451–477). Cambridge: Cambridge University Press.
- Kline, R. B. (2005). *Principles and practices of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein, & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 3–90). San Francisco, CA: Jossey-Bass.
- Krippendorff, K. (1980). *Content analysis: An introduction to its methodology*. Beverly Hills, CA: Sage Publications.
- Krippendorff, K. (2013). *Content analysis: An introduction to its methodology* (3rd ed.). Thousand Oaks, CA: Sage.
- Lane, S., & Stone, C. (2006). Performance assessment. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 387–431). Westport, CT: American Council on Education and Praeger Publishers.
- Lilienfeld, S. O., & Andrews, B. P. (1996). Development and preliminary validation of a self-report measure of psychopathic personality traits in non-criminal population. *Journal of Personality Assessment*, *66*(3), 488–524.
- Linacre, J. M. (1989). *Many-facet Rasch measurement*. Chicago, IL: MESA Press.
- Loken, E. & Rulison, K. L. (2006, June). “Low-stakes” learning and assessment with IRT. Paper presented at the annual meeting of the Psychometric Society, Montreal, Canada.
- Lord, F. M. (1952). A theory of test scores (Psychometric Monograph No. 7). Iowa City, IA: Psychometric Society, p. 35.
- Lord, F. M., & Novick, M. R. (1968). *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.
- Lynam, D. R., & Derefinko, K. J. (2006). Psychopathy and Personality. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 133–155). New York: Guilford Press.
- Maydeu-Olivares, A., Coffman, D. L., & Hartmann, W. M. (2007). Asymptotically distribution-free (ADF) interval estimation of coefficient alpha. *Psychological Methods*, *12*(2), 157.
- McCrae, R. R., Harwood, T. M., & Kelly, S. L. (2011). The NEO inventories. In T. M. Harwood, L. E. Beutler, & G. Groth-Marnat (Eds.), *Integrative assessment of adult personality* (3rd ed., pp. 252–275). New York: Guilford Press.
- Miller, J. D., Lyman, D. R., Widiger, T. A., & Leukefeld, C. (2001). Personality disorders as extreme variants of common personality dimensions: can the five factor model adequately represent psychopathy? *Journal of Personality*, *69*(2), 253–276.
- Miller, C. S., Woodson, J., Howell, R. T., & Shields, A. L. (2009). Assessing the reliability of scores produced by the Substance Abuse Subtle Screening Inventory. *Substance Use & Misuse*, *44*(8), 1090–1100.
- Mislevy, R. J., Levy, R., Kroopnick, M., & Rutstein, D. (2008). Evidentiary foundations of mixture item response theory models. In G. R. Hancock, & K. M. Samuelsen (Eds.), *Advances in latent variable mixture models* (pp. 149–175). Charlotte, NC: Information Age.
- Molenberghs, G., & Verbeke, G. (2005). *Models for discrete longitudinal data*. USA: Springer Science & Business Media.
- Nandakumar, R., Yu, F., Li, H., -H., & Stout, W. F. (1998). Assessing unidimensionality of polytomous data. *Applied Psychological Measurement*, *22*, 99–115.
- Netemeyer, R. G., Bearden, W. O., & Sharma, S. (2003). *Scaling procedures: Issues and applications*. Thousand Oaks, CA: Sage.
- Novick, M. R. (1966). The axioms and principal results of classical test theory. *Journal of Mathematical Psychology*, *3*(1), 1–18.
- Novick, M. R., & Lewis, C. L. (1967). Coefficient alpha and the reliability of composite measurements. *Psychometrika*, *32*(1), 1–13.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Osburn, H. G. (2000). Coefficient alpha and related internal consistency reliability coefficients. *Psychological Methods*, *5*(3), 343–355.
- Peterson, R. A., & Kim, Y. (2013). On the relationship between coefficient alpha and composite reliability. *Journal of Applied Psychology*, *98*(1), 194–198.
- Rasch, G. (1980). *Probabilistic models for some intelligence and attainment tests*. Denmark; Chicago, IL: Danish Institute for Educational Research; MESA Press.
- Raykov, T. (2001). Bias of coefficient alpha for fixed congeneric measures with correlated errors. *Applied Psychological Measurement*, *25*(1), 69–76.
- Raykov, T. (2004). Estimation of maximal reliability: a note on a covariance structure modeling approach. *British Journal of Mathematical and Statistical Psychology*, *57*, 21–27.
- Raykov, T., & Marcoulides, G. A. (2006). On multilevel model reliability estimation from the perspective of structural equation modeling. *Structural Equation Modeling*, *13*, 130–141.
- Raykov, T., & Penev, S. (2010). Evaluation of reliability coefficients for two-level models via latent variable analysis. *Structural Equation Modeling*, *17*, 629–641.
- Reckase, M. D. (1997). *Models for multidimensional tests and hierarchically structured training materials. Technical report*. Iowa City, IA: American College Testing Program.
- Reckase, M. (2009). *Multidimensional item response theory* (Vol. 150). New York, NY: Springer.
- Reeve, C. L., Heggstad, E. D., & George, E. (2005). Estimation of transient error in cognitive ability scales. *International Journal of Selection and Assessment*, *13*(4), 316–320.

- Reise, S. P., Ainsworth, A. T., & Haviland, M. G. (2005). Item response theory fundamentals, applications, and promise in psychological research. *Current Directions in Psychological Science, 14*(2), 95–101.
- Reise, S. P., & Waller, N. G. (2003). How many IRT parameters does it take to model psychopathology items? *Psychological Methods, 8*(2), 164–184.
- Reise, S. P., & Waller, N. G. (2010). Measuring psychopathology with nonstandard item response theory models: Fitting the four-parameter model to the Minnesota Multiphasic Personality Inventory. In S. E. Embretson (Ed.), *Measuring psychological constructs: Advances in model-based approaches* (pp. 147–173). Washington, DC: American Psychological Association.
- Reise, S. P., Widaman, K. F., & Pugh, R. H. (1993). Confirmatory factor analysis and item response theory: two approaches for exploring measurement invariance. *Psychological bulletin, 114*(3), 552.
- Revelle, W., & Zinbarg, R. E. (2009). Coefficients alpha, beta, omega and the glb: comments on Sijtsma. *Psychometrika, 74*, 145–154.
- Rouse, S. V., Finger, M. S., & Butcher, J. N. (1999). Advances in clinical personality measurement: an item response theory analysis of the MMPI-2 PSY-5 scales. *Journal of Personality Assessment, 72*(2), 282–307.
- Rulon, P. J. (1939). A simplified procedure for determining the reliability of a test by split-halves. *Harvard Educational Review, 9*(1), 99–103.
- Schmeiser, C. B., & Welch, C. J. (2006). Test development. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 307–353). Washington, DC: National Council on Measurement in Education and the American Council on Education.
- Schmidt, F. L., & Hunter, J. E. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology, 62*(5), 529.
- Schmidt, F. L., Le, H., & Ilies, R. (2003). Beyond alpha: an empirical examination of the effects of different sources of measurement error on reliability estimates for measures of individual differences constructs. *Psychological Methods, 8*(2), 206–224.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment, 8*(4), 350.
- Schumacker, R. E., & Lunz, M. E. (1997). Interpreting the chi-square statistics reported in the many-faceted Rasch model. *Journal of Outcome Measurement, 1*(3), 239–257.
- Segall, D. O. (1996). Multidimensional adaptive testing. *Psychometrika, 61*, 331–354.
- Segall, D. O. (2000). Principles of multidimensional adaptive testing. In W. J. van der Linden, & C. A. W. Glas (Eds.), *Computerized adaptive testing: Theory and practice* (pp. 53–73). Boston, MA: Kluwer Academic.
- Segall, D. O. (2010). Principles of multidimensional adaptive testing. In W. J. van der Linden, & C. A. W. Glas (Eds.), *Elements of adaptive testing* (pp. 57–76). New York, NY: Springer.
- Shavelson, R. J., Webb, N. M., & Rowley, G. L. (1989). Generalizability theory: new developments and novel applications. *American Psychologist, 44*(6), 922–932.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: uses in assessing rater reliability. *Psychological Bulletin, 86*(2), 420.
- Siegel, S., & Castellan, N. (1988). *Nonparametric statistics for the behavioral sciences*. New York: McGraw-Hill.
- Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika, 74*(1), 107–120.
- Sijtsma, K., & Junker, B. W. (2006). Item response theory: past performance, present developments, and future expectations. *Behaviormetrika, 33*(1), 75–102.
- Smith, J. (2009). *Some issues in item response theory: Dimensionality assessment and models for guessing*. ProQuest LLC. Ann Arbor, MI.
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel Analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage.
- Spearman, C. (1904). The proof and measurement of association between two things. *American Journal of Psychology, 15*(1), 72–101.
- Stout, W. (1990). A new item response theory modeling approach with applications to unidimensionality assessment and ability estimation. *Psychometrika, 55*(2), 293–325.
- Sudweeks, R. R., Reeve, S., & Bradshaw, W. S. (2004). A comparison of generalizability theory and many-facet Rasch measurement in an analysis of college sophomore writing. *Assessing Writing, 9*(3), 239–261.
- Tellegen, A. (1982). *Brief manual for the differential personality questionnaire*. Minnesota: University of Minnesota.
- Thomas, M. L. (2011). The value of item response theory in clinical assessment: a review. *Assessment, 18*(3), 291–307.
- Vacha-Haase, T. (1998). Reliability generalization: Exploring variance in measurement error affecting score reliability across studies. *Educational and Psychological Measurement, 58*(1), 6–20.
- Vacha-Haase, T., & Thompson, B. (2011). Score reliability: a retrospective look back at 12 years of reliability generalization studies. *Measurement and Evaluation in Counseling and Development, 44*(3), 159–168.
- van der Linden, W. J., & Glas, C. A. W. (2010). *Elements of adaptive testing*. New York, NY: Springer.
- Verhelst, N. D., Glas, C. A. W., & De Vries, H. H. (1997). A steps model to analyze partial credit. *Handbook of modern item response theory*. New York: Springer, 123–138.
- Vispoel, W. P., Morris, C. A., & Kilinc, M. (2016). Using G-theory to enhance evidence of reliability and validity for common uses of the Paulhus Deception Scales. *Assessment, 2016* (online publication).
- Wainer, H. (1990). *Computerized adaptive testing: A primer*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Wallace, K. A., & Wheeler, A. J. (2002). Reliability generalization of the life satisfaction index. *Educational and Psychological Measurement, 62*(4), 674–684.
- Walton, K. E., Roberts, B. W., Krueger, R. F., Blonigen, D. M., & Hicks, B. M. (2008). Capturing abnormal personality with normal personality inventories: an item response theory approach. *Journal of Personality, 76*(6), 1623–1648.
- Wang, W. C., & Chen, P. H. (2004). Implementation and measurement efficiency of multidimensional computerized adaptive testing. *Applied Psychological Measurement, 28*, 450–480.
- Wasserman, J. D., & Bracken, B. A. (2003). Psychometric characteristics of assessment procedures. In J. R. Graham, & J. A. Naglieri (Eds.), *Handbook of psychology: Assessment psychology* (pp. 43–66). (Vol. 10). Hoboken, NJ: Wiley.

- Weir, J. P. (2005). Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. *Journal of Strength & Conditioning Research*, 19(1), 231–240.
- Widiger, T. A., & Lynam, D. R. (1998). Psychopathy and the five-factor model of personality. In T. Millon, E. Simonsen, M. Birket-Smith, & R. D. Davis (Eds.), *Psychopathy: Antisocial, criminal, and violent behaviors* (pp. 171–187). New York: Guilford.
- Xu, S., & Lorber, M. F. (2014). Interrater agreement statistics with skewed data: evaluation of alternatives to Cohen's kappa. *Journal of Consulting and Clinical Psychology*, 82(6), 1219–1227.
- Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods*, 6(1), 21–29.
- Zumbo, B. D., Pope, G. A., Watson, J. E., & Hubley, A. M. (1997). An empirical test of Roskam's conjecture about the interpretation of an ICC parameter in personality inventories. *Educational and Psychological Measurement*, 57(6), 963–969.

Chapter 3

Validity

Chapter Outline

| | | | |
|---|-----------|---|-----------|
| Historical and theoretical developments of validity | 45 | Empirical applications of the validity with other variables | 56 |
| Assessing measurement invariance | 47 | Validity evidence based on internal structure | 57 |
| Construct validity and Messick's unified approach | 47 | Factor analysis | 58 |
| Models against the unitary conceptualization of validity | 48 | Interpretations and naming of factors | 59 |
| Types of evidence-based validity | 52 | Empirical applications of internal structure validity | 59 |
| Validity evidence based on consequences for testing | 52 | Validity evidence based on response processes | 60 |
| Validity evidence based on test content | 54 | The special case of cultural validity | 62 |
| Face validity | 55 | Summary | 63 |
| Validity evidence based on associations with other variables | 55 | References | 63 |

HISTORICAL AND THEORETICAL DEVELOPMENTS OF VALIDITY

The measurement of psychological phenomena has been a major concern in psychological science. Such phenomena include personality traits (observable or latent), dyadic interactions and intergroup dynamics, cognitive abilities, psychotherapeutic effects, and more. Assessment is common practice in various fields of psychology, such as developmental, educational, clinical, industrial/organizational, forensic, and neuropsychology.

The most important issue in the development and evaluation of tests is the process of validation, which involves the accumulation of evidence as a means to support or justify results. Tests cannot be considered inherently valid or invalid, because what is to be validated is not the test itself, but rather the use of a test for a particular purpose. Therefore, the first step in validation and in test development is to specify the intended uses and interpretations of test scores (AERA et al., 1999). Maximizing test score validity is the major focus of all researchers and in particular test developers. The availability of measures that yield scores with strong validity evidence enables psychologists to enhance the scientific status of their research, make more accurate decisions in applied settings, and use and interpret test results in beneficial ways.

Although psychology has a long history of using standardized assessment instruments, contemporary theory and research began in the mid-20th century with the publication of Cronbach & Meehl's (1955) "Construct Validity in Psychological Tests" and 4 years later Campbell and Fiske's (1959) "Convergent & Discriminant Validation by the Multitrait & Multimethod Matrix." Most theoretical analyses and empirical studies of validity during the past 50 years been greatly influenced by the ideas and assumptions delineated in these two seminal papers.

The earliest definitions of validity are pretty similar to the contemporary ones, that is, validity is the degree to which a test measures what it purports to measure (e.g., Smith & Wright, 1928). When we say "what" we refer to a construct that Cronbach and Meehl (1955) define as "some postulated attribute of people, assumed to be reflected in test performance" (p. 283). The 1954 edition of the APA Technical Recommendations outlined four types of validity: *content*, *predictive*, *concurrent*, and *construct*. Campbell and Fiske (1959) introduced the multitrait-multimethod approach to validation. They introduced the concepts of *convergent*, *divergent*, *diagnostic*, and *discriminant* types under the construct validity. The 1966 version combined concurrent validity and predictive validity into criterion-related validity. The 1966 edition of the Standards included the traditional "holy trinity" view of validity by classifying it into content, criterion-related, and construct.

The revolutionary formula of the correlation coefficient by Karl Pearson in 1896 allowed quantification of the degree to which two variables related to one another in a linear fashion. The correlation formula was soon employed to estimate the degree to which test scores correlated with other variables thought to measure the same construct. These developments led

Guilford (1946) to state that “a test is valid for anything with which it correlates” (p. 429). Ultimately, providing validity evidence that was based on relationships among test scores became known as *criterion-related evidence* (APA, 1966).

Apart from employing the correlation coefficient as a *criterion index*, its role in the estimation of content validity began to grow. Thus, test developers began to develop tests based on content specifications rather than to predict or approximate a specific criterion measure. Content-based tests required evidence to demonstrate that items were representative samples of the domain. Tests of predictive use required evidence that showed the test scores to be satisfactory predictors of a criterion.

A wide variety of criteria are predicted by psychological tests, some overt and observable and others latent and detectable indirectly. When an observable criterion (e.g., professional success) is assessed, the validity coefficient is said to be an index of criterion validity. When an unobservable construct is observed (e.g., achievement motivation), the validity coefficient is said to be an *index of construct validity* (Bornstein, 2011). Lennon (1956) provided an early definition of *content validity* as “the extent to which a subject’s responses to the items of a test may be considered to be a representative sample of his responses to a real or hypothetical universe of situations which together constitute the area of concern to the person interpreting the test” (p. 295). Ebel (1977) and Yalow and Popham (1983) believe the term “content validity” is useful for practitioners and lay audiences and effectively communicates an important aspect of the quality of test scores. Sireci and Faulkner-Bond (2014) define content validity as the degree to which the content of a test is congruent with testing purposes. In addition, they use the terms “validity evidence based on test content” and “content validity evidence” interchangeably (Lennon, 1956).

Criterion validity is divided into *concurrent* validity (when the test score is used to assess some outcome in the present) and *predictive* validity (when the test score is used to predict a future outcome). Choosing an appropriate criterion can often be a complicated issue, as the criterion measure can overlap with a measure to be validated resulting in criterion contamination (Lehman, 1978). The point in time whereby concurrent validity becomes predictive validity is hard to specify and varies as a function of the criterion being assessed and the purpose of the assessment. *Other-ratings* are employed as an add-on to criterion validity and as a method in predictive validity and in accuracy assessment. The use of *other-ratings* may also serve as a useful index in the study of concurrent criterion validity. Other-ratings usually involve outside observers, such as spouses, friends, or complete strangers. Self-rating validation research presumes other-rating accuracy to be strong (e.g., Connelly & Ones, 2010). According to Funder and West (1993), accurate personality judgments from another-rater should predict judgments from another other-rater (i.e., self-other accuracy) and last, relevant behaviors and outcomes (i.e., criterion-related validity).

By the 1950s it had become evident that these two categories of validity (criterion and content) did not cover every testing situation. In order to address this limitation, Cronbach and Meehl (1955) devised a new type of validity called *construct validity*. Construct validity theory was appealing at the time because it was consistent with the philosophy of science that dominated psychology during the mid-1950s, namely *logical positivism*. Instead of conceptualizing what the test measured in terms of a content domain or criterion, construct validity conceptualized what the test measured in terms of how test scores relate to an array of other factors. This model reflects changes in empiricist models in science. “Whereas descriptive empiricism characterized validity as a matter of identity between the test domain and the intended domain, this logical empiricist approach posits hypothetical constructs as explanatory of test responses” (Markus & Borsboom, 2013, p. 9). *Construct validity* is in turn divided into *convergent validity* (the degree to which a test is associated with some theoretically related construct) and *discriminant validity* (the degree to which a test score is minimally associated or unrelated to a theoretical construct).

Sechrest (1963) was the first to delineate the concept of *incremental validity*. He argued that in addition to convergent and discriminant validity, a psychological instrument applied academic, clinical, or personnel applications must yield an improvement in prediction. Thus, for a test to be useful in an applied context it should demonstrate *incremental validity* over brief case history information, simple biographical data, and brief interviews. Adding to Sechrest’s (1963) presentation of incremental validity, Wiggins (1973) explicitly compared the value of a personality test when making personnel decisions against base-rate information (e.g., the general frequency of success, or turnover in a setting). Anastasi (1988) highlighted key issues in incremental validity by indicating that incremental validity depends on base rates and selection ratio considerations. She demonstrated the effect of selection on validity coefficients for specific base-rate levels and cautioned in attempting to generalize across samples with divergent base rates. Hierarchical multiple regression analysis is a well-established statistical procedure for assessing incremental validity in the social sciences and has been successfully applied in the technical literature in studies utilizing cognitive assessment data (Canivez, 2013b).

Incremental validity studies using hierarchical multiple regression analysis have been conducted on various versions of the Wechsler scales (Canivez, 2013a; Canivez, Watkins, James, James, & Good, 2014), the Cognitive Assessment System (Canivez, 2011), the Differential Ability Scales (Youngstrom, Kogos, & Glutting, 1999), the Reynolds Intellectual Assessment Scales (Nelson & Canivez, 2012), and the Woodcock–Johnson Tests of Cognitive Abilities–Third Edition (WJ-III COG;

McGill, 2015; McGill & Busse, 2014a). Across these studies, it was consistently demonstrated that the full-scale score on intelligence tests accounted for most of the reliable achievement variance in the regression models and that little additional incremental variance was accounted for by factor scores after controlling for the predictive effects of the general factor. Information as to the incremental validity of the first-order KABC-II CHC scores in predicting achievement outcomes beyond that already accounted for by the Fluid-Crystallized Index (FCI) are not provided in the KABC-II manual. Furthermore, a search of the empirical literature has produced no related scientific investigations since the publication of the instrument.

Consistent with previous incremental validity researches using cognitive measures, *multicollinearity* between the FCI and the first-order factor scores was observed across all of the multiple regression analyses. Multicollinearity refers to a potential threat to validity in multiple regression research that is introduced when a prediction model utilizes independent variables (IVs) that are significantly correlated (Pedhazur, 1997).

Assessing measurement invariance

Bias is a technical term that addresses systematic errors that lead to differential interpretation of scores. In order to evaluate bias, we must determine whether knowledge of an examinee's group membership influences the examinee's score on the measured variance (e.g., an item, subdomain, or test), given the examinee's status on the latent variance of interest (Millsap, 2011). Consequently, for a test to be fair (from a psychometric perspective) it should exhibit measurement invariance across all distinctive subgroups being evaluated. The degree to which the construct measured by a test is consistent across subgroups is known as *construct equivalence* (CE). CE is of special concern in cross-cultural research whereby constructs, such as intelligence and morality can be culturally affected (Van de Vijver & Poortinga, 2005). It is also associated with test adaptations or computer-based testing whereby the conditions of test administration are altered. The degree to which such alterations affect the construct is unknown.

CE can be evaluated statistically by Confirmatory Factor Analysis (CFA) and weighted multidimensional scaling (MDS), as they are able to analyze the structure of data from multiple groups simultaneously. CFA evaluated the hypothesized test structure, whereas MDS is an exploratory analysis that fits dimensions to best account for the data in all groups. In CFA the degree to which the hypothetical structure adequately fits the data for multiple groups can be analyzed using descriptive statistics, such as root mean square error of approximation, standardized root mean square residual, and adjusted goodness-of-fit statistic.

There are numerous statistical approaches for assessing measurement invariance. These methods can be classified into three groups: (1) linear measurements models, (2) nonlinear measurements models, and (3) observed score methods (Millsap, 2011). These approaches can be broken down into methods that estimate invariance at the scale and item levels (Zumbo, 2003). Scale-level analyses focus on the degree of invariance observed within common factor analytic models across groups. In contrast, item-level analyses and differential item functioning (DIF) examine invariance separately for each item. DIF examines the situation in which examinees who have equal standing on the target construct but those who come from different groups (e.g., ethnicity, age) have different probabilities of responding to the item (Holland & Thayer, 1988). "DIF represents a statistical interaction between group membership and item performance after matching examinees across groups on some criterion (usually total test score)" (Sireci & Sukin, 2013).

Construct validity and Messick's unified approach

The construct validity of score interpretation comes to sustain all score-based inferences. The essence of unified validity is that the appropriateness, meaningfulness, and usefulness of scored-based inferences are integrated and their integration is the outcome of empirically based score interpretation. To refer to validity as a unified concept does not imply that validity cannot be usefully differentiated into distinct aspects, such as the social consequences of performance assessments or the role of score meaning. The target of these distinctions is to provide a means of addressing functional aspects of validity that helps to clarify some complexities in evaluating the appropriateness, meaningfulness, and usefulness of score influences. A key feature for the content aspect of construct validity is to determine the boundaries and structure of the construct domains, such as the knowledge, skills, attitudes, motives, and other attributes to be revealed by the assessment tasks. The boundaries and structure of the construct domain can be examined through job analysis, task analysis, curriculum analysis, and especially domain theory. The goal of the test developed is to ensure that important aspects of the construct domain are covered. This procedure is described as selecting items/tasks in terms of their functional importance. Both content relevance and representativeness of test items are commonly evaluated by expert professional judgment.

The substantive aspect of construct validity highlights the role of theories and process modeling in identifying the domain processes expressed through test items (Embretson, 1987; Messick, 1989). The issue of domain coverage refers

not just to the content representativeness of the construct measure, but also to the process representation of the construct and the degree to which these processes are reflected in the measurement. Such evidence can be derived through various sources, such as “thinking aloud” protocols and eye-movement records, during responding or through computer modeling of task processes.

According to the structural aspect of construct validity, the theory underlying the construct domain should direct the development of construct-based scoring criteria, in addition to the selection or construction of appropriate assessment tasks. Thus the internal structure of the assessment (i.e., the interrelations among the scored aspects of task and task performance) should correspond with one’s knowledge about the internal structure of the construct domain (Messick, 1989).

Evidence of generalizability relies on the degree of correlation of the assessed tasks with other tasks representing the construct or aspects of the construct. The issue of generalizability of score inferences across tasks or contexts links to the score meaningfulness. The conflict between depth and breadth of domain coverage often reveals a “conflict” between validity and reliability (or generalizability). In addition to generalizability across tasks, the limits of score meaning are also affected by the degree of generalizability across time or occasions and across observers or raters of the task performance.

The external aspect of validity refers to the extent to which the assessment scores correlations with other measures and behavioral manifestations reflect the expected interactive relations implicit in the theory of the target construct. Thus the constructs represented in the assessment should account for the external pattern of correlations. Notably, among these external relationships are those between the assessment scores and criterion measures related to selection, placement, program evaluation, or other purposes related to applied contexts. The consequential aspect of construct validity includes evidence for evaluating the intended and unintended consequences of score interpretation and use. Consequences can be associated with bias in scoring and interpretation or with unfairness in test employment. The major concern regarding negative consequences is that any negative impact on individuals or groups should derive from test invalidity, such as construct underrepresentation or construct irrelevant variance (Messick, 1989).

A fundamental of construct validity is construct representation. In construct validity through the use of cognitive-process analysis or research on personality and motivation, a person attempts to identify the mechanisms underlying task performance. According to Messick (1995) there are two major threats to construct validity: construct underrepresentation (CU) and construct irrelevant invariance (CII). In construct underrepresentation the assessment is too limited and fails to include important dimensions or facets of the construct. In contrast, in the CII the assessment is too broad, containing excessive reliable variables associated with biased responses that may affect an objective construct interpretation.

Messick (1995) posits that construct validity of score interpretations appears to underlie all score-based inferences—not only the ones related to interpretive meaningfulness but also the content and criterion-related inferences specific to decisions and actions based on test scores. Messick (1995) proposes the concept of *unified validity* that “integrates considerations of content, criteria and consequences into a construct framework for the empirical testing of rational hypothesis about score meaning and theoretically relevant relationships, including those of an applied and a scientific nature” (p. 741).

MODELS AGAINST THE UNITARY CONCEPTUALIZATION OF VALIDITY

Drawing primarily from research on cognitive modeling, Embertson (1987) distinguished between the traditional goal of construct validity and the delineation of a “nomological net” of relationships between test score and an array of theoretically related variables which she called “nomothetic span” from a complementary goal that she termed “*construct representation*” (i.e., efforts to identify the theoretical mechanisms that underlie item responses). Embertson (1987) proposed the use of direct observation of examinees, path analysis, and posttest interview data to clarify the processes underlying responses to test items. Since Embertson’s introduction of the conceptualization of construct representation, many investigators have applied these techniques to deconstruct the cognitive processes underlying responses to test items (e.g., Cramer, Waldorp, Van der Maas, & Borsboom, 2010).

In a critical essay on the topic of validity, Borsboom, Mellenbergh, and Van Heerden (2004) note: “We do not see the need for a unified validity concept because we think there is nothing to unify” (p. 1069). Borsboom et al. (2004) conceptualized an *attribute variation approach*, arguing that rigorous validity assessment highlights that changes in an attribute can be linked directly to changes in scores on a test designed to measure that attribute. Borsboom et al. (2004) underlined naturally occurring variations in traits and abilities rather than direct manipulation of latent traits. These authors cited latent class analyses to detect Piagetian developmental shifts in children’s reasoning over time (e.g., Jansen & Van der Maas, 2002) as exemplars of the attribute variation approach. Kane’s (2004) *argument-based* approach to validity adopts the interpretation as the framework for collecting and presenting validity evidence and explicitly associates validity with the plausibility of the various assumptions and inferences involved in the interpretation. The validity argument provides the rationale for accepting the interpretive argument and, thus, for accepting the interpretation. The validity argument may employ new

empirical data, the results of previous research, and various kinds of reasoning (e.g., common sense) to support various parts of the interpretive argument. Treating validation research as an effort to evaluate the inferences and assumptions inherent in test-score interpretations provides a clear framework for evaluating the validity of interpretations assigned to test scores. Validation research is assumed to involve a systematic effort to improve (1) the accuracy of conclusions based on test scores, (2) the appropriateness of the uses made of these scores, and (3) the quality of data-collection procedures designed to support the proposed conclusions and uses.

A major advantage of an argument-based approach to validation is that it provides guidelines for choosing the most appropriate kinds of evidence in particular cases. The interpretations derived from test scores generally depend on the structure of various kinds of inferences, such as generalizations, extrapolations, predictions, causal and noncausal explanations, theory-based inferences, and score-based decisions.

Bornstein's *process-focused* (PF) model (Bornstein, 2011; see Table 3.1) conceptualized validity as the degree to which respondents can be shown to engage in a predictable set of psychological processes during testing; once these processes are identified, exceptional manipulations are introduced to alter these processes and determine whether the manipulations affect test scores in meaningful ways. The PF model conceptualized variables that are seen as confounds in traditional validity assessment (e.g., self-presentation effects) as opportunities for manipulation, exploration, and focused analysis.

Research examining the process-focused validity of scores derived from self-attribution measures of interpersonal dependency illustrates one way in which the PF model may be operationalized. As Bornstein (2002) noted, the Interpersonal Dependency Inventory (IDI; Hirschfeld et al., 1977) and Rorschach Oral Dependency scale (ROD scale; Masling, Rabie, & Blondheim, 1967) are both widely used, and both yield well-validated (from an outcome perspective) scores that have been shown to predict a broad array of dependency-related behaviors (e.g., suggestibility, help seeking, compliance, interpersonal yielding) in laboratory and field settings (see Bornstein, 1999, for a metaanalysis of behaviorally referenced validity evidence for these two measures). Although scores derived from the IDI and ROD scale show good concurrent and predictive validity, IDI and ROD scale scores correlate modestly with each other, raising questions regarding the degree to which the two measures are assessing similar constructs.

Hubley and Zumbo (2011) reframed Messick's model (Table 3.2) by highlighting several key features of validity and validation. First, one can envision that, based on a construct, one develops a measure to which one ascribes test score meaning and inference. From test score meaning and inference emerge: (1) intended social and personal consequences, but also (2) unintended social and personal side effects of legitimate test use. Furthermore, they maintain that it is helpful to use different terms to distinguish between intended consequences and unintended side effects. Notably, consequences and side effects of legitimate test use may also influence test score meaning and inference, which makes them relevant to the validation process. Test score meaning and inference are shaped by several forms of validity evidence, and include but are not necessarily limited to criterion-related, convergent/discriminant, known groups, content, score structure, reliability, and

TABLE 3.1 A Four-Step Approach Commonly Used in Test Score Validation

A Process-Focused Model of Validity

1. Deconstruct assessment instrument(s)
 - a. Specify underlying psychological processes
 - b. Identify context variables that alter these processes
2. Operationalize and evaluate process–outcome links
 - a. Turn process-altering variables into manipulations
 - b. Delineate hypothesized outcomes
 - c. Experimental design
3. Interpret outcome
 - a. Process-based validity results
 - b. Limiting conditions
4. Evaluate generalizability/ecological validity
 - a. Population
 - b. Context and setting

Source: Reprinted with permission from Bornstein, R. F. (2011). Toward a process focused model of test score validity: improving psychological assessment in science and practice. *Psychological Assessment*, 23(2), 532–544, with permission. Copyright 2011 by the American Psychological Association.

TABLE 3.2 Hubley and Zumbo's Reframing of Messick's Matrix

| | Function | |
|------------------|---|---|
| | Inferences from and interpretation of test scores | Use of, or decisions made based on, test scores |
| Evidential basis | Construct validity + relevance + value implications + social consequences | Construct validity + relevance and utility + value implications + social consequences |

Source: Reprinted from Hubley, A. M., & Zumbo, B. D. (2011). Validity and the consequences of test interpretation and use. *Social Indicators Research*, 103(2), 219–230, with permission. Copyright 2011 by Springer Science + Business Media.

generalizability/invariance evidence, as well as intended social and personal consequences and unintended social and personal side effects. The centrality of the large dashed circle (Fig. 3.1), is meant to signify that construct validity is at the core of this unified view of validity and validation. Theory or theories influence the construct, the test/measure, and construct validity evidence. The “theory or theories” we are referring to include the theory related to the construct, theories related to the sample and context, and psychometric theory and models. Finally, the authors noted that the effect of values is pervasive throughout the framework and related to theory/theories (broadly defined), the construct, test/measure, and construct validity, as well as validation choices and decisions.

According to Cizek (2012), Messick's formulation is limited, as it describes only two things: (1) the extent to which evidence supports an intended test score inference and (2) the extent to which the subsequent consequences of using a test align with values and intended outcomes. Cizek's (2012) framework proposes a more comprehensive framework that reflects concern about score meaning and test use while differentiating these related inquiries into two parallel undertakings: (1) gathering and evaluating support for test score performance (i.e., validation) and (2) gathering and evaluating support

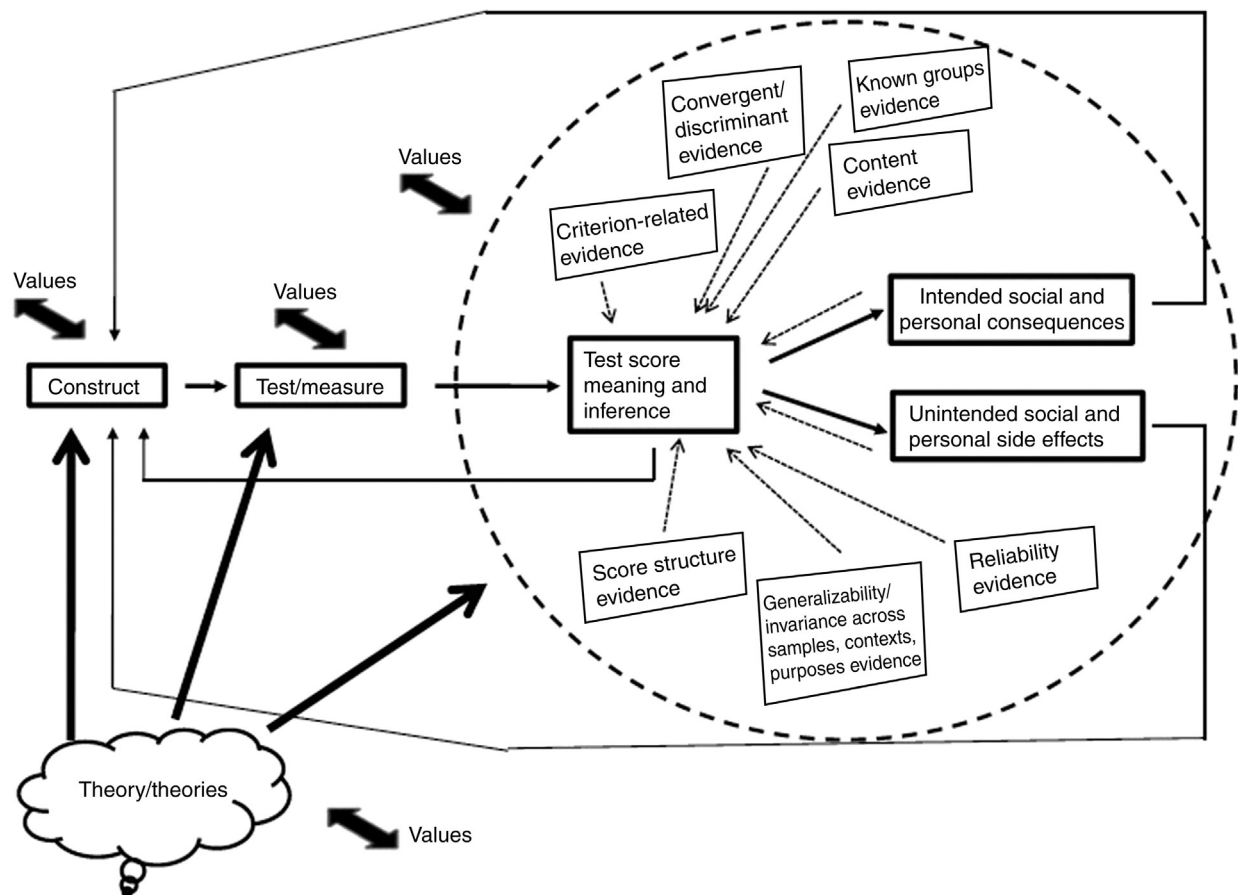


FIGURE 3.1 Hubley and Zumbo's revised unified view of validity and validation. (Reprinted from Hubley, A. M., & Zumbo, B. D. (2011). *Validity and the consequences of test interpretation and use*. *Social Indicators Research*, 103(2), 219–230, with permission. Copyright 2011 by Springer Science + Business Media.)

for test use (i.e., justification). Based on this framework, Cizek (2012) defines validity as “the degree to which scores on an appropriately administered instrument support inferences about variation in the characteristic that the instrument was developed to measure” (p. 35).

As Table 3.3 shows, despite shifts in the theoretical conceptualization of validity (e.g., Messick, 1989) and the recommendations of the 1999 Standards, the procedures used to evaluate test score validity remain largely the same as they were 50 years ago. There is a substantial difference between the “idealized” descriptions of test score validity proposed by the 1999 Standards and the validity applications practiced by researchers.

Thus, the majority of validity studies published in leading journals used correlational studies (91%) relying exclusively on self-report outcome measures (79%). Only 9% of studies used empirical procedures. One cannot conclude from these data why developments in test score validation do not correspond with theoretical transformations. According to Bornstein (2011), the lack of change may be attributed in particular to the definition of validity in the 1999 Standards. In the 1999 Standards the definition of validity is somewhat vague, without clear guidelines regarding operationalization, implementation, and integration of different forms of validity evidence. Another reason may be that most debates of construct representation and the methods used to assess it have focused exclusively on tests of cognitive ability and not on other measures (e.g., Mislevy, 2007).

Newton and Shaw (2013) investigated the use of *validity modifier labels* (VMLs) in contemporary research reports that had been published between 2005 and 2010.

There is a disagreement over the level(s) at which a claim to validity might be stated. Four such levels illustrate the spectrum of opinion:

1. The elements of the measurement procedure (e.g., “the item is valid”)
2. The measurement procedure (e.g., “the test is valid”)
3. The decision procedure (e.g., “the use of the test is valid”)
4. The testing policy (e.g., “the system is valid”)

Since the 1950s successive editions of the Standards have always adopted a fairly broad conception of validity linked to the intended use of test scores (i.e., to the decision procedure). In recent years many have wanted to extend validity to the level of testing policy. It seems that validity has moved beyond traditional views, and the field seems to have split into those who believe that validity is a narrow, integrated concept (e.g., Cizek, 2012) and those who believe that it should be considered a broad scientific and ethical concept (e.g., Kane, 2013).

Nowadays, it appears that “validity” is used differentially and even the official consensus position seems somewhat vague and unclear (Newton & Shaw, 2013).

TABLE 3.3 Validity Assessment Strategies 2006–08

| Journal | Number of Validity Articles | Proportion of Studies Using Correlational Designs (%) | Proportion of Studies Using Experimental Designs (%) | Proportion of Studies Using Self-Report Outcome Measures (%) | Proportion of Studies Using Alternative Outcome Measures (%) |
|--|-----------------------------|---|--|--|--|
| <i>Assessment</i> | 93 | 94 | 6 | 78 | 22 |
| <i>Educational & Psychological Measurement</i> | 93 | 92 | 8 | 91 | 9 |
| <i>Journal of Personality Assessment</i> | 131 | 89 | 11 | 75 | 25 |
| <i>Journal of Psychoeducational Assessment</i> | 49 | 94 | 6 | 71 | 29 |
| <i>Psychological Assessment</i> | 120 | 91 | 9 | 76 | 24 |
| Overall | 486 | 91 | 9 | 79 | 21 |

Source: Reprinted with permission from Bornstein, R. F. (2011). Toward a process focused model of test score validity: improving psychological assessment in science and practice. *Psychological Assessment*, 23(2), 532–544, with permission. Copyright 2011 by the American Psychological Association.

The official rejection of VMLs leaves researchers with a limited choice in employing novel methods in the establishment of validity. In their laborious research of validity indexes (Table 3.4), Newton and Shaw (2013) speculated that the majority of these VMLs identified were designed in an attempt to classify aspects of validity. The new VMLs were often introduced to highlight subtle, yet important, differences in emphasis (e.g., cognitive compared with content) rather than providing a deviant mode of perceiving validity.

TYPES OF EVIDENCE-BASED VALIDITY

Validity evidence based on consequences for testing

Validity evidence based on consequences of testing refers to evaluating both the intended and the unintended consequences associated with a testing program. Considerations of testing consequences are an important social policy issue, but many

TABLE 3.4 Various Kinds of Measurement Validity

One Hundred and Twenty-Two Kinds of Validity for Measurement

| | | | |
|-----------------|----------------------|---------------------------|------------------|
| Administrative | Descriptive | Instructional | Rational |
| Artifactual | Design | Internal test | Raw |
| Behavior domain | Diagnostic | Internal | Relational |
| Cash | Differential | Interpretative | Relevant |
| Cluster domain | Direct | Interpretive | Representational |
| Cognitive | Discriminant | Intrinsic | Response |
| Common sense | Discriminative | Intrinsic content | Retrospective |
| Concept | Domain | Intrinsic correlational | Sampling |
| Conceptual | Domain-selection | Intrinsic rational | Scientific |
| Concrete | Edumetric | Item | Scoring |
| Concurrent | Elaborative | Job component | Self-defining |
| Concurrent true | Elemental | Judgmental | Semantic |
| Congruent | Empirical | Linguistic | Single-group |
| Consensual | Empirical-judgmental | Local | Site |
| Consequential | Etiological | Logical | Situational |
| Construct | External test | Longitudinal | Specific |
| Constructor | External | Lower-order | Structural |
| Content | Extratest | Manifest | Substantive |
| Context | Face | Natural | Summative |
| Contextual | Factorial | Nomological | Symptom |
| Convergent | Fiat | Occupational | Synthetic |
| Correlational | Forecast true | Operational | System |
| Criterion | Formative | Performance | Systemic |
| Cross-age | Functional | Practical | Theoretical |
| Cross-cultural | General | Predictive | Trait |
| Cross-sectional | Generalized | Predictor | Translation |
| Cultural | Generic | Procedural | Treatment |
| Curricular | Higher-order | Prospective | True |
| Decision | Incremental | Psychological and logical | User |
| Definitional | Indirect | Psychometric | Washback |
| Derived | Inferential | | |

Source: Reprinted from Newton, P. E., & Shaw, S. D. (2013). Standards for talking and thinking about validity. *Psychological Methods, 18*(3), pp. 301–319, with permission. Copyright by the American Psychological Association.

test specialties believe that they are irrelevant to validity. Others argue that such consequences contribute in evaluating the appropriateness of using a test for a particular purpose (e.g., Messick, 1989). Cronbach (1982) indicated that in order to evaluate a testing program as an instrument of policy, the evaluation of consequences is essential. Later, Cronbach (1988) perceived consequences as central in the evaluation of validity by suggesting that negative consequences could invalidate test use even if they were not due to test design flaws. The Standards for educational and psychological testing (AERA et al., 1999) explicitly address the consequential aspect of validity for educational assessments that are considered to be tools for improving instructional practice. Sireci and Sukin (2013) note that as testing programs have consequences, it is important to evaluate the degree to which the positive outcomes of the test outbalance any negative consequences.

Sources of validity evidence are often related to the particular use of different measures. For example, validity evidence based on test content is likely to be of significance in educational achievement testing, while internal structure may be of special importance in self-report inventories. However, one source of evidence alone is not sufficient for a strong validity agreement. In most cases multiple sources of evidence are necessary (Sireci & Sukin, 2013). The type of instrument selected for assessment may also influence the category of validity evidence. For example, observation scales should demonstrate strong evidence of internal structure by high interrater agreement. Multiple-choice measures should have high content validity. Psychometricians highlight that interpretations should be more reliable if validity evidence is derived from multiple sources.

According to *consequential validity*, validity lies not only in the degree to which a test score is capable of predicting some theoretically related outcome, but also in the degree to which that test score is employed in a way to produce valid data. Inherent in this framework is the assumption that an evidentially (research-based) valid test score can provide consequentially valid data in some contexts but invalid results in others, depending on how the test score is interpreted. For example, psychopathology scores may be evaluated differently in two different clinics.

Haertel's (2013) framework for classifying mechanisms of intended testing effects as direct and indirect effects can clarify comprehension of the validity evidence needed for assessment and accountability systems. The direct effects of educational assessments (instructional guidance for students, student placement and selection, informing comparisons among educational assessments, and educational management) involve interpretations that rely directly on the information provided by scores about the assessed constructs. Indirect effects (directing student effort, focusing the system, such as curriculum and instruction, and shaping public perceptions that can influence actions) have no direct link with the information provided by test scores (Haertel, 2013). These indirect mechanisms of action are key components of the interpretation and use argument, and are decisive in the evaluation of consequences of educational assessments and accountability programs.

Ozer and Benet-Martínez (2006) have identified three types of outcomes: *individual*, *interpersonal*, and *societal/institutional*. Individual outcomes consist of such constructs as physical health, psychopathology, self-concept and identity, happiness/subjective well-being (SWB), and spiritual and virtual aspects. For example, two robust conclusions from studies in SWB are that personality dispositions are strong predictors of SWB. Specifically, individuals high in extraversion and low in neuroticism tend to perceive events and situations in a more positive way and are less responsive to negative feedback (Diener & Lucas, 1999).

Similarly, personality traits play a significant role in physical health and life longevity. For example, studies demonstrated that positive emotionality (extraversion) and conscientiousness predict longer lives (e.g., Danner, Snowdon, & Friesen, 2001) while hostility (low agreeableness) predicts poorer physical health and earlier mortality (Miller, Smith, Turner, Guijarro, & Hallet, 1996). With regard to psychopathology, research demonstrates associations between personality dispositions and psychological disorders. Dimensional models of personality disorders suggest that they are understood as extreme expressions of personality traits (e.g., Widiger, 2011). For example, anxiety disorders are primarily predicted by higher neuroticism, and depression is mostly linked to neuroticism and low extraversion (Trull & Sher, 1994).

Interpersonal outcomes consist of peer and family relationships and romantic relationships. For example, agreeableness and extraversion are the best predictors of processes and outcomes related to peer relations in children, such as peer acceptance and friendship (Jensen-Campbell et al., 2002). Furthermore, low agreeableness and neuroticism consistently emerge as predictors of negative relationship outcomes, such as relationship dissatisfaction, conflict, abuse, and ultimately dissolution (Karney & Bradbury, 1995).

Social/institutional outcomes consist of occupational choice and performance, political attitudes and values, community involvement, and criminality. Research examining job and occupational variables began to include Big Five measures to examine the consequential meaning of the five factors (e.g., Paunonen, 2003). Low conscientiousness seems to be consistently associated with various aspects of criminal and antisocial behavior (e.g., Shiner, Masten, & Tellegen, 2002; Wiebe, 2004).

Empirical Applications of Consequential Validity

Nock et al. (2010), in their study of the role of implicit cognition in the prediction of suicidal attempt, examined whether individuals who have decided to kill themselves would reveal stronger implicit cognition, linking self with death/suicide, and whether the strength of such an association would predict actual suicidal attempts. The authors developed and evaluated

a version of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) that measures the association of death/suicide and self. The IAT is a brief computer-administered test that uses examinees' reaction times when classifying semantic stimuli to measure the automatic mental associations they hold about various issues, such as life, death, and suicide.

The main goal of the study was the prediction of suicide. Evidence for such prediction would enhance research on self-destructive behaviors and would illustrate the usefulness of psychological assessment in the improvement of prediction of self-destructive behaviors. Known demographic and psychiatric risk factors for suicide attempts were assessed to test the incremental predictive validity of the IAT. The sample consisted of adults presenting to the psychiatric emergency department of a large metropolitan hospital. The results revealed that the IAT predicted suicide attempts beyond the effects of known risk factors (e.g., depression), suggesting that the assessment of implicit cognition may prove valuable for clinical diagnosis. Thus, the findings support the consequential validity of the IAT (Greenwald, Nosek, & Sriram, 2006).

Validity evidence based on test content

In the earlier versions of the Standards (i.e., APA, AERA, & NCME, 1954, 1966, 1974, 1985) validation was described as “content validity” (Sireci, 1998b). A relatively new aspect, validity evidence based on test content is *alignment*, is associated with educational testing (Porter, Smithson, Blank, & Zeidner, 2007). Webb, 1997 alignment method proposes five dimensions from which to evaluate alignment between content standards and assessments: (1) *content focus*, (2) *articulation across grades and ages*, (3) *equity and fairness*, (4) *pedagogical implications*, and (5) *system applicability* (Table 3.5).

Sireci (1998a, 1998b) describes content validity as pertaining to four elements of test quality: *domain definition*, *domain representation*, *domain relevance*, and *appropriateness of test development process*. A recent and concise definition defines content validity as the degree to which the content of a test is congruent with testing purposes (Sireci & Faulkner-Bond, 2014). A domain definition transforms the theoretical construct to a more concrete content domain. For example, for achievement testing in elementary, middle, and secondary schools, the content and cognitive elements of the test specifications are typically drawn from curriculum frameworks that regulate instruction. Evaluating domain definition involves obtaining external consensus that the definition conforms to prevailing notions of the domain held by experts in the field.

Domain representation refers to the degree to which a test adequately represents and measures the domain as defined in the test specifications. To evaluate domain representation, external and independent “subject matter experts” (SMEs) are asked to review and rate all the items on a test (e.g., Sireci, 1998a, 1998b). Thus, SMEs evaluate the extent to which test items are congruent with the curriculum framework. These studies of domain representation have recently been characterized within the realm of test alignment research (Bhola, Impara, & Buckendahl, 2003). While traditional content validity studies pertain more to the broader level of the content domain and its relation to the test design and specification, alignment studies adopt a more specified approach and estimate the degree to which the content of a test represents its intended domain in relation to various criteria, such as depth, breadth, or cognitive complexity. Alignment methods that are designed

TABLE 3.5 Description of Webb Method

| Dimension | Description | Evaluation Criterion |
|---------------------------|---|---|
| Categorical concurrence | The extent to which the items on the test correspond to strands ^a in the content standers | Minimum of six items per strand |
| Depth of knowledge | The level of consistency between cognitive complexity articulated in objectives ^b and tested by items | At least 50% of items should be at or above cognitive complexity level articulated in corresponding objectives ^b |
| Range of knowledge | The level of consistency between the range of complexity articulated in objectives ^b and tested by items | At least 50% of objectives ^b should be measured by at least one assessment item |
| Balance of representation | The extent to which the test mirrors the standers in terms of relative emphasis on different standers or topics | Index indicating relative proportion of items to objectives ^b between standers and test approaches I |

^aMost general level at which standers or expectations are articulated.

^bMost specific level at which standers or expectations are articulated.

Source: Reprinted with permission from Sireci, S. G., & Faulkner-Bond, M. (2014). Validity evidence based on test content. *Psicothema*, 26(1), 100–107, with permission. Copyright 2014 Psicothema.

for educational tests tend to pertain on several levels of test specifications, while some methods evaluate the alignment of the assessment with instruction. Domain relevance reflects the extent to which each item on a test is relevant to the specified domain. Taken together, studies of domain representation and relevance evaluate: (1) whether all significant aspects of the content domain are measured by the test and (2) whether the test contains insignificant or irrelevant content.

Appropriateness of the test development process refers to all processes used when constructing a test to ensure that test content accurately represents in a precise manner the target construct. Examples of quality control procedures that support content validity include: (1) reviews of test items by content experts to ensure their technical accuracy, (2) reviews of items by measurement experts to determine how well the items conform to standard principles of quality item writing (Haladyna & Downing, 1989), (3) sensitivity review of items and intact test forms to ensure the test is free of construct irrelevant material that may offend, advantage, or disadvantage members of particular subgroups of examinees, (4) pilot-testing of items followed by statistical item analyses to select the most appropriate items for operational use, and (5) analysis of DIF to indicate items that may be harder for some groups of examinees than for others (Holland & Wainer, 1993).

Face validity

Face validity is closely related to content validity. Face validity is the degree to which a measure appears to be related to a specific construct. The apparent meaning and relevance of a test's content might affect test takers' motivation to respond in a spontaneous manner. Face validity is not considered an important facet of validity, as nonexperts' opinions do not play a major role in the empirical or theoretical quality of a test (Furr & Bacharach, 2008). This type of validity is based on analyses and evaluations of the test content by experts, including items, subscales formats, wording, and instructions placed on respondents. "In general, it addresses questions about the extent to which the content of a measure represents a specified content domain" (Goodwin & Leech, 2003, p. 183).

Empirical Applications of the Content Validity

Most of the cross-cultural research on personality structure has been done through the application of well-established measures. However, there have been occasions when very brief instruments have been selected and used. One such instrument is the Ten Item Personality Inventory–Japanese (TIPI-J), a very brief measure of the Big Five in Japanese (Oshio, Abe, & Cutrone, 2012). Extremely brief scales, especially single-item measures, can lack validity and be susceptible to Type I and Type II errors (Credé, Harms, Niehorster, & Gaye-Valentine, 2012). Type I error, also known as "false positive," is the error of rejecting a null hypothesis when it is actually true. Specifically, it occurs when we are observing a statistical difference when in reality there is none. Type II error, also known as a "false negative," is the error of not rejecting a null hypothesis when the alternative hypothesis is the true state of nature. Specifically, it occurs when we are failing to observe a difference when it actually exists. Analyses demonstrated good levels of internal consistency and retest reliability for the TIPI-J (Oshio et al., 2012). Moreover, analyses of the concurrent validity of the TIPI-J in comparison to other Japanese Big Five scales revealed convergent correlations that were substantial and equivalent to the original English-language version (Oshio, Abe, & Cutrone, 2013). Thus the validity of the TIPI-J, consisting of only 10 items, is similar to that found in longer measures in Japan.

A recent study (Oshio, Abe, Cutrone, & Gosling, 2014) compared the content validity of the TIPI-J with respect to the Big Five dimensions by examining the convergent and discriminant correlations between the TIPI-J and the 44-item Big Five Inventory (BFI; John and Srivastava, 1999), a recent Big Five version designed to optimize Big Five content coverage. Overall, results of the correlation analysis and the structural equation modeling supported the content validity of the TIPI-J in spite of the different languages of the scales. The findings suggest that each dimension of the TIPI-J corresponds with the predicted factors of the BFI-E. The results of the convergent correlation coefficient and the 95% confidence intervals (95% CI) supported the content validity of the TIPI-J. The CFA using the SEM revealed that variances of the five common Big Five trait factors were significant and all trait factors had significant effects on each corresponding dimension.

Validity evidence based on associations with other variables

Validity based on the relationships between test scores and other variables extends beyond single test-criterion relationships. This type of validity incorporates the analysis of the relationships of test scores with constructs that are expected to be related positively or negatively or to be unrelated. This is also known as *convergent* evidence (i.e., is the degree to which test scores are correlated with tests of related constructs). For example, if the Narcissistic Personality Inventory (NPI) is a measure of narcissism, we should consider the way narcissism is associated with other psychological constructs, such as desire for superiority, need for achievement, self-esteem, dominance, exploitativeness, and so on. Taking into consideration

the positive or negative direction of correlations, we may note that positive self-esteem and need for achievement may be positively related to narcissism, while exploitativeness may be negatively associated with narcissism.

This validity category was also referred to as *generalizability* evidence and *external* evidence. The generalizability aspect of construct validity evaluates the extent to which test score properties and interpretations can be generalized to and across sample groups, settings, and tasks. The generalizability component of construct validity attempts to establish that a test provides representative coverage of the content and processes of the construct domain in question. The “relationship to other variables” evidence category is broad and includes several traditional types of validity, such as criterion-related, concurrent, predictive, convergent, and discriminant validity.

Empirical applications of the validity with other variables

Example 1

The study by [McGill \(2015\)](#) assessed the incremental validity of KABC-II CHC (Cattell–Horn–Carroll) factor scores in predicting achievement beyond that provided by the Fluid-Crystallized Index (FCI). Hierarchical multiple regression analyses were used to assess the extent to which KABC-II factor scores were provided by the FCI. Hierarchical multiple regression analyses were employed to assess the extent to which KABC-II factor scores provided meaningful improvements in prediction of KTEA-II scores beyond that already accounted for by the FCI composite. Across both age samples (7–12 + 13–18 years), the FCI accounted for statistically significant proportions of achievement in all of the regression models with clinically significant effect size estimates. This finding is consistent with previous incremental validity research of other intelligence test measures and samples (e.g., [Canivez 2013a,b](#); [McGill & Busse, 2014b](#)), as well as [Thorndike’s \(1986\)](#) observation that the vast majority of predictable variance in criterion variables (e.g., achievement measures) is accounted for by the full-scale score from a cognitive battery.

Example 2

Despite their differences, stress theories have a common denominator: Stress is seen as the product of two constructs—impinging demands and compromised resources—which combine to produce somatic and mental changes that put people at risk for pathology ([Cohen, Kessler, & Gordon, 1995](#)). In this study, the criterion validity of scores was examined through a recently developed stress measure, the Stress Overload Scale (SOS; [Amirkhan, 2012](#)), using a variety of methodological strategies. The SOS was selected because it was an improvement over previous scales ([Amirkhan, 2012](#)). It assesses stress overload using two subscales, Event Load and Personal Vulnerability. Like other stress measures, the SOS yields continuous scores; but, unlike others, its subscales may be crossed to form a diagnostic grid that assigns categorical risk scores. The SOS consists of 30 items, six of which are filler items (e.g., “calm”) intended to offset the generally negative tone of stress questionnaires. Each item is preceded by a prompt, “In the past week, have you felt...” and followed by a 5-point rating scale, ranging from 1 (*not at all*) to 5 (*a lot*). Three independent variables were derived from the SOS: scores for the Personal Vulnerability and the Event Load subscales, as well as for their sum, the SOS total score.

Study 1—Predictive Criterion Validity: The first study made use of the traditional stress-scale criterion of illness. Students often complain that they get sick following the strain of the final weeks of the semester. The sample consisted of 127 undergraduate psychology students. A subset of 66 participants also completed a follow-up study to determine the reliability of the criterion health measure. Using a traditional criterion in the validation of stress measures, the full SOS scores were found capable of predicting poststressor illness as measured by five different indexes. Moreover, this finding emerged even after steps were taken to correct stress-scale validation problems. Current results show that the Event Load and Personal Vulnerability subscales play equally important roles in predicting illness.

Study 2—Concurrent Criterion Validity: The second study was designed to compensate for some of the shortcomings of the first study, by determining whether the SOS could differentiate between people in stressed versus relaxed circumstances. Two samples were drawn from the general community: one, a group of litigants, defendants, jurors, and lawyers at a courthouse on an early weekday; the other, a group of vacationers, sightseers, and families at an aquarium at midday on a weekend. If the SOS could discriminate between those at the contentious legal setting and those at the relaxing tourist attraction, this would provide evidence of concurrent validity. The second study verified the concurrent validity of SOS items. That is, results demonstrated that SOS scores could successfully discriminate between respondents at a courthouse (assumed to be stressed) and those at a tourist attraction (assumed to be calm).

Study 3—Concurrent Criterion Validity: The third study was designed to avoid the self-report problems associated with use of a criterion measure and also to correct for the ambiguities of the prior study. It did so by using a biomarker of stress as the criterion, assessing salivary cortisol in a group of pregnant women. The Trier Social Stress Test (TSST) is a laboratory

procedure that has been used to induce changes in salivary cortisol (in both general population and pregnant samples) through the use of standardized stress-generating tasks (De Weerth, Gispen-de Wied, Jansen, & Buitelaar, 2007). A subset of 40 pregnant women was recruited from community sites in Southern California as part of a larger study ($n = 100$) examining depression risk and health during pregnancy (Urizar, 2012). Results showed that pregnant women who had higher SOS scores exhibited a blunted biological response to laboratory-induced stress, secreting significantly less cortisol over the course of the laboratory trial. However, high and low scorers showed no significant differences either in short-term cortisol reactivity or in cortisol recovery. This may signal a limit to the SOS predictive validity, namely that it can detect only broad rather than temporary stress reactions.

Validity evidence based on internal structure

The term *internal structure* refers to the dimensionality or underlying structure of an assessment. A test's internal structure reflects the way that the parts of a test are related to each other. For a test to be considered a valid measure of a part construct, the actual structure of the test should match the theoretically based structure of the construct (Furr & Bacharach, 2008). Internal structure validity can be derived from different sources, such as *internal structure*, *dimensionality*, and *measurement invariance*. When assessing dimensionality, a researcher is mainly interested in determining if the interrelationships among the items support the intended test scores that will be used to draw inferences. For measurement invariance, it is useful to provide evidence that the item characteristics (e.g., item discrimination and difficulty) are comparable across factors, such as sex or race. Finally, reliability indexes provide evidence that the reported test scores are consistent across time (retest reliability). Some measures are designed to be unidimensional, whereas others are designed to be multidimensional. A dimension is a homogeneous continuum that accounts for variation in examinees' responses to test items. Analysis of internal structure involves some type of comparison of the hypothesized and observed dimensionalities. Apart from dimensionality, another issue of importance is the types of reported scores, such as a *composite score*, *subtest scores*, or *score profile*. For example, a test that intends to report one composite score should be predominately unidimensional.

The assessment test of dimensionality is one aspect of validating the internal structure of a test. Factor analysis is a common statistical technique used to assess the dimension of a set of data (e.g., Kline, 2010). Among the most common factor analytic methods is CFA, which is a type of structural equation model (SEM) that examines the hypothesized relationships between indicators (e.g., items responses, behavioral ratings) and the latent trait (or the theoretical construct) that the indicators aim to assess (e.g., Kline, 2010). CFA provides evidence to support the validity of an internal structure of a test by verifying the number of underlying dimensions and the pattern of item-to-factor relationships (i.e., factor loadings). For example, if the hypothesized structure is incorrect, the CFA model will provide poor fit to the data because the observed intercorrelations among the indicators will not be accurately reproduced from the model parameter estimates. If the multifactor fits the data well and the construct is intended to be multidimensional, this provides supportive evidence of the internal structure of the specific tool.

Three sets of parameters are estimated in a CFA model: (1) the factor loadings, which represent the strength of the relationship between the indicator and its respective latent variable and may be considered a measure of item discrimination, (2) the variance and covariance coefficients for the latent variables, and (3) the variance and covariance coefficients for the measurement error (i.e., unique variance of each indicator) (Rios & Wells, 2014). Rios and Wells (2014) refer to the *bifactor* model as another means in estimating dimensionality. The bifactor model, originally developed by Holzinger and Swineford (1937), has been growing in popularity within SEM and item response theory (IRT) over the past few years. The bifactor model is a multidimensional model that represents the hypothesis that several constructs, as indicated each by subset of indicators, account for unique variance above and beyond the variance accounted for by one common construct that is identified by all indicators. More specifically, this model is composed of one general and multiple specific factors. The general factor reflects the target construct of the measure and accounts for the common variance among all indicators. On the other hand, the specific factors pertain to only a subset of indicators that are related in some way (e.g., content subdomain, item type, and so on) and account for the unique variance above and beyond the variance accounted for by the general factor.

There are several statistical methods for evaluating internal structure or the dimensionality of an assessment. These methods include estimate reports of internal consistency reliability, factor analysis, MDS, and structural equation modeling. In the 1999 Standards, internal structure referred to the psychometric traits of the test items, the test properties, such as reproducibility and generalizability, and the measurement used to score the items. This type of construct validity (internal structure) basically reflects the various types of reliability, such as intrarater, test-retest, internal consistency, split-half, and alternate forms. In other words, the reliability of an instrument now provides evidence for its internal structure validation. Differential item functioning (DIF) has also been proposed as another category of evidence for internal structure. DIF refers

to the situation where respondents of equal ability perform differently on a test due to items that are biased against groups on such factors as age, gender, or religion. Therefore, DIF studies are undertaken to examine test item bias.

Factor analysis

Perhaps the most common statistical analytical method in studying internal consistency reliability is factor analysis. Factor analysis refers to a set of statistical procedures designed to determine the number of distinct constructs needed to account for the pattern of correlations among a set of measures (Fabrigar & Wegener, 2012). The purpose of factor analysis is to identify the fewest possible constructs necessary to reproduce the original data. Mathematically, it explores the set of equations that maximize the multiple correlations of the factors to the items. The relations of each variable to each of the factors reveal whether the item is related to only one of the factors (constructs) or to more than one. Factor analysis has its origins in the early 1900s and in Charles Spearman's "Two-Factor Theory" of intelligence (1904). He applied the technique in order to understand the structure of intelligence. His research led him to develop the construct of the g factor of general intelligence and the five factors of specific intellectual abilities.

Factor analysis uses mathematical procedures for the simplification of interrelated measures to explore patterns in a set of variables (Child, 2006). The two main factor analysis techniques are exploratory factor analysis and CFA. Exploratory factor analysis attempts to discover complex patterns by exploring the data set and testing predictions, whereas CFA attempts to confirm hypotheses and uses path analysis diagrams to represent variables and factors (Child, 2006). To perform a factor analysis, there should be an absence of univariate and multivariate outliers (Field, 2009). Moreover, another determining factor concerns the assumption that there is a linear relationship between the factors and the variables when calculating the correlations (Gorsuch, 1983). For something to be labeled as a factor, it should have at least three variables, although this depends on the design of the study (Tabachnick & Fidell, 2007). As a general guide, rotated factors that have two or fewer variables should be interpreted with caution. A factor with two variables is considered reliable only when the variables are highly correlated with each another ($r > .70$) but fairly uncorrelated with other variables.

The recommended sample size is at least 300 participants, and the variables that are subjected to factor analysis should each have at least 5–10 observations (Comrey & Lee, 1992). We normally say that the ratio of respondents to variables should be at least 10:1 and that the factors are considered to be stable and to cross-validate with a ratio of 30:1. Next, the correlation r must be .30 or greater since anything lower would suggest a really weak relationship between the variables (Tabachnick & Fidell, 2007).

Factor Extraction Techniques

Principal components analysis is used to extract maximum variance from the data set with each component, thus reducing a large number of variables into smaller number of components (Tabachnick & Fidell, 2007). Researchers may use principal components analysis as the first step to reduce the data, and then follow up with a "true" factor analysis technique.

Rotation Methods

The goal of rotation is to attain an optimal simple structure that attempts to have each variable load on as few factors as possible, but maximizes the number of high loadings on each variable (Rummel, 1970). Ultimately, the simple structure attempts to have each factor define a distinct cluster of interrelated variables so that interpretation is easier (Cattell, 1973). For example, variables that relate to language should have high loadings on language ability factors but should have close to zero loadings on mathematical ability. Broadly speaking, there are orthogonal rotation and oblique rotation. Orthogonal rotation is when the factors are rotated 90 degree from each other, and it is assumed that the factors are uncorrelated (DeCoster, 1998; Rummel, 1970). Oblique rotation is when the factors are not rotated 90 degree from each other, and the factors are considered to be correlated.

Number of Factors Retained

The eigenvalues and scree test (i.e., scree plot) are used to determine how many factors to retain. One criterion that can be used to determine the number of factors to retain is Kaiser's criterion, which is a rule of thumb. This criterion suggests retaining all factors that are above the eigenvalue of 1 (Kaiser, 1960). Another criterion is based on Jolliffe's criterion, which recommends retaining factors above .70 (Jolliffe, 1972). It has been argued that both criteria may result in overestimation in the number of factors extracted (Costello & Osborne, 2005; Field, 2009); therefore, it is suggested to use the scree test in conjunction with the eigenvalues to determine the number of factors to retain. The scree test consists of eigenvalues and factors (Cattell, 1978). The number of factors to be retained is the number of data points that are above the break (i.e., point of inflexion).

Interpretations and naming of factors

One significant difficulty of this technique is naming the factors. There is no way to determine the accuracy or the representativeness of factor names. In interpreting the factors, one needs to look at the loadings to determine the strength of the relationships. A determining factor is the large loading factors.

There should be few item cross loadings (i.e., split loadings) so that each factor defines a distinct cluster of interrelated variables. A cross loading is when an item loads at .32 or higher on two or more factors (Costello & Osborne, 2005). Depending on the design of the study, a complex variable (i.e., an item that is in the situation of cross loading) can be retained with the assumption that it is the latent nature of the variable, or the complex variable can be dropped when the interpretation is difficult. Another option is to choose a significant loading cutoff to make interpretation easier. The signs of the loadings show the direction of the correlation and do not affect the interpretation of the magnitude of the factor loading or the number of factors to retain (Kline, 1994). Further, some variables are difficult to interpret because they may load onto more than one factor, a phenomenon known as split loadings. Naming of factors is linked to expertise in the field under study and taking into consideration the loading of variables or factors (in second-order factor analysis).

Empirical applications of internal structure validity

Example 1

Tests with substantive changes, such as those made to the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV) may result in the measurement of different constructs compared to previous test versions (Strauss, Spreen, & Hunter, 2000). Thus, investigation of the internal structure of the WAIS-IV is necessary for determining the constructs it measures because it cannot be assumed that they are the same constructs found in the WAIS-III. To that end, several investigations were conducted to assess the internal structure of the WAIS-IV prior to and after its publication. Prior to the publication, CFAs were conducted to assess the structured validity of its scores. Six models were examined, including both first- and second-order factor models. The first-order four-factor model, with factors labeled Verbal Comprehension (VC), Perceptual Reasoning (PR), Working Memory (WM), and Processing Speed (PS), was found to fit the standardization data well and to have a superior fit to models with fewer first-order factors. A second-order model with general intelligence as the second-order factor and the aforementioned four factors as first-order factors was also examined and favored over the first-order four-factor model despite resulting in a slightly inferior fit. Referring to this decrease in fit, the test authors stated, “This is expected because the fit of a second-order model can never exceed the fit of the corresponding first-order model” (Wechsler, 2008, p. 66). Following publication of the WAIS-IV, several independent researchers conducted structural validity analyses with the standardization data. Using the 10 core and five supplemental WAIS-IV subtests, Benson, Hulac, and Kranzler (2010) conducted CFA to compare the model favored by the test authors to various models they argued were more aligned with the Cattell–Horn–Carroll (CHC) structure of intelligence. Results indicated that a CHC-inspired structure was a better fit to the data than the model favored by the test authors. More specifically, they found a five-factor model with factors labeled Crystallized Intelligence, Visual Processing, Fluid Reasoning, Short-Term Memory, and Processing Speed to have a significantly superior fit than the four-factor model proposed by the test authors. Also using the full standardization data, Ward, Bergman, and Hebert (2012) found that the four-factor model with three orthogonal minor factors they labeled Spatial Visualization, Quantitative Reasoning, and Digit–Letter Memory Span was the best-fitting and most theoretically sound model. Benson et al. (2010) also conducted factorial invariance analyses to determine whether the factor structure of the WAIS-IV remained consistent across age groups. They found differences in the magnitude of factor loadings across various age cohorts of the standardization sample.

Example 2

The purpose of a study by Crego, Gore, Rojas, and Widiger (2015) was to estimate the discriminant and convergent validity of the Personality Inventory for DSM-5 (PID-5) questionnaire of the *DSM-5* dimensional trait model. Both discriminant and convergent validities were estimated with regard to the correlations among PID-5 domain (e.g., Negative Affectivity) and trait (e.g., Anxiousness) scales, as well as with the domain of general personality (e.g., Neuroticism) with which they are said to be aligned (APA, 2013). Indications of potentially problematic discriminant validity have been suggested in PID-5 studies. Gore and Widiger (2013) indicated that “there were very high correlations across domain scales within the same measures particularly for the PID-5” (p. 818). It was also found that the Five Factor Obsessive Compulsive Inventory includes a Perfectionism scale that converges adequately with PID-5 Rigid Perfectionism (Crego et al., 2015). Quilty, Ayearst, Chmielewski, Pollock, & Bagby (2013) reported the correlations between of the 25 PID-5 trait scales with the NEO Personality Inventory–Revised (NEO PI-R) (Costa & McCrae, 1992) and concluded that “evidence for the

discriminant validity of the PID-5 domain and facet scales was mixed” (p. 348). They noted that PID-5 disinhibition scales correlated with neuroticism and that negative affectivity subscales correlated with conscientiousness. They attributed some of this to limitations of the NEO PI-R but also suggested that there may in fact be “shortcomings in these forms of validity” in some PID-5 scales (p. 348).

In this study (Crego et al., 2015) the convergent and the discriminant of the 25 PID-5 scales were tested against the NEO PI-R, IPC, 5DPT, HEXACO PI-R, and IPIP-NEO domain scales. Convergent validity (correlations with their home domain) across the five measures of personality was demonstrated for most of the PID-5 scales. Discriminant validity (correlations with other domains) was good for almost all the scales with antagonism.

Example 3

Sinclair et al. (2013) recently developed a new index for the Personality Assessment Inventory (PAI) as a means of better predicting risk factors for increasing level of care (ILOC). The PAI (Morey, 1991) is a broadband measure of psychological functioning and interpersonal style that was developed using the construct validation approach. It consists of 344 items that fall under 4 validity scales, 11 clinical scales, and 2 interpersonal scales. Sinclair et al. (2015) sought to extend the study of Sinclair et al. (2013) by examining the validity of the level of care index (LOCI) in two independent psychiatric samples. In Study I, differences in LOCI scores were compared across levels of care in a mixed sample of psychiatric inpatients and outpatients to establish construct validity and were also evaluated in terms of their associations with known risk factors for increased level of care (e.g., suicide risk). Likewise, the incremental validity of the LOCI was also evaluated to see whether the index had predictive value above and beyond other PAI indexes that could also provide information about level of care. In Study II the construct validity of the LOCI was further evaluated in a separate inpatient sample by examining associations with several criteria variables, such as previous admissions to the hospital for the prior 6 months and whether someone’s current admission was related to suicide risk.

Results revealed that, in addition to differentiating inpatients from outpatients, the LOCI was also found to be meaningfully associated with a number of risk factors for increased level of care, such as suicide risks and self-harming behaviors, with effect sizes in the moderate to high range. Furthermore, results generally supported the incremental validity of the LOCI, which would further indicate that it contains unique indicators of the potential need for increased level of care that extend beyond suicide and violence risk.

Validity evidence based on response processes

According to the Standards (AERA et al., 1999) evidence based on response processes refers to “evidence concerning the fit between the construct and the detailed nature of performance or response actually emerged in by examinees” (p. 12). The Standards provide few indications for obtaining evidence about the response processes: “Questioning test-takers about their performance strategies or response to particular items...Maintaining records that monitor the development of a response to a writing task...Documentation of other aspects of performance, like eye movement or response times” (p. 12). In addition, the Standards state that the study of response processes can expand beyond the test takers to include... “observers or judges to record and/or evaluate examinees’ performance or products” (p. 13). The answer to the question of “when evidence based on response processes is necessary?” fits into what Sireci (2012) calls a “de-constructed approach to test validation” that offers necessary validity evidence to support the use of the test.

In both cases the answer to the question is supported by two major conceptualizations: (1) The concept formulated by Embertson (1987) of “construct-representation,” which includes as threats to validity those from a “construct under representation” and those from “construct-irrelevant variance,” and (2) the development of a “rival hypothesis” that as indicated by the Standards (1999) defies the proposed interpretation to justify the use of the test. Based on these two conceptualizations, researchers should assess the performance of a validation study to obtain evidence based on response processes that justify the particular use of a test when: (1) the performance of the test takers reflects the psychological processes and/or cognitive operations delineated in the test specification, (2) the processes of judges or observers when evaluating the performance of the test takers are consistent with the intended interpretation of the scores, and (3) groups of test takers defined by demographics, linguistic, or other conditions associated with the intended use of the test do not differ in the nature of their performance because of sources of “construct-irrelevant variance” (Padilla & Benítez, 2014).

Castillo and Padilla (2012) conducted a validation study using cognitive interviews following the “argument based approach to validation” (Kane, 2006) to obtain evidence of the process of response to the items of a psychological scale designed to measure the construct “family support.” The study aimed to investigate the assumption that people living alone and those living with others responded to the items employing similar psychological processes. The comparison between the psychological processes of the two groups did not support this assumption.

Methods for Obtaining Validity Evidence of the Response Processes

Collecting evidence based on response processes involves determining the cognitive strategies adopted by examinees or ruling out specific constructs—irrelevant strategies, such as guessing or test wiseness. The methods have been grouped into two categories: those that directly access the psychological processes or cognitive operations (thinking aloud, focus groups, and interviews) and those that provide indirect indicators that in turn require additional inference (eye-tracking and response times). The focus group is considered a useful method for exploring unknown topics through group discussion about the topic, element, or aspects included in the scale or test items (Hawthorne et al., 2006). Participants in the focus group can discuss their feelings or thoughts that can reveal their psychological processes while responding to the items.

The interview is quite a popular method in validity studies based on response processes. Types of interviews include the *in-depth* interview, the *semistructured* interview, and the *think-aloud* protocols. The interview aims at either detecting elements, such as words or expressions, which may be problematic for the test or respondents, or identifying the way individuals refer to the object, content, or specific aspects included in the items. In both cases the aim is that the items do not impede the fit between the response processes and those delineated in the test specifications. The cognitive interview may be especially useful in collecting information based on response processes. The aim of cognitive interviewing is to assess the participants' cognitive pretest method in survey research when survey developers seek to understand the “question-answer” cognitive process (Castillo, Padilla, Gomez, & Andres, 2010). Eye-tracking or eye movement has been used as an indirect sign with regard to the attention and cognitive process (Day, 2010). Validation studies that measure response times commonly focus on connecting response time with the complexity of processes involved in developing the task (Cepeda, Blackwell, & Munakata, 2013). Response time's validation studies seek to obtain evidence of the response processes (e.g., guessing) by registering response times while test takers are responding to the items.

Validity evidence based on response processes is not a simple task, and consequently comprehensive studies in this are scant. Regardless of the selected method, the quality of the data gathered should be taken into account, particularly when such data are based on subjective judgments, such as those made by observers and interviewers. Biases in responses to observations and interviews, such as social desirability must also be considered. Despite the possible occurrence of such problems, gathering such data is important, as data derived from response processes represent a unique perspective from which test score interpretations can be evaluated (Geisinger et al., 2013).

Ecological Validity of Traditional Neuropsychological Tests

Ecological validity has typically been taken to refer to whether one can generalize from observed behavior in the laboratory to natural behavior in the world. Although common in current discussions of research, the idea of ecological validity has a long history in psychological thought. A brief historical examination of this idea reveals that concerns with ecological validity are evident in multiple dimensions of experimental work, including the nature of the experimental setting, the stimuli under investigation, and the observer's response employed as the measure. According to Franzen and Wilhelm (1996), an ecologically valid assessment measure is one that has characteristics similar to a naturally occurring behavior and has value in predicting everyday functioning. More specifically, ecological validity may be conceptualized as the “functional and predictive relationship between the patient's performance on a set of neuropsychological tests and the patient's behavior in a variety of real-world settings” (Sbordone, 1996, p. 16).

There are two conceptual approaches to addressing the issue of the ecological validity of assessment measures. The first approach is *verisimilitude*, which is the degree to which the cognitive demands of a test theoretically emulate the cognitive demands in the everyday environment (Franzen & Wilhelm, 1996). Therefore, the focus of such tests is on how well the test captures essential everyday cognitive skills (Chaytor & Schmitter-Edgecombe, 2003). The second approach is *veridicality*, which refers to the degree to which traditional tests are empirically related to indicators of everyday functioning (Franzen & Wilhelm, 1996). This type of technique involves using statistical analyses to determine the relation between performance on traditional neuropsychological tests and measures of everyday functioning. Veridicality operates under the assumption that even though traditional tests were not designed within an ecological validity framework, they may be able to predict everyday functioning. Both approaches have been employed in past research to investigate the ecological validity of neuropsychological tests among individuals who have experienced a traumatic brain injury (TBI) (e.g., Cuberos-Urbano et al., 2013; Odhuba, van den Broek, & Johns, 2005).

The structure, stability, and validity of child temperament traits have primarily been examined with parent questionnaire methods, but laboratory methods represent an important complement. However, the novel setting and contrived scenarios of laboratory methods and their low convergence with parent questionnaire methods have led some to question their ecological validity. Lo, Vroman, and Durbin (2015) tested this assumption by employing parents as sources

of information regarding the ecological validity of laboratory assessments of child temperament. Parents observed their child participating in 10 different laboratory tasks and reported on the typicality of their child's behavior. The results suggested that parents considered their child's responses during the laboratory tasks as highly typical representations of their child's behavior outside of the lab, supporting the ecological validity of trait-relevant behavior elicited with laboratory tasks.

THE SPECIAL CASE OF CULTURAL VALIDITY

For a long time there have been calls for practitioners to develop cultural competence (e.g., APA 2003). Specifically, the APA's (2003) multicultural guidelines for research highlight the development and implementation of research practices that place culture at a central place in contemporary research. Typically, there have been two approaches to studying the cultural validity of theories: *etic* and *emic* (Cheung, van de Vijver, & Leong, 2011). The *etic* approach focuses on developing theories that can be applied universally and on testing the generalizability of theories across diverse groups. In contrast, the *emic* approach focuses on developing theories specific to an individual cultural group or on identifying culturally specific factors. More recently, scholars (Cheung et al., 2011) have proposed integrating etic and emic approaches. Integrating the two approaches would help to identify personality constructs and to develop new measures that could be universal at their core but incorporate personality characteristics that can be found across cultures. "Psychological science will benefit by moving from etic or emic methods to approaches that more accurately represent our understanding of the complex interplay of universal and culturally specific influences on psychological phenomena" (Hardin, Robertschek, Flores, Navarro, & Ashton, 2014). Despite the advantages of these approaches, there are also several limitations: For example, there has been an almost exclusive focus on the cultural validity of assessments, in particular focusing on the assessment of personality constructs (e.g., Cheung et al., 2011). Early approaches (e.g., Hui & Triandis, 1985; Coulacoglou, 2008) focused on the cultural validity of tests as a function of different types of equivalence (e.g., linguistic equivalence). This focus of assessment still continues.

Yet questions of cultural validity should expand beyond simple questions about the construct validity to more complicated questions about underlying theoretical relationships and their implications. For example, personality assessments reveal individual differences in traits, those interested in emotional states (e.g., anxiety, depression) may implement constructs in an empirical way, such as behavioral manifestations (e.g., poor academic performance). Such types of studies (i.e., using experimental designs) compose only 15% of the searched articles in the 2012 volume of the *Journal of Cross-Cultural Psychology*. Second, existing approaches to cultural validity concentrate on evaluating the extent to which assessments and theories are cross-culturally relevant/equivalent and thus valid. This focus provides information for making decisions regarding the application of a construct or assessment in a specific cultural context (Hardin et al., 2014). However, knowing that a particular assessment instrument has limited cultural validity in a specific cultural context does not necessarily imply that the underlying theoretical construct is not valid.

Finally, existing approaches to cultural validity have almost exclusively focused on cultural groups defined in terms of racial, national, or geographic linguistic differences. However, as Matsumoto and Yoo (2006) argue, cross-cultural researchers have moved beyond this Phase I research to more sophisticated questions, such as the identification of meaningful dimensions of cultural variability (e.g., individualism/collectivism; Phase II research), to cultural studies that use these measured individual-level dimensions in place of group-level categories Phase III research to Phase IV studies that empirically link these individual-level dimensions to group-level observed differences. Thus, to keep pace with advances in cross-cultural research that have moved away from reified group differences, approaches to testing cultural validity must also move away from examining for whom theoretical constructs are more or less culturally valid to understanding why theoretical constructs are more or less valid. Hardin et al. (2014) addressed these limitations in existing approaches to cultural validity by delineating a new perspective referred to as the *cultural lens approach* (CLA). The CLA is a combined emic-etic approach (Cheung et al., 2011) because it integrates culturally specific concepts into existing theories in order to expand their universality. The goal of the CLA is to facilitate distinguishing culturally specific manifestations from the underlying theoretical principles, thus allowing testing the generalizability of theoretical concepts in a more direct way. More specifically, the CLA goes beyond individual differences assessment to include other types of applications, such as specific experimental manipulations or behavioral measures. Second, the CLA goes beyond categorical decisions regarding issues of equivalence between diverse groups; rather, the CLA follows a series of steps to assess cultural validity, which: (1) leads to the generation of testable hypotheses about cultural variations in the implementation of constructs and theoretical propositions, and (2) ultimately in many cases extends theoretical applications across cultures. The CLA provides answers to questions of *when* and *why* a theory is valid (e.g., Zanna & Fazio, 1982).

SUMMARY

This is one of the most significant chapters in this book, a cornerstone in psychological assessment. Good test validity guarantees the usefulness of an instrument. The chapter begins with the historical background of validity theory. The building blocks of the theory can be traced to the mid-1950s with the seminal works of Cronbach and Meehl, whose standards defined validity between the mid-1950s and late 1990s. Test consistency and bias in relation to validity are discussed. A special section is dedicated to the key role of cross-cultural validity.

The works of Samuel Messick have influenced the definition and the role of validity for the past 25 years. Messick became well-known through his unitary conceptualization of validity, stressing the dominant role of construct validation. Since the early 2000s various approaches have been proposed, mostly to contradict the overwhelming role of construct validity. Finally, the various types of evidence-based validity are discussed following the conceptualizations of the 1999 Standards. In addition to the theoretical information, various empirical application studies are presented to help in the elucidation of the practical usefulness of validity.

REFERENCES

- American Educational Research Association (AERA), American Psychological Association, & National Council on Measurement in Education. (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.
- American Psychological Association. (1966). *Standards for educational and psychological tests and manuals*. Washington, DC.
- American Psychological Association. (2003). Guidelines on multicultural education, training, research, practice, and organizational change for psychologists. *American Psychologist*, 58(5), 377–402.
- Amirkhan, J. H. (2012). Stress overload: a new approach to the assessment of stress. *American Journal of Community Psychology*, 49(1–2), 55–71.
- Anastasi, A. (1988). *Psychological testing* (6th ed.). New York, NY: Macmillan.
- Benson, N., Hulac, D. M., & Kranzler, J. H. (2010). Independent examination of the Wechsler Adult Intelligence Scale–Fourth Edition (WAIS-IV): what does the WAIS-IV measure? *Psychological Assessment*, 22(1), 121–130.
- Bhola, D. S., Impara, J. C., & Buckendahl, C. W. (2003). Aligning tests with states' content standards: methods and issues. *Educational Measurement: Issues and Practice*, 22(3), 21–29.
- Bornstein, R. F. (1999). Criterion validity of objective and projective dependency tests: a meta-analytic assessment of behavioural prediction. *Psychological Assessment*, 11(1), 48–57.
- Bornstein, R. F. (2002). A process dissociation approach to objective projective test score interrelationships. *Journal of Personality Assessment*, 78(1), 47–68.
- Bornstein, R. F. (2011). Toward a process focused model of test score validity: improving psychological assessment in science and practice. *Psychological Assessment*, 23(2), 532–544.
- Borsboom, D., Mellenbergh, G. J., & Van Heerden, J. (2004). The concept of validity. *Psychological Review*, 111(4), 1061–1071.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56(2), 81–105.
- Canivez, G. L. (2011). Incremental predictive validity of Cognitive Assessment System PASS scores. Poster presented at the 2011 *Annual Convention of the National Association of School Psychologists*, San Francisco, CA.
- Canivez, G. L. (2013a). Incremental criterion validity of WAIS-IV factor index scores: relationships with WIAT-II and WIAT-III subtest and composite scores. *Psychological Assessment*, 25(2), 484–495.
- Canivez, G. L. (2013b). Psychometric versus actuarial interpretation of intelligence and related aptitude batteries. In D. H. Saklofske, C. R. Reynolds, & V. L. Schwab (Eds.), *The Oxford handbook of child psychological assessment* (pp. 84–112). New York, NY: Oxford University Press.
- Canivez, G. L., Watkins, M. W., James, T., James, K., & Good, R. (2014). Incremental validity of WISC-IV^{UK} factor index scores with a referred Irish sample: predicting performance on the WIAT-II^{UK}. *British Journal of Educational Psychology*, 84(4), 667–684.
- Castillo, M., & Padilla, J. L. (2012). How cognitive interviewing can provide validity evidence of the response processes to scale items. *Social Indicators Research*, 114(3), 963–975.
- Castillo, M., Padilla, J. L., Gomez, J., & Andres, A. (2010). A productivity map of cognitive pretest methods for improving survey questions. *Psicothema*, 22(3), 475–481.
- Cattell, R. B. (1973). *Factor analysis*. Westport, CT: Greenwood Press.
- Cattell, R. B. (1978). *The scientific use of factor analysis in behavioral and life sciences*. New York, NY: Plenum Press.
- Cepeda, N. J., Blackwell, K. A., & Munakata, Y. (2013). Speed isn't everything: complex processing speed measures mask individual differences and developmental changes in executive control. *Developmental Science*, 16(2), 269–286.
- Chaytor, N., & Schmitter-Edgecombe, M. (2003). The ecological validity of neuropsychological tests: a review of the literature on everyday cognitive skills. *Neuropsychology Review*, 13, 181–197.
- Cheung, F. M., van de Vijver, F., & Leong, F. T. L. (2011). Toward a new approach to the study of personality in culture. *American Psychologist*, 66(7), 593–603.

- Child, D. (2006). *The essentials of factor analysis* (3rd ed.). New York, NY: Continuum International Publishing Group.
- Cizek, G. J. (2012). Defining and distinguishing validity: interpretations of score meaning and justifications of test use. *Psychological Methods, 17*(1), 31–43.
- Cohen, S., Kessler, R. C., & Gordon, L. U. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler, & L. U. Gordon (Eds.), *Measuring stress: A guide for health and social scientists*. Oxford, UK: Oxford University Press.
- Comrey, L. A., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Connelly, B. S., & Ones, D. S. (2010). Another perspective on personality: meta-analytic integration of observers' accuracy and predictive validity. *Psychological Bulletin, 136*(6), 1092–1122.
- Costa, P. T., & McCrae, R. R. (1992). The five-factor model of personality and its relevance to personality disorders. *Journal of Personality Disorders, 6*(4), 343–359.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10*(7), 1–9.
- Coulacoglou, C. (2008). *Exploring the child's personality: Clinical and cross-cultural applications of the Fairy Tale Test*. Springfield, IL: C.C. Thomas Publishers.
- Cramer, A. O. J., Waldorp, L. J., Van der Maas, H. L. J., & Borsboom, D. (2010). Comorbidity: a network perspective. *Behavioral and Brain Sciences, 33*, 137–193.
- Credé, M., Harms, P., Niehorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. *Journal of Personality and Social Psychology, 102*(4), 874–888.
- Crego, C., Gore, W. L., Rojas, S. L., & Widiger, T. A. (2015). The discriminant (and convergent) validity of the Personality Inventory for DSM-5. *Personality Disorders: Theory, Research, and Treatment, 6*(4), 321–335.
- Cronbach, L. J. (1982). *Designing evaluations of educational and social programs*. San Francisco, CA: Jossey-Bass.
- Cronbach, L. J. (1988). Five perspectives on validity argument. In H. Wainer, & H. Braun (Eds.), *Test validity* (pp. 3–17). Hillsdale, NJ: Lawrence Erlbaum.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52*(4), 281–302.
- Cuberos-Urbano, G., Caracuel, A., Vilar-López, R., Valls-Serrano, C., Bateman, A., & Verdejo-García, A. (2013). Ecological validity of the Multiple Errands Test using predictive models of dysexecutive problems in everyday life. *Journal of Clinical and Experimental Neuropsychology, 35*, 329–336.
- Danner, D. D., Snowdon, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: findings from the Nun Study. *Journal of Personality and Social Psychology, 80*(5), 804–813.
- Day, R. F. (2010). Examining the validity of the Needleman–Wunsch algorithm in identifying decision strategy with eye-movement data. *Decision Support Systems, 49*(4), 396–403.
- DeCoster, J. (1998). *Overview of Factor Analysis*. Retrieved from <http://www.stat-help.com/notes.html>
- De Weerth, C., Gispén-de Wied, C. C., Jansen, L. M. C., & Buitelaar, J. K. (2007). Cardiovascular and cortisol responses to a psychological stressor during pregnancy. *Acta Obstetrica et Gynecologica Scandinavica, 86*(10), 1181–1192.
- Diener, E., & Lucas, R. E. (1999). Personality and subjective well-being. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 213–229). New York, NY: Russell Sage Foundation.
- Ebel, R. L. (1977). Comments on some problems of employment testing. *Personnel Psychology, 30*(1), 55–63.
- Embertson, S. E. (1987). Improving the measurement of spatial aptitude by dynamic testing. *Intelligence, 11*(4), 333–358.
- Fabrigar, L. R., & Wegener, D. T. (2012). *Understanding statistics: Exploratory factor analysis*. New York, NY: Oxford University Press.
- Field, A. (2009). *Discovering statistics using SPSS: Introducing statistical method* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Franzen, M. D., & Wilhelm, K. L. (1996). Conceptual foundations of ecological validity in neuropsychological assessment. In R. J. Sbordone, & C. J. Long (Eds.), *Ecological validity of neuropsychological testing* (pp. 91–112). Boca Raton, FL: St Lucie Press.
- Funder, D. C., & West, S. G. (1993). Consensus, self-other agreement and accuracy in personality judgment: an introduction. *Journal of Personality, 61*(4), 457–476.
- Furr, R. M., & Bacharach, V. R. (2008). *Psychometrics: An introduction*. Thousand Oaks, CA: Sage Publications.
- Geisinger, K. F., Bracken, B. A., Carlson, J. F., Hansen, J. I. C., Kuncel, N. R., Reise, S. P., & Rodriguez, M. C. (2013). *APA handbook of testing and assessment in psychology: Vol. 1. Test theory and testing and assessment in industrial and organizational psychology*. Washington, DC: American Psychological Association.
- Goodwin, L. D., & Leech, N. L. (2003). The meaning of validity in the new Standards for Educational and Psychological Testing: implications for measurement courses. *Measurement and Evaluation in Counselling and Development, 36*(3), 181–191.
- Gore, W. L., & Widiger, T. A. (2013). The DSM-5 dimensional trait model and five-factor models of general personality. *Journal of Abnormal Psychology, 122*(3), 816–821.
- Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: the Implicit Association Test. *Journal of Personality and Social Psychology, 74*(6), 1464–1480.
- Greenwald, A. G., Nosek, B. A., & Sriram, N. (2006). Consequential validity of the implicit association test: comment on Blanton and Jaccard (2006). *American Psychologist, 61*(1), 56–61.
- Guilford, J. P. (1946). New standard for test evaluation. *Educational and Psychological Measurement, 6*(4), 427–439.
- Haertel, E. H. (2013). Getting the help we need. *Journal of Educational Measurement, 50*(1), 84–90.
- Haladyna, T. M., & Downing, S. M. (1989). A taxonomy of multiple-choice item-writing rules. *Applied Measurement in Education, 2*(1), 37–50.

- Hardin, E. E., Robitschek, C., Flores, L. Y., Navarro, R. L., & Ashton, M. W. (2014). The cultural lens approach to evaluating cultural validity of psychological theory. *American Psychologist, 69*(7), 656–668.
- Hawthorne, G., Davidson, N., Quinn, K., McCrate, F., Winkler, I., Lucas, R., & Molzahn, A. (2006). Issues in conducting cross-cultural research: implementation of an agreed international protocol designed by the WHOQOL Group for the conduct of focus groups eliciting the quality of life of older adults. *Quality of Life Research, 15*(7), 1257–1270.
- Hirschfeld, R. M. A., Klerman, G. L., Gough, H. G., Barrett, J., Korchin, S. J., & Chodoff, P. (1977). A measure of interpersonal dependency. *Journal of Personality Assessment, 41*(6), 610–619.
- Holland, P. W., & Thayer, D. T. (1988). Differential item performance and the Mantel–Haenszel procedure. In H. Wainer, & H. I. Braun (Eds.), *Test validity* (pp. 129–145). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Holland, P. W., & Wainer, H. (Eds.). (1993). *Differential item functioning* (pp. 137–166). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Holzinger, K. J., & Swineford, F. (1937). The bi-factor method. *Psychometrika, 2*(1), 41–54.
- Huble, A. M., & Zumbo, B. D. (2011). Validity and the consequences of test interpretation and use. *Social Indicators Research, 103*(2), 219–230.
- Hui, C. H., & Triandis, H. C. (1985). Measurements in cross-cultural psychology. *Journal of Cross-Cultural Psychology, 16*(2), 131–152.
- Jansen, B. R. J., & Van der Maas, H. L. J. (2002). The development of children's rule use on the balance scale task. *Journal of Experimental Child Psychology, 81*(4), 383–416.
- Jensen-Campbell, L. A., Adams, R., Perry, D. G., Workman, K. A., Furdella, J. Q., & Egan, S. K. (2002). Agreeableness, extraversion, and peer relations in early adolescence: winning friends and deflecting aggression. *Journal of Research in Personality, 36*(3), 224–251.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: history, measurement, and theoretical perspectives. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research, 2* (pp. 102–138). New York, NY: Guilford Press.
- Jolliffe, I. T. (1972). Discarding variables in a principal component analysis, I: artificial data. *Applied Statistics, 21*, 160–173.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141–151.
- Kane, M. T. (2004). The analysis of interpretive arguments: some observations inspired by the comments. *Measurement: Interdisciplinary Research and Perspective, 2*(3), 192–200.
- Kane, M. T. (2006). Validation. In B. L. Robert (Ed.), *Educational measurement* (4th ed., pp. 17–64). Westport, CT: Praeger.
- Kane, M. T. (2013). Validation as a pragmatic, scientific activity. *Journal of Educational Measurement, 50*(1), 115–122.
- Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: a review of theory, method, and research. *Psychological Bulletin, 118*(1), 3–34.
- Kline, P. (1994). *An easy guide to factor analysis*. New York, NY: Routledge.
- Kline, R. B. (2010). *Principles and practice of structural equation modelling* (3rd ed.). New York, NY: Guilford Press.
- Lehman, R. (1978). Symptom contamination of the schedule of recent events. *Journal of Consulting and Clinical Psychology, 46*, 1564–1565.
- Lennon, R. T. (1956). Assumptions underlying the use of content validity. *Educational and Psychological Measurement, 16*(3), 294–304.
- Lo, S. L., Vroman, L. N., & Durbin, C. E. (2015). Ecological validity of laboratory assessments of child temperament: evidence from parent perspectives. *Psychological Assessment, 27*(1), 280.
- Markus, K. A., & Borsboom, D. (2013). *Frontiers of validity theory: Measurement, causation, and meaning*. New York, NY: Routledge.
- Masling, J. M., Rabie, L., & Blondheim, S. H. (1967). Obesity, level of aspiration and Rorschach and TAT measures of oral dependence. *Journal of Consulting Psychology, 31*(3), 233–239.
- Matsumoto, D., & Yoo, S. H. (2006). Toward a new generation of cross-cultural research. *Perspectives on Psychological Science, 1*(3), 234–250.
- McGill, R. J. (2015). Incremental criterion validity of the WJ-III COG: clinical clusters marginal predictive effects beyond the general factor. *Canadian Journal of School Psychology, 30*(1), 51–63.
- McGill, R. J., & Busse, R. T. (2014a). An evaluation of multiple single-case outcome indicators using convergent evidence scaling. *Contemporary School Psychology, 18*(1), 13–23.
- McGill, R. J., & Busse, R. T. (2014b). Incremental validity of the WJ III COG: limited predictive effects beyond the GIA-E. *School Psychology Quarterly, 30*(3), 353–365.
- Messick, S. (1989). Validity. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 13–103). New York, NY: American Council on Education/Macmillan.
- Messick, S. (1995). Validity of psychological assessment: validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist, 50*(9), 741.
- Miller, T. Q., Smith, T. W., Turner, C. W., Guijarro, M. L., & Hallet, A. J. (1996). Meta-analytic review of research on hostility and physical health. *Psychological Bulletin, 119*(2), 322–348.
- Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. New York, NY: Routledge.
- Mislevy, R. J. (2007). Validity by design. *Educational Researcher, 36*(8), 463–469.
- Morey, L. C. (1991). *Personality Assessment Inventory—professional manual*. Lutz, FL: Psychological Assessment Resources.
- Nelson, J. M., & Canivez, G. L. (2012). Examination of the structural, convergent, and incremental validity of the Reynolds Intellectual Assessment Scales (RIAS) with a clinical sample. *Psychological Assessment, 24*(1), 129–140.
- Newton, P. E., & Shaw, S. D. (2013). Standards for talking and thinking about validity. *Psychological Methods, 18*(3), 301–319.
- Nock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: implicit cognition predicts suicidal behaviour. *Psychological Science, 21*(4), 511–517.
- Odhuba, R. A., van den Broek, M., & Johns, L. C. (2005). Ecological validity of measures of executive functioning. *British Journal of Clinical Psychology, 44*(2), 269–278.
- Oshio, A., Abe, S., & Cutrone, P. (2012). Development, reliability, and validity of the Japanese version of Ten Item Personality Inventory (TIPI-J). *The Japanese Journal of Personality, 21*(1), 40–52.

- Oshio, A., Abe, S., & Cutrone, P. (2013). Big Five content representation of the Japanese version of the Ten-Item Personality Inventory. *Psychology, 4*(12), 924–929.
- Oshio, A., Abe, S., Cutrone, P., & Gosling, S. D. (2014). Further validity of the Japanese version of the Ten Item Personality Inventory (TIPI-J): cross-language evidence for content validity. *Journal of Individual Differences, 35*(4), 236–244.
- Ozer, D. J., & Benet-Martínez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology, 57*, 401–421.
- Padilla, J. L., & Benítez, I. (2014). Validity evidence based on response processes. *Psicothema, 26*(1), 136–144.
- Paunonen, S. V. (2003). Big Five factors of personality and replicated predictions of behaviour. *Journal of Personality and Social Psychology, 84*(2), 411–424.
- Pedhazur, E. J. (1997). *Multiple regression in behavioural research: Explanation and prediction* (3rd ed.). New York, NY: Holt, Rinehart, & Winston.
- Porter, A. C., Smithson, J. L., Blank, R. K., & Zeidner, T. (2007). Alignment as a teacher variable. *Applied Measurement in Education, 20*(1), 27–51.
- Quilty, L. C., Ayeart, L., Chmielewski, M., Pollock, B. G., & Bagby, R. M. (2013). The psychometric properties of the Personality Inventory for DSM-5 in an APA DSM-5 field trial sample. *Assessment, 20*, 362–369.
- Rios, J., & Wells, C. (2014). Validity evidence based on internal structure. *Psicothema, 26*(1), 108–116.
- Rummel, R. J. (1970). *Applied factor analysis*. Evanston, IL: Northwestern University Press.
- Sbordone, R. J. (1996). Ecological validity: some critical issues for the neuropsychologist. In R. J. Sbordone, & C. J. Long (Eds.), *Ecological validity of neuropsychological testing* (pp. 15–41). Boca Raton, FL: St Lucie Press.
- Sechrest, L. (1963). Incremental validity: a recommendation. *Educational and Psychological Measurement, 23*(1), 153–158.
- Shiner, R., Masten, A. S., & Tellegen, A. (2002). A developmental perspective on personality in emerging adulthood: childhood antecedents and concurrent adaptation. *Journal of Personality and Social Psychology, 83*(5), 1165–1177.
- Sinclair, S. J., Slavin-Mulford, J., Antonius, D., Stein, M. B., Siefert, C. J., Haggerty, G., & Blais, M. A. (2013). Development and preliminary validation of the Level of Care Index (LOCI) from the Personality Assessment Inventory (PAI) in a psychiatric sample. *Psychological Assessment, 25*(2), 606–617.
- Sinclair, S. J., Smith, M., Chung, W. J., Liebman, R., Stein, M. B., Antonius, D., & Blais, M. A. (2015). Extending the validity of the Personality Assessment Inventory's (PAI) Level of Care Index (LOCI) in multiple psychiatric settings. *Journal of Personality Assessment, 97*(2), 145–152.
- Sireci, S. G. (1998a). Gathering and analysing content validity data. *Educational Assessment, 5*(4), 299–321.
- Sireci, S. G. (1998b). The construct of content validity. *Social Indicators Research, 45*(1), 83–117.
- Sireci, S. G. (2012). “De-constructing” test validation. (Newton, P. Chair), *Paper presented at the annual conference of the National Council on Measurement in Education as part of the symposium “Beyond Consensus: The Changing Face of Validity”*, Vancouver, Canada.
- Sireci, S. G., & Faulkner-Bond, M. (2014). Validity evidence based on test content. *Psicothema, 26*(1), 100–107.
- Sireci, S. G., & Sukin, T. (2013). Test validity. In K. F. Geisinger (Ed.), *APA handbook of testing and assessment in psychology* (pp. 61–84). (Vol. 1). Washington, DC: American Psychological Association.
- Smith, H. L., & Wright, W. W. (1928). *Tests and measurements*. New York, NY: Silver Burdett.
- Strauss, E., Spreen, O., & Hunter, M. (2000). Implications for test revisions for research. *Psychological Assessment, 12*(3), 237–244.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Allyn & Bacon.
- Thorndike, R. L. (1986). The role of general ability in prediction. *Journal of Vocational Behaviour, 29*(3), 332–339.
- Trull, T. J., & Sher, K. J. (1994). Relationship between the five-factor model of personality and Axis I disorders in a nonclinical sample. *Journal of Abnormal Psychology, 103*(2), 350–360.
- Urizar, G. (2012). Socio-demographic differences on coping styles and cortisol patterns during pregnancy. *Annals of Behavioural Medicine, 43*(1), 125.
- Van de Vijver, F., & Poortinga, Y. (2005). Conceptual and methodological issues in adapting tests. In R. K. Hambleton, P. F. Merenda, & C. D. Spielberger (Eds.), *Adapting educational and psychological tests for cross cultural assessment* (pp. 39–64). Mahwah, NJ: Lawrence Erlbaum.
- Ward, L. C., Bergman, M. A., & Hebert, K. R. (2012). WAIS-IV subtest covariance structure: conceptual and statistical considerations. *Psychological Assessment, 24*(2), 328–340.
- Webb, N. L. (1997). *Criteria for alignment of expectations and assessments in mathematics and science education*. Washington, DC: Council of Chief State Schools Officers, Research Monograph No. 6.
- Wechsler, D. (2008). *Wechsler Adult Intelligence Scale—Fourth Edition technical and interpretive manual*. San Antonio, TX: Pearson.
- Widiger, T. A. (2011). Personality and psychopathology. *World Psychiatry, 10*(2), 103–106.
- Wiebe, R. P. (2004). Delinquent behaviour and the five factor model: hiding in the adaptive landscape? *Individual Differences Research, 2*(1), 38–62.
- Wiggins, J. S. (1973). *Personality and prediction: Principles of personality assessment*. Menlo Park, CA: Addison-Wesley.
- Yalow, E. S., & Popham, W. J. (1983). Content validity at the crossroads. *Educational Researcher, 12*(8), 10–14.
- Youngstrom, E. A., Kogos, J. L., & Glutting, J. J. (1999). Incremental efficacy of Differential Ability Scales factor scores in predicting individual achievement criteria. *School Psychology Quarterly, 14*(1), 26–39.
- Zanna, M. P., & Fazio, R. H. (1982). *The attitude-behaviour relation: Moving toward a third generation of research in consistency in social behaviour: The Ontario Symposium* (2). Hillsdale, NJ: Lawrence Erlbaum, pp. 283–301.
- Zumbo, B. D. (2003). Does item-level DIF manifest itself in scale-level analyses? Implications for translating language tests. *Language Testing, 20*(2), 136–147.

Chapter 4

Advances in Latent Variable Measurement Modeling

Chapter Outline

| | | | |
|--|-----------|--|-----------|
| Latent variable mixture modeling | 67 | Factor mixture models | 75 |
| Growth mixture modeling: a general framework | 68 | Factor mixture models in examining the latent structure of personality disorders | 76 |
| Latent growth curve models | 68 | | |
| Latent change score models | 69 | | |
| Growth mixture models | 69 | Mediation analysis in clinical psychology | 77 |
| The unique means GMM: the latent class growth model | 69 | Mediation models for longitudinal data | 78 |
| The unique means shared variance GMM | 70 | Testing measurement invariance | 78 |
| The unique means, variances, and patterns GMM | 70 | Comparing latent factor means and structural coefficients | 79 |
| Latent class analysis | 70 | Potential causes of measurement noninvariance | 79 |
| LCA for developmental research | 71 | Considerations when testing measurement invariance | 79 |
| Studying personality longitudinally: different conceptions of change | 71 | Assessing model fit | 79 |
| Multitrait-multimethod analysis in longitudinal research | 72 | Assessing measurement invariance of scales | 80 |
| Longitudinal CFA-MTMM models | 72 | Assessing MI/DIF with multiple groups models | 80 |
| Exploratory factor analysis and confirmatory factor analysis | 73 | Key concepts in network analysis | 80 |
| Exploratory structural equation modeling | 73 | Network analysis and psychopathology | 81 |
| Applying bifactor statistical indices in the evaluation of psychological measures | 74 | Summary | 82 |
| An integrative framework to investigate sources of construct-related multidimensionality | 75 | References | 82 |

LATENT VARIABLE MIXTURE MODELING

Latent variable mixture modeling (LVMM) is part of a latent variable modeling framework (Muthén & Muthén, 1998–2012; Muthén, 2001) and is flexible with regard to the type of data that can be analyzed. Observed variables used to determine latent classes (LCs) can be continuous, censored, binary, ordered/unordered categorical counts, or combinations of these variable types, and the data can be collected in a cross-sectional and/or longitudinal manner (Muthén & Muthén, 1998–2012). Consequently, a diverse array of research questions involving LCs can be investigated. For example, hypotheses can focus on predicting class membership, identifying mean differences in outcomes across LCs, or describing the extent to which LC membership moderates the relationship between two or more variables. The literature has used many names to describe mixture modeling, or finite mixture modeling as it is known in the statistics literature (McLachlan & Peel, 2000). Names vary according to the type of data used for indicators [continuous vs. categorical, akin to cross-sectional latent profile analysis (LPA) vs. latent class analysis (LCA), etc.], whether continuous latent variables (LVs) are included with categorical latent class variables [cross-sectional factor mixture models, longitudinal growth mixture models (GMMs)], whether the data were collected cross-sectionally or longitudinally (latent class vs. latent transition), and whether variability is allowed within the LCs [latent class growth modeling (LCGM) vs. GMM; Muthén, 2008].

LVMM is a person-centered analytic tool that focuses on similarities and differences among individuals, instead of relations among variables (Muthén & Muthén, 1998–2012). The primary goal of LVMM is to identify homogenous subgroups of individuals, with each subgroup possessing unique characteristics. In LVMM, subgroup membership should be inferred from data.

As a by-product of mixture modeling, every individual in the data set has his/her own probabilities calculated for his/her membership in all of the LCs estimated. Latent classes are based on these probabilities and each person is allowed fractional membership in all classes to determine the degree of certainty and precision of classification. Thus, by adjusting for uncertainty and measurement error, these classes become latent (e.g., [Asparouhov & Muthén, 2007](#)).

GROWTH MIXTURE MODELING: A GENERAL FRAMEWORK

[Masyn, Henderson, and Greenbaum \(2010\)](#) organized factor mixture models (FMMs) along a dimensional categorical spectrum, with factor analysis (FA), a clearly dimensional model, at one point of the spectrum and LCA, a clearly categorical model at the opposite end. GMMs are special cases of FMMs with repeated measures data and growth parameterizations. Finite mixture modeling is a general, person-centered statistical framework that explains population heterogeneity. Such heterogeneity is explained by identifying unobserved (latent) population subgroups that are derived from observed variables ([McLachlan & Peel, 2000](#)). When estimating a GMM, any of the parameters can be constrained or allowed to vary across classes, including the factor means, variances/covariances, factor loading, and even residual item variances/covariances (e.g., [Enders & Tofghi, 2008](#)).

There are two common methods of estimating basic individual trajectories: (1) multilevel models (also known as *hierarchical linear models* and *random effects models*) (e.g., [West, Ryu, Kwok, & Cham, 2011](#)) and (2) structural equation models (SEMs) (e.g., [Bollen & Curran, 2006](#)). These models are equivalent under certain conditions ([Hertzog & Nesselroade, 2003](#)). Thus, both models may be referred to as *growth models*, *curve models*, or *growth curve models*. Individual trajectories also referred to as *growth trajectories* or *curves* or *growth curves*.

Latent growth curve models

In the most basic latent growth curve model (LGCM) ([Fig. 4.1](#)), two latent factors, intercept and change, are defined from a series of repeated measures.

Often the latent intercept factor describes the starting value at the first wave of measurement, whereas the latent change factor describes the change per unit of assessed time. The model assumes that people start with some base level (the intercept) and then may change from one assessment to the next, the form of which is indicated by the change factor. To fit this, the latent intercept factor is scaled by fixing all loadings from the factor to the repeated measures at one. The latent intercept factor influences the repeated measure equally across time and implies an overall level, whereas the latent change factor represents a trajectory of change from that level. When the LGCM is scaled in this manner, the mean of the intercept factor reflects values at the first assessment, whereas the mean of the change factor reflects the average rate of change between two measurement occasions. It should be noted that any model-implied trajectory, including the linear trajectories,

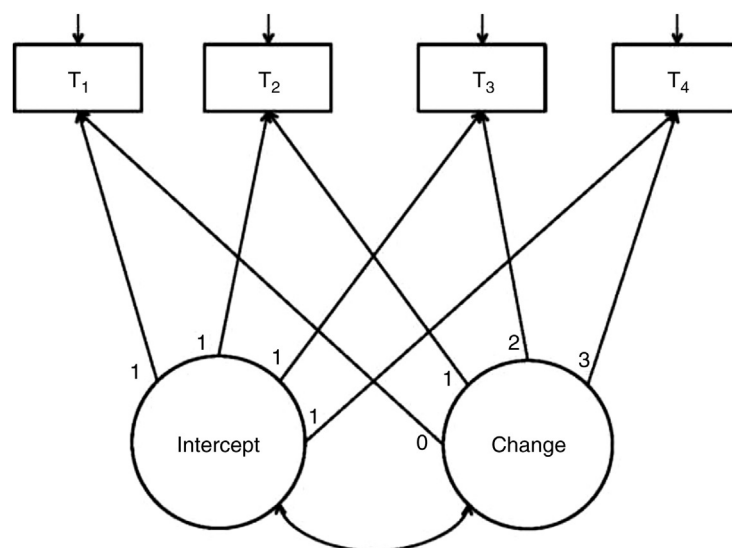


FIGURE 4.1 Univariate latent curve model. (Reprinted from [Jackson, J. J., & Allemand, M. \(2014\). Moving personality development research forward: applications using structural equation models. European Journal of Personality, 28\(3\), 300–310, with permission. Copyright 2014 by John Wiley & Sons.](#))

requires that everyone follows the same path of development. Even if the model-implied trajectory fits the majority of the individual trajectories, that does not indicate that everyone in the sample changes in the same amount or direction (Roberts & Mroczek, 2008).

Despite the many promising effects of LGCM, there are numerous questions important to personality development that cannot be adequately addressed with LGCMs. Many of the limitations of LGCM derive from speculations that the trajectory reflects a relatively uniform long-term developmental process. Recently, there have been many discussions concerning possible interventions to change personality traits (Heckman, Pinto, & Savelyev, 2013), with some studies already demonstrating that interventions or training may lead to such change (e.g., Blonigen, Timko, & Moos, 2013; Jackson, Thoemmes, Jonkmann, Lüdtke, & Trautwein, 2012). LGCMs are well suited to deal with these group designs and can handle this situation in two different ways: first, treatment conditions can be used as a predictor variable, much like any other discrete life experience; and second, via the study of the effectiveness of interventions or experimental designs by applying a multiple group analysis. Instead of predicting the change factor by group membership, one could instead fit a multiple-group LGCM that explicitly tests whether particular parameters differ across the control and experimental groups.

Latent change score models

Among the most promising techniques to overcome the shortcomings of LGCMs are *latent change score models* (LCSMs; Ferrer & McArdle, 2010). The ability to model time-specific changes and overall change across the study period allows much more complex nonlinear trajectories to be fit, than those that can be examined with LGCMs. Thus, these models are particularly helpful in the evaluation of short-term processes or dynamic aspects of personality. Given their stronger ability to evaluate reciprocal relationship, LCSMs may be more appropriate in examining personality–environment transactions than LGCMs.

Growth mixture models

Another extension of traditional LGCMs is to identify different classes of developmental trajectories (Ram & Grimm, 2009; Jung & Wickrama, 2008). Often theory suggests that different classes or groups of people may have varying trajectories; for example, investment in life roles (e.g., occupational) may result in different developmental consequences (e.g., Roberts, Wood, & Smith, 2005). Sometimes, these different groups or classes may be best identified based on their trajectory blueprint if groups or classes cannot be directly measured or identified. GMM combines LCA with LGCM to identify such latent groups that evidence different trajectories.

Recent examples of this method in personality include Klimstra, Hale III, Raaijmakers, Branje, and Meeus's (2009) identification of developmental differences in Block's three adolescent types. Extending this across adolescence to young adulthood, Johnson, Hicks, McGue, and Iacono (2007) found that three separate groups characterized personality development during this time period. Another recent application of this model used changes in drinking motives to explain the relationship between changes in personality and "maturing out" of problem drinking during young adulthood (Littlefield, Sher, & Wood, 2010).

In addition to associations between changes in personality and experience, researchers might be interested whether changes in one personality construct correspond with changes in another, as this may indicate common or unique drivers of development. To date, there is mixed evidence that traits change relative in concert. For example, in one of the first studies, Allemand, Zimprich, and Hertzog (2007) observed a number of medium effect-sized correlated changes in the big five personality traits across a 4-year period in middle-aged and older adults. Moreover, in a follow-up study, Allemand, Zimprich, and Martin (2008) found correlated personality change over 12 years, except for neuroticism.

The unique means GMM: the latent class growth model

LCGM (or group-based trajectory modeling; Nagin, 2005) can be understood as a mixture of latent growth curve models (LGCMs) in which only the factor means are free to vary across classes, whereas the factor variances and covariances are constrained to be zero in each class. Whereas LGCMs accommodate individual differences in change with normally distributed variability around latent growth factors (e.g., intercept, slope, quadratic, etc.) LCGMs account for heterogeneity in growth with discrete latent trajectories (i.e., classes of individuals who are presumed to share the same latent trajectory of change). The LCGM is among the most popular of the GMMs mainly because of its early description in the methodological literature, its conceptual accessibility, and its stability in model convergence. Furthermore, the LCGM is in many respects a highly constrained model that may not adequately represent the actual heterogeneity in individual growth trajectories.

The unique means shared variance GMM

To move beyond the notion that there is complete homogeneity of trajectories within class, GMM growth factor variances and covariances can be estimated, but constrained to equality across classes. Such a model allows for a number of unique latent trajectory classes and also permits interindividual variability within each class, but assumes that the degree of such variability is similar across classes.

The unique means, variances, and patterns GMM

Thus far we have considered GMMs that differ in the degree to which they accommodate individual differences in variability across classes. We now consider GMMs that allow for differences in the shape of change. For example, it may be hypothesized, based on theory or past research, that there is a group whose pattern of change is quadratic (e.g., an accelerating rate of change), whereas others in the sample might adopt a linear trajectory. In this case, it may be worth considering a GMM with differences in pattern across classes.

LATENT CLASS ANALYSIS

LCA was introduced by [Lazarsfeld \(1950\)](#) to classify individuals based on the values with which they were identified in a set of dichotomous observed variables. More than 20 years later, [Goodman \(1974\)](#) developed an algorithm for obtaining maximum likelihood estimates of the model parameters, and proposed extensions for polytomous variables and multiple LVs. [Haberman \(1979\)](#) showed the connection between LC models and log-linear models for contingency tables with missing cell counts. Many important extensions of the classical LC model have been proposed since then ([Clogg, 1995](#)), such as models containing covariates, local dependencies, ordinal and continuous variables, more than one LV, and repeated measures. A general framework for categorical data analysis with discrete LVs was proposed by [Hagenaars \(1990\)](#) and then extended by [Vermunt \(1997\)](#).

In LCA, categorical and continuous observed variables are considered to classify each individual into one of the categories of an LV. LCA is a specification of the most general class of latent variable models (LVMs). [Bartholomew, Knott, and Moustaki \(2011\)](#) provided a framework that identifies four main types of LVMs. In this framework, observed variables are often defined as indicators or manifest variables. [Bartholomew \(1987\)](#) identified four main types of LVMs as (1) FA, (2) latent trait analysis (LTA), or item response theory (IRT), (3) LPA, and (4) LCA. A fundamental distinction in [Knott and Bartholomew's \(1999\)](#) classification is between continuous and discrete LVs. Prior to applying an LVM, a researcher has to justify whether the conceptualization of the underlying LV is continuous or categorical.

In FA and LTA, the LVs are considered as continuous, whereas in LPA and LCA, the LV is considered to be discrete. Sometimes, LCA is referred to as a *person-centered analysis* (i.e., the interest is in finding heterogeneous groups of individuals) in contrast to a variable-centered analysis, such as FA (i.e., the focus is on relationships among variables; [Bauer & Curran, 2004](#)).

LCA differs from IRT as in the latter, the LV is assumed to be continuous, whereas in LC models, the LV is assumed to be categorical and consisting of two or more nominal or ordered classes ([Hagenaars & McCutcheon, 2002](#)). IRT models use the observed responses (to a number of items) to measure a continuous LV and the strength of the relationship between item scores, that is, the probability of responding into a particular category and LVs ([De Ayala, 2009](#); [Sijtsma & Molenaar, 2002](#)). LCA assumes a parametric statistical model and uses observed data to estimate parameter values for the selected model. Each individual has a certain probability of membership to each latent class. Observations within the same latent class are homogeneous on certain criteria, whereas those in different LCs are dissimilar from each other. In this way, LCs are represented by distinct categories of a discrete LV.

In LCA, we estimate the class membership probabilities (i.e., the probability for an individual's membership in a certain class) and the item response probabilities conditional upon class membership (i.e., the probability for an individual to provide a certain response to a specific item given that she or he has been classified in a specific latent class). According to the item response probabilities, observations are grouped into classes. LCA can be used to find separate classes of individuals according to the responses the items of a questionnaire (e.g., [Collins & Lanza, 2010](#)). LCA results can be used to classify individuals into their most likely (latent) group, where groups are the categories of a categorical LV.

Some extensions of LCA have been advanced, such as *latent class regression analysis* ([Hagenaars & McCutcheon, 2002](#)), which has been introduced to consider the effect of some covariates on the probability of membership to each class, and *multilevel LCA* to classify individuals when data are nested (e.g., criminals nested within prisons; [Henry & Muthén, 2010](#); [Vermunt, 2003, 2008](#)), considering jointly the effect of covariates.

LCA for developmental research

LCA is a statistical approach that plays an increasingly important role in studies of child development. LCA provides a framework for describing population heterogeneity in terms of differences across individuals on a set of behaviors or characteristics, as opposed to describing the variability of a single variable. This distinction has been described as a *person-centered* approach in contrast to more traditional *variable-centered* approaches, such as multiple regression analysis.

Kyriakopoulos et al. (2015) employed LCA (Stahl & Sallis, 2012; Stringaris, Stahl, Santosh, & Goodman, 2011) to classify children with autism spectrum disorder (ASD) on the basis of multiple complex developmental criteria (e.g., absence or impairment of affective regulation and anxiety, social deficits, and thought disorders). The sample consisted of a unique cohort of patients admitted between 2003 and 2012 to a specialist's children's inpatient unit at South London and Maudsley NHS Foundation Trust. LCA identified two distinct classes of ASD patients: those with psychiatric symptoms (ASD-P, 51%) and those without (ASD-NonP, 49%).

The identification of two classes of ASD children using LCA is a significant and novel finding because these classes were derived directly from data, rather than defined a priori based on theoretical assumptions. Consistent with previous literature the authors identified bizarre anxiety reactions/peculiar phobias and thought disorder as two key symptom domains associated with psychosis in ASD (Sprong et al., 2008; Weisbrot, Gadow, DeVincent, & Pomeroy, 2005).

LTA is a direct extension of LCA to repeated measures data (Collins & Lanza, 2010), and illuminates developmental processes that are best characterized by shifts between discrete stages, rather than cumulative increases or decreases along a single quantitative dimension.

STUDYING PERSONALITY LONGITUDINALLY: DIFFERENT CONCEPTIONS OF CHANGE

Quantifying both the normative pattern of intraindividual change and any interindividual heterogeneity in longitudinal trajectories can contribute to the understanding of underlying processes or mechanisms. Additionally, the ability to predict differences in change trajectories may assist in clinical prognosis. There are five independent ways of operationalizing stability and change over time in personality literature: *structural* (i.e., factorial), *differential* (i.e., rank-order), *normative* (i.e., mean), *individual*, and *ipsative* (i.e., profile) stability (e.g., De Fruyt et al., 2006; Wright, Pincus, & Lenzenweger, 2012). Their differences lie in the degree to which they emphasize persons as opposed to variables.

Wright and Hallquist (2014) posit that certain mixture models can simultaneously estimate the degree and kind of change making ipsative analyses potentially more informative. Thus, the ultimate goal of personality-oriented longitudinal modeling is to delineate patterns of change by identifying subgroups of individuals who follow distinct paths of change and those who belong to each subgroup. A large body of research reveals that the DSM-defined symptoms of borderline personality disorder (BPD) are over time, but relatively little work has investigated the heterogeneity in those trajectories (e.g., Hallquist & Lenzenweger, 2013).

A major advantage of LGCM is that it provides information not only about the mean level of change, as with repeated-measures analysis of variance (ANOVA), but also the degree of interindividual heterogeneity in the observed trajectories. The key parameters of change in the LGCM are the factor means (α) and variances/covariances (Ψ). Factor means capture the average level and rate of change (i.e., normative change) for the sample, whereas the factor variances represent individual variability in the pattern of change (i.e., individual change), which is assumed to be normally distributed. Covariances represent the association between scores at the time-point of the intercept and rate of change over time. As LGCMs model individual differences in change with factor variances, these models are to some degree person-oriented in nature.

Accumulating evidence from studies (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2006) regarding diagnoses and stability of personality disorders (PDs) indicates that the mean number of symptoms for nearly all PDs declines over time. Moreover, findings revealed that these disorders are much less stable than previously thought (e.g., Skodol et al., 2005). For example, Zanarini et al. (2006) found that 88% of psychiatric patients with BPD no longer met the diagnostic threshold 10 years after diagnosis (and 39% of the sample remitted within 2 years). Moreover, the stability of the diagnostic criteria reveals that certain PDs vary widely over relatively brief time periods, suggesting that some criteria capture dysfunctional personality traits whereas others may be more sensitive to stress-related behaviors or state-dependent symptoms (McGlashan et al., 2005). Although reports from the Collaborative Longitudinal Personality Disorders Study (Skodol et al., 2005) and the McLean Study of Adult Development (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005) have observed symptom remission for each of the PDs studied, they are potentially limited by the fact that participants were receiving psychiatric treatment at the initial study assessment and had high levels (above diagnostic threshold) of personality pathology, which raises a concern that PD symptom remission may partly reflect regression toward the mean (Campbell & Kenny, 1999).

Identifying the characteristics of individuals who experience chronic PD symptoms versus those whose symptoms remit rapidly over time may have direct implications for clinical assessment. Moreover, characterizing such heterogeneity may illuminate an understanding of the development of personality and psychopathology. GMM, a combination of LGCM and finite mixture modeling, is a longitudinal data analytic approach. This approach is considered appropriate to distinguish heterogeneity in the longitudinal course of PD symptoms (Lincoln & Takeuchi, 2010; Malone, Van Eck, Flory, & Lamis, 2010).

Hallquist and Lenzenweger (2013) evaluated heterogeneity of PD symptomatology longitudinally aiming of testing for and describing latent trajectories. The sample consisted of 250 young adults divided into two groups using a PD screening measure: those who met the diagnostic criteria for a DSM-III-R PDs and those with few PD symptoms. Total PD symptom counts and symptoms of each DSM-III-R PD were analyzed using GMM. In the NoPD group, latent trajectories were characterized by stable, minor symptoms; the rapid or gradual remission of subclinical symptoms; or the emergence of symptoms of avoidant, obsessive-compulsive, or paranoid PD. In the PPD group, three latent trajectories emerged: rapid symptom remission, slow symptom decline, or a relative absence of symptoms. Rapid remission of PD symptoms was associated with fewer comorbid disorders, lower negative emotionality, and greater positive emotionality and constraint, whereas emergent personality dysfunction was associated with comorbid PD symptoms and lower positive emotionality. In most cases, symptom change for one PD was associated with concomitant changes in other PDs, depressive symptoms, and anxiety. These results indicate that the longitudinal course of PD symptoms is heterogeneous, with distinct trajectories evident for both symptomatic and nonsymptomatic individuals.

Multitrait-multimethod analysis in longitudinal research

Over the last decades, many statistical models have been proposed for analyzing longitudinal data including multilevel and LV modeling approaches (e.g., Steele, 2008; Heck, Thomas, & Tabata, 2013). Longitudinal measurement designs allow researchers to (1) investigate change and/or variability processes, (2) test the degree of measurement invariance (MI), as well as indicator-specific effects, and (3) examine potential causal relationships (Steyer, 2005). Originally multitrait-multimethod (MTMM) analysis was developed for exploring the construct validity (Campbell & Fiske, 1959). Longitudinal MTMM models allow researchers to investigate the construct validity of different measures across time by integrating the information provided by multiple method or reporters in a single model. Furthermore, longitudinal MTMM models allow modeling method effects across time and examining potential causes of methods effects by incorporating other variables (manifest or latent) in the model.

Koch, Schultze, Eid, and Geiser (2014) extended the range of current longitudinal models for MTMM analysis by introducing a comprehensive modeling frame for different types of methods. Specifically, they introduce a new multilevel structural equation model for the analysis of longitudinal MTMM data referred to as Latent State-Combination-Of-Methods model (LS-COM). The LS-COM model integrates the advantages of four models: SEM, multilevel modeling, longitudinal modeling, and MTMM modeling with interchangeable and structurally different methods. Specifically, the LS-COM allows researchers to (1) explicitly model measurement error, (2) specify method factors on different measurement levels, (3) analyze the convergent and discriminant validity across multiple occasions, (4) investigate change and stability of construct and methods effects across time, and (5) test important assumptions in longitudinal data analysis, such as the degree of MI. The LS-COM model is formulated based on the principles of *stochastic measurement theory* (Zimmerman, 1975; Steyer & Eid, 2001).

Longitudinal CFA-MTMM models

According to Eid and Diener (2006) multimethod measurement designs overcome many limitations of single method measurement designs and should therefore be preferred whenever possible. With respect to longitudinal confirmatory factor analysis–multitrait-multimethod models (CFA-MTMM) it is possible to (1) investigate the convergent and discriminant validity at each occasion of measurement and across different occasions of measurement, (2) study change and stability of construct and method effects across time, (3) model measurement error, (4) investigate the generalizability of method effects, and (5) test important assumptions, such as MI and/or indicator-specific effects.

Today, MTMM measurement designs are commonly analyzed using CFA with multiple indicators in each trait-method unit (e.g., Eid, 2000; Eid, Lischetzke, Nussbeck, & Trierweiler, 2003; Eid, Lischetzke, & Nussbeck, 2006). Up to now, only few CFA-MTMM models have been proposed for the analysis of longitudinal data (e.g., Geiser, Eid, Nussbeck, Courvoisier, & Cole, 2010; Koch, 2013).

Eid et al. (2008) clarified that the type of method used in a study is of particular importance for defining appropriate CFA-MTMM models. Specifically, Eid et al. (2008) showed that measurement designs with (1) interchangeable methods,

(2) structurally different methods, and (3) a combination of structurally different and interchangeable methods indicate different sampling procedures and therefore require different CFA-MTMM models. According to [Eid et al. \(2008\)](#), interchangeable methods are methods that can be randomly sampled from a set of similar methods.

EXPLORATORY FACTOR ANALYSIS AND CONFIRMATORY FACTOR ANALYSIS

CFA is a type of SEM that deals specifically with measurement models. The aim of LV measurement models (i.e., FA) is to establish the number and nature of factors that account for the variation and covariation among a set of indicators (variables).

There are two main types of analyses based on the common factor model: exploratory factor analysis (EFA) and CFA ([Jöreskog, 1971](#)). Both EFA and CFA aim to reproduce the observed relationships among a group of indicators with a smaller set of LVs.

EFA is generally used to discover the factor structure of a measure and to examine its internal reliability. EFA is often recommended when researchers make no specific hypothesis about the nature of the underlying factor structure of the target measure. Although EFA is an important precursor of CFA/SEM ([Cudeck & MacCallum, 2007](#)), it is widely considered as less useful, partly on the basis that it is an “exploratory” method and that should be used only when the researcher has no a priori assumptions regarding factor structure.

CFA can be used for a variety of purposes, such as psychometric evaluation, the detection of method effects, construct validation, and the evaluation of MI. Nowadays, CFA is almost always used in the process of scale development to examine the latent structure of a test instrument. CFA verifies the number of underlying dimensions of the instrument (factors) and the pattern of item-factor relationships (factor loadings). CFA also assists in the determination of how a test should be scored. For instance, when the latent structure is multifactorial (i.e., two or more factors), the pattern of factor loadings supported by CFA will indicate how a test might be scored using subscales; that is, the number of factors are indicative of the number of subscales, the pattern of item-factor relationships (which items load on which factors), and how the subscales should be scored. CFA is an important analytic tool for other aspects of psychometric evaluation, such as the estimation of scale reliability (e.g., [Raykov, 2001](#)).

CFA should be employed as a precursor to SEMs that specify structural relationships (e.g., regressions) among the LVs. SEM models consist of two major components: (1) the measurement model, which specifies the number of factors, how the various indicators are related to the factors, and the relationships among indicator errors (i.e., a CFA model); and (2) the structural model, which specifies how the various factors are related to one another (e.g., direct or indirect effects, no relationship).

In practice, CFA is often confined to the analysis of variance-covariance structures. In this case the parameters of factor loadings, error variances and covariances, and factor variances and covariance are estimated to reproduce the input variance-covariance matrix. The analysis of covariance structures is based on the assumption that indicators are measured as deviations from their means (i.e., all indicators means equal zero). There are three types of parameters that can be specified in a CFA model: free, fixed, or constrained. A free parameter is unknown, and the researcher allows the analysis to find its optimal value that, aligned with other model estimates, minimizes the differences between the observed and predicted variance-covariance matrices. A fixed parameter is prespecified by the researcher to be a specific value, most commonly either 1.0 or 0. A third type of estimate is a constrained parameter. As with a free parameter, a constrained parameter is unknown.

A common source of CFA model misspecification is the incorrect designation of the relationships between indicators and the factors. This can occur in the following manners (assuming the correct number of factors was specified): (1) the indicator was specified to load on a factor, but actually has no salient relationship to any factor; (2) the indicator was specified to load on one factor, but actually has salient loadings on two or more factors; and (3) the indicator was specified to load on the wrong factor. Depending on the problem, a solution will be either to respecify the pattern of relationships between the indicator and the factors, or eliminate the indicator from the model.

EXPLORATORY STRUCTURAL EQUATION MODELING

For decades, the typical approach to the analysis of multidimensional instruments has been based on CFA. Both CFA and SEM frameworks had an indisputable influence on educational and psychological research (e.g., [Bollen, 1989](#)).

Within a decade CFA almost completely replaced classical methods, such as EFA. However, CPA often relies on the highly restrictive independent cluster model (ICM) in which cross-loadings between items and nontarget factors are assumed to be zero. It was recently observed that measures assessing multidimensional constructs rarely achieve reasonable fit within the ICM-CFA approach (e.g., [Marsh et al., 2010](#)). As a consequence to this observation more flexible approaches

have been proposed (Asparouhov & Muthén, 2009; Morin, Marsh, & Nagengast, 2013) or “rediscovered” (Reise, 2012), such as ESEM, bifactor models, and their combination. Morin, Arens, and Marsh (2016) argue that ICM-CFA models typically fail to account for at least two sources of construct-relevant psychometric multidimensionality to (1) the hierarchical nature of the constructs being assessed, and (2) the error-prone nature of indicators typically used to measure psychological and educational constructs.

ESEM is an alternative analytic framework for examining the latent structure underlying data derived from multifactorial personality measures. The ESEM approach differs from the standard ICM-CFA approach to the extent that (1) all primary and nontarget loadings are freely estimated, conditional on the imposition of minimal identifying restrictions; and (2) EFA factors can be rotated (Morin et al., 2013; Marsh, Morin, Parker, & Kaur, 2014). In the recent literature ESEM (Asparouhov & Muthén, 2009) has been proposed as a promising tool in personality research and a possible alternative to CFA (Marsh et al., 2010, 2011). Apart from having a superior model fit, the ESEM approach has significant advantages over ICM-CFA approach in basic parameter evaluation. Increasing empirical and simulation evidence demonstrates that even when ICM-CFA representations of multifactorial scale data fit the sample data, factor correlations can be upwardly biased (e.g., Marsh et al., 2014; Morin et al., 2013). ESEM might also enhance construct estimation. As ESEM represents an integration of EFA within a general SEM framework, the statistical features of SEM, including SEM parameter estimates, standard errors, fit indexes, the modeling of error covariance, and tests of invariance between groups and across time (e.g., Marsh et al., 2014; Morin et al., 2013).

Booth and Hughes (2014) in their article compare the use of ESEM as an alternative to CFA models in personality research. They compared model fit, factor distinctiveness, and criterion associations of factors derived from ESEM and CFA models. In Sample 1 ($n = 336$) participants completed the NEO-FFI, the Trait Emotional Intelligence Questionnaire-Short Form, and the Creative Domains Questionnaire. In Sample 2 ($n = 425$) participants completed the Big Five Inventory and the depression and anxiety scales of the General Health Questionnaire. ESEM models provided better fit than CFA models, but ESEM solutions did not uniformly meet cutoff criteria for model fit. Factor scores derived from ESEM and CFA models correlated highly (.91 to .99), suggesting the additional factor loadings within the ESEM model add little in defining latent factor content. Lastly, criterion associations of each personality factor in CFA and ESEM models were almost identical in both inventories.

The bifactor model is a potentially valuable tool for exploring central aspects of the disorders, such as the validity of attention-deficit/hyperactivity disorder (ADHD) subtypes (Toplak et al., 2009) or the equivalence of ADHD factorial models based on neuropsychological processing theories (e.g., Burns, de Moura, Beauchaine, & McBurnett, 2014).

Over the last decade, increasing evidence has provided a new methodological approach to the study of the structure of ADHD (e.g., Normand, Flora, Toplak, & Tannock, 2012; Wagner et al., 2015; Willoughby, Blanton, & the Family Life Project Investigators, 2015). These studies have employed bifactor models to represent ADHD symptoms via both a general factor and two or three specific factors. One of the key advantages of bifactor modeling is that variance because of common origin (i.e., the general factor G) can be differentiated from variance associated with sources specific to each cluster of indicators (i.e., the specific factors of inattention (N) and hyperactivity/impulsivity (HY/IM)). All of these studies converge that the bifactor model of ADHD presents global fit indices that are significantly better than those of traditional first-order factor models. Moreover, the bifactor model is considered to optimally represent the latent structure of the disorder. In a recent study Arias, Ponce, Martínez-Molina, Arias, and Núñez (2016) tested first-order factor and bifactor models of ADHD using CFA and ESEM to adequately summarize the DSM-IV-TR symptoms observed in a Spanish sample of preschoolers. Six ESEM and CFA models were estimated based on teacher evaluations of the behavior of 638 children 4–6 years of age. An ESEM bifactor model with a central dimension plus three specific factors (inattention, hyperactivity, and impulsivity) showed the best fit and interpretability. The bifactor model provided a positive option to previous inconsistencies in the factorial models of ADHD in young children. However, the low reliability of the specific factors controverts the subscales for ADHD measurement.

APPLYING BIFACTOR STATISTICAL INDICES IN THE EVALUATION OF PSYCHOLOGICAL MEASURES

Psychometric analyses of personality and psychopathology measures have at least two overarching objectives. The first, of particular relevance to clinical assessment, is to determine how precisely (typically unit-weighted) total and subscale scores reflect their intended constructs. Related to this is the critically important, yet often ignored, determination of whether subscale scores provide unique information above and beyond the total score (Haberman, Sinharay, & Puhon, 2009). The second objective, especially important to researchers interested in theory testing, is to determine how well a particular set of items reflects an LV and how the items can be employed in the specification of a measurement model in a SEM context.

Rodriguez, Reise, and Haviland (2016) in a recent study demonstrate the use of various bifactor model-based psychometric indices that will assist researchers in achieving the preceding objectives: omega reliability coefficients (omega, omega_S,

omegaH, omegaHS; Reise, 2012; Revelle & Zinbarg, 2009), factor determinacy (FD; Grice, 2001), construct replicability (H; Hancock & Mueller, 2001), explained common variance (ECV; Sijtsma, 2009; Stucky & Edelen, 2014; Stucky, Thisen, & Edelen, 2013), and percentage of uncontaminated correlations (PUC; Bonifay, Reise, Scheines, & Meijer, 2015; Reise, Scheines, Widaman, & Haviland, 2013). Rodriguez et al. (2016) assumes that item response data are consistent with a bifactor structure and several orthogonal group factors that represent subdomain constructs. Finally, these authors extend the findings of 50 recent studies in which bifactor models have been estimated and presented in the psychopathology, personality, and assessment literatures.

The authors concluded that first, although all measures had been tagged “multidimensional,” unit-weighted total scores overwhelmingly reflected variance due to a single LV. Second, unit-weighted subscale scores often have ambiguous interpretations because their variance mostly reflects the general, not the specific, trait. Finally, they reviewed the implications of their evaluations and consider the limits of inferences drawn from a bifactor modeling approach.

When data fit a bifactor structure, as was the case in all 50 examples, SEM researchers still must decide how best to specify their measurement models. One possibility is to specify the full bifactor structure. However, item-level multidimensional measurement models can cause complexities, especially if the general factor is strong or some group factors are ill defined, if there are small loadings that are unlikely to replicate, or if items have cross-loadings on group factors. Notably, researchers might have no special interest in the group factors, as such, but probably wish to specify them to either control for variance or be true to the model promoted as the one with the “best fit.”

At present, investigations into issues of dimensionality are of particular interest in the field of psychometrics, where areas, such as IRT, are especially concerned with evaluations of the degree of uni- or multidimensionality (Reise, Moore, & Haviland, 2013). One possible index is ECV (Sijtsma, 2009), which also can be used to estimate the essential unidimensionality of the modeled common variance in an item set. Rodriguez et al. (2016) have presented definitions and calculations for six indices that provide valuable psychometric data when item response data are multidimensional with a bifactor structure: two omega coefficients, factor determinacy, construct replicability, ECV, and PUC. They then examined 50 published bifactor models and described the strengths and limits of the indices’ applications and interpretations.

Analyses of the selected models led to two conclusions. First, although all 50 measures were reportedly “multidimensional,” unit-weighted total scores overwhelmingly reflected variance due to a single LV. That is, they can be interpreted as univocal indicators of a single LV, despite the multidimensionality. This finding underscores the remarkable resiliency of total scores to the biasing effects of multidimensionality. Second, SEM researchers are basically concerned with selecting a set of items to best represent an LV. In the case of subscales, the LVs of interest are the specification of group factors.

An integrative framework to investigate sources of construct-related multidimensionality

Morin et al. (2016) show how an integration of CFA, emerging ESEM, and rediscovered (bifactor) models provides a general framework bifactor ESEM to account for the two sources of construct-relevant psychometric multidimensionality: (1) the hierarchical nature of the constructs being assessed, and (2) the fallible nature of indicators that tend to include at least some degree of association with nontarget constructs. Thus, when both sources of multidimensionality are present, then a bifactor ESEM model is the best choice. Such integrated models have not as yet, however, been systematically applied to the investigation of complex measurement instruments.

The first step in the application of the proposed framework starts with a comparison of first-order ICM CFA and ESEM models to assess the presence of construct-relevant multidimensionality due to the unreliable nature of the indicators and reinforced by the presence of conceptually related or overlapping constructs. Given that bifactor models tend to endorse unmodeled cross-loadings through the estimation of inflated global factors (Murray & Johnson, 2013), it is important that the application of this framework starts with a comparison of ESEM versus ICM CFA models.

The second step in the application of the proposed framework involves the comparison of first-order versus bifactor and higher order solutions (relying on ESEM or CFA depending on the results from the first step), to assess the presence of construct-relevant multidimensionality due to the presence of hierarchically superior constructs. Morin et al. (2016) anticipated that this specific combination (i.e., bifactor ESEM) could prove important when employing complex multidimensional measures, especially those that include a distinct subset of items specifically designed to assess hierarchically superior constructs.

Factor mixture models

Over the last 75 years a large array of psychometric instruments has been employed in the study of personality and PDs. Many of these instruments conceptualize personality features in terms of latent traits that vary dimensionally across

population. A recent paper by [Hallquist and Wright \(2014\)](#) describes and illustrates how FMM, an extension of FA that allows for latent subgroups, can potentially enhance and inform the development of psychometric personality tests and the way FMM may illuminate the latent structure of personality.

Although psychometric theory has contributed to major advances in personality assessment, the authors of this paper indicate three premises of conventional test development efforts that may not hold in some databases: (1) a trait falls along a continuum that is approximately normally distributed; (2) the true level of a trait can be approximated by multiple items that provide overlapping information; and (3) the latent structure of a test characterizes the entire sample and is not markedly different for one or more subgroups, latent or observed.

The authors delineate how FMM may be particularly useful in cases where one or more of these premises is invalid, that is, when a personality trait is not normally distributed or data where response patterns reflect both underlying traits and unique latent subgroup characteristics. Additional positive features of this analytic framework include the ability to test the fit of the model to the data, such that models can be retained or discarded on the basis of formal statistical rules. The same applies to the comparison of various models. Model testing is usually based on a chi-square statistic, which tests whether the estimated parameters of the model adequately reproduce the empirical data.

Whereas the two extremes—latent trait models and latent profile models—have been widely used to study personality, the middle ground (i.e., hybrid models), where variation can exist both in terms of profiles and traits, has only recently been described ([Lubke & Muthén, 2005](#); [Teh, Seeger, & Jordan, 2005](#)). For example, using FMMs in a large epidemiological sample of adolescents, [Lubke et al. \(2007\)](#) tested whether inattention and hyperactivity-impulsivity are best conceptualized as subtypes of ADHD, or whether these features are continuous traits in the population. They found that a dimensional representation of inattention and hyperactivity-impulsivity fit the data better than categorical models, refuting the existence of subtypes. In addition, FMMs identified two LCs of ADHD severity: persons with mild or absent symptoms (approximately 93% of the sample) and those with moderate to severe symptoms consistent with the syndrome.

Factor mixture models in examining the latent structure of personality disorders

For more than 30 years the DSM has advanced a model of personality pathology comprising 10 putatively discrete categorical PDs or a diagnosis of PDs not otherwise specified (PD-NOS).

In a recent review, [Wright and Zimmerman \(2015\)](#) discuss the PD latent structure using a series of FA methods. The authors discuss four major issues: (1) why so many patients meet the criteria for multiple PDs or no specific PD (i.e., PD-NOS); (2) is personality pathology dimensional, categorical, or some hybrid of the two? Clinical theory doubts the existence of discrete lines between individual with and without PDs as proposed in the DSM (e.g., [Clarkin, Yeomans, & Kernberg, 2006](#)); (3) regardless of these different types of PDs, what is a reasonable diagnostic threshold for PDs? It is important to explore whether diagnostic thresholds are reliable; and (4) what are the important behavioral patterns of PD to track and target for intervention? Personality pathology is a dynamic phenomenon reflecting processes that occur within and between levels of experience (e.g., motivational, cognitive, and behavioral) over time, which result in maladaptive self-regulation and responses to environmental demands (p. 111).

All these issues deal with different facets of the underlying structure that gives rise to personality pathology. For example, a major depressive episode is not always manifested in a conspicuous manner. It is often inferred from specific symptoms, such as social withdrawal, decreased activity level, or lack of future goals. LVM assumes that manifest or observed variables arise from subtle or latent causes. FA is the most common statistical method of LVM. In addition to FA, other statistical models include LCA and LPA. LCA or LPA is a categorical LVM technique that accounts for patterns of covariation by estimating latent features that differ from each other in symptoms or scale means.

A number of studies have examined the latent structure of DSM-IV PDs with FA methods (using both CFA and EFA). These studies have differed considerably in terms of the basic unit of analysis (e.g., individual PD criteria or dimensional PD scores), the assessment method (e.g., self- or clinician report), the sample type (e.g., community or clinical sample), and the statistical procedures (e.g., parallel analysis or scree test in the EFA).

The findings from studies focusing on PD diagnoses as the basic unit of analysis (i.e., either the presence or absence of diagnosis, or the number of criteria fulfilled) have failed to provide strong support for the assumption that the pattern of covariation can be justified by three (correlated) latent dimensions representing the higher order clusters of odd-eccentric, dramatic-emotional, and anxious-fearful disturbances. In the majority of studies, CFA models showed unacceptable fit to the data (e.g., [Bastiaansen, Rossi, Schotte, & de Fruyt, 2011](#)) or produced improper solutions ([Trull, Vergés, Wood, & Sher, 2013](#)), and EFA factors differed more often than not from the expected patterns (e.g., [Fossati et al., 2000, 2006](#)). A latent structure that accounts for diagnosis-level PD covariation requires more than three factors, which are likely to resemble major domains of general personality ([Widiger & Trull, 2007](#)).

Two other studies (Durrett & Westen, 2005; Huprich, Schmitt, Richard, Chelminski, & Zimmerman, 2010) also examined the latent structure of DSM-IV PD criteria based on clinician ratings and structured clinical interviews using CFA. Findings revealed modest support for a model with 10 correlated factors that equal the 10 distinct PDs, with fit indices around the lower bound of acceptability. Thus, it appears that FA studies based on individual PD criteria are likely to be more reliable. Regarding the content of the factors reviewed, one finding demonstrated that the only PDs that were replicated across studies as coherent, distinct latent dimensions were obsessive-compulsive and schizotypal PDs (Durrett & Westen, 2005; Huprich et al., 2010).

MEDIATION ANALYSIS IN CLINICAL PSYCHOLOGY

Establishing causality has been a topic of heated debate in recent times (Gawronski & Bodenhausen, 2014). One common criterion for establishing causality is temporal precedence or the demonstration that a purportedly causal mechanism occurs in time (MacKinnon, Fairchild, & Fritz, 2007). One technique that is commonly employed to evaluate causality is *mediational analysis*. According to MacKinnon and Pirlott (2015), “Statistical mediation methods provide valuable information about underlying mediating psychological processes...” (p. 30). Mediation analysis primarily yields the relationship of the mediator and outcome variables when partialing out the relationship between the predictor and mediator variables.

Mediation analysis provides an optimal way to test mechanisms based on theory (e.g., MacKinnon, 2008). Researchers generate hypothesis about causal mechanisms and thus activate a broad pattern of predictions (MacKinnon & Pirlott, 2015).

Underlying all mediation methodology is a temporal component (e.g., Kazdin, 2007). The theoretical framework in which X operates before M, which then operates before Y, underlies the conceptualization of a temporal design-based mediation (Winer et al., 2016). Winer et al. (2016) distinguished between atemporal (i.e., unrelated to time) and temporal research. This distinction precludes researchers from operating within atemporal conceptual frameworks and reaching temporal conclusions. Bootstrapping techniques introduced over the past 10 years to psychological research shaped the course of mediation analysis by increasing the possibility of finding significant relationships (e.g., MacKinnon et al., 2007).

Using cross-sectional data collected as part of larger studies (Nadorff, Anestis, Nazem, Harris, & Winer, 2014) the relationship between defensiveness, as measured by the shortened version of the Marlowe-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972); anhedonia, as measured by the Specific Loss of Interest and Pleasure Scale (Winer, Veilleux, & Ginger, 2014); and symptoms of posttraumatic stress disorder (PTSD), as measured by the Post-Traumatic Checklist (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The study aimed to explore if individuals who were less defensive (X) would be more likely to endorse PTSD symptoms (M), and if this would in turn lead to elevated anhedonia (Y), which may result from longstanding, intense anxiety. This mediational model was indeed significant, which might then lead researchers to describe a causal, temporal relationship between the three variables. Later they tested whether the directional relationship initially demonstrated was meaningful by switching the positions of defensiveness and anhedonia, forming a model in which anhedonia (X) leads to both symptoms of PTSD (M) and, ultimately, defensiveness (Y). Even with the independent and dependent variables reversed, the mediation model remained significant.

Despite its popularity, mediation analysis has been often criticized for its limitations regarding causal mediation effects. Mediation analysis can prove a complicated method as researchers can typically randomize only one of the three variables in the mediation theory. However, randomization of X does not affirm the causality of M on Y.

MacKinnon and Pirlott (2015) address these limitations by drawing on new statistical developments in causal mediation analysis. Typically, within-subjects designs allow for the same participant to participate in both the experimental and control conditions. However, carry over effects may affect measurement of the dependent variable. This problem is designated as the fundamental problem of causal inference (Holland, 1988). The assumptions of no confounding bias as applied to the X to M and M to Y relations are known as the *sequential ignorability assumption*. Experimental studies validate the causal link of X to M but not the M to Y relation because subjects are not randomized to levels of M. A large body of psychological literature highlighted the important implications of violating sequential ignorability assumption (e.g., Bullock, Green, & Ha, 2010). Specifically, when underestimating the importance of sequential ignorability, an observed relation could be obfuscated by a confounding variable. According to MacKinnon and Pirlott (2015), the violation of sequential ignorability assumption signifies that “most mediation analyses may find evidence for incorrect mediators without researchers being aware of this problem” (p. 33).

Statistical methods that improve causal conclusions from experimental mediation studies include *comprehensive SEM* (Bollen, 1989; Holland, 1988; Sobel, 2008), *principal stratification* (Frangakis & Rubin, 2002; Jo, 2008), and *inverse probability weighting* (Robins, Hernán, & Brumback, 2000).

Several methods have been suggested for constructing confidence intervals for indirect effects. The most well-known methods are *bootstrap methods* (e.g., Shrout & Bolger, 2002), *Bayesian credible intervals* (Yuan & MacKinnon, 2009), and

Monte Carlo confidence intervals (MacKinnon, Lockwood, & Williams, 2004; Preacher & Selig, 2012). Since MacKinnon et al.'s (2007) review, research focused more in seeking optimal statistical methods to investigate theoretical issues. In particular, four of the extensions to the single mediation model evaluated by MacKinnon et al. (2007) have come to dominate the mediation literature (Preacher, 2015). These include: (1) mediation model for longitudinal data, (2) causal inference for indirect effects, (3) mediation model for discrete and nonnormal variables, and (4) mediation analysis in multilevel designs.

Mediation models for longitudinal data

In response to psychologists' reliance on cross-sectional designs and models for estimating mediation, scholars have developed models that take into account the role of time. The three most common longitudinal mediation models are: (1) methods based on the cross-lagged panel model (CLPM), (2) LGCM, and (3) the latent change score (LCS) (e.g., Bentley, 2011; MacKinnon, 2008; MacKinnon et al., 2007; MacKinnon, Lockhart, Baraldi, & Gelfand, 2013; Roth & MacKinnon, 2012; Selig & Preacher, 2009).

Cross-Lagged Panel Models

A popular method for assessing longitudinal mediation is the CLPM, which is based on SEM for repeated measures of X, M, and Y. The CLPM examines whether and to what extent individual differences in X predict variability to Y via M with advantages deriving from the use of repeated measures of the same variables on the same individuals (Preacher, 2015). The parameters of a CLPM closely related to mediation analysis are those that connect different variables across measurement intervals separated by selected lag.

Latent Growth Curve Models

An alternative method has been proposed in the context of the LGCM (Bollen & Curran, 2006; Cheong, 2011). The LGCM permits aspects of longitudinal change in a variable (e.g., individuals' intercepts and slopes) to assume the role of X, M, or Y in a mediation model. For example, it might be of interest to determine the degree to which a teaching intervention (X) influences linear change in math ability in high school (Y) via the rate of skill acquisition in elementary school (M). In this example, both the mediator and outcome are individuals' rates of change, or linear slopes over time, whereas X is a binary predictor.

Latent Change Score Models

MacKinnon (2008) suggests an adaptation of the LCS model (also called the *latent difference score model*) for studying longitudinal mediation. The basic idea behind LCS models is to use LVs to represent the difference (change) between adjacent measurements of a repeatedly measured variable (McArdle, 2001). Unlike the CLPM, LCS models do not address the relationships among the variables themselves over time but rather focus on change in a variable and the relationships among these changes. Unlike the mediation LGCM, change is not assumed to be constant across lags. Furthermore, unlike the mediation LGCM, change occurs across only a single measurement period (although more elaborate LCS models are possible).

TESTING MEASUREMENT INVARIANCE

The last decade has witnessed a boost of invariance (or equivalence) testing within the SEM literature especially as it relates to MI and testing for latent mean differences (Vandenberg & Lance, 2000). One possible explanation for this boost is greater awareness that parameter estimates (latent factor means or structural coefficients) cannot be compared across groups when measures are noninvariant. Another explanation is the increase in cross-cultural research (van de Vijver & Leung, 2000).

Testing for equivalence of measures or MI has gained increasing attention in recent years (e.g., Chen, 2008; van de Vijver & Fischer, 2009), especially in cross-cultural research. MI allows researchers to examine if members of different groups or cultures attribute the same meanings to scale items (e.g., Fischer et al., 2009; Milfont, Duckitt, & Wagner, 2010). In the cross-cultural literature four levels of equivalence have been identified (Fontaine, 2005; van de Vijver & Leung, 1997): *functional equivalence* (does the construct exist in all groups studies?), *structural equivalence* (are indicators related to the construct in a nontrivial way?), *metric equivalence* (are loading weights identical across groups?), and *full score or scalar equivalence* (are intercepts, i.e., the origins of measurement scales, identical across groups?).

Some of the most common applications of MI involve checking for evidence of measurement bias in scales administered in different languages or to different cultural populations, examining stability of a measurement model over time,

and testing MI prior to evaluating differences in latent means. The distinction between measurement bias and invariance is essential. Bias results from the presence of a nuisance factor that produces an undesirable source of measurement variance due to construct bias, method bias, and/or item bias (van de Vijver & Poortinga, 2005). MI refers to the comparability of scores between groups and examines if items contribute equally across these variables (Meredith, 1993).

Comparing latent factor means and structural coefficients

Testing measurement and structural invariance is essential because they (1) correct and estimate measurement error, (2) assess factorial validity, and (3) estimate whether the measurement and structural model is invariant or equal across groups (Sass, 2011).

Research (e.g., McDonald, Seifert, Lorenzet, Givens, & Jaccard, 2002) has revealed that the statistical conclusions drawn from mean comparisons may differ or be invalid, depending on the type of analysis conducted [e.g., ANOVA vs. multilevel CFA (MCFA)] and whether or not MI is achieved. Multiple indicator multiple cause (MIMIC) and hybrid models (Marsh, Tracey, & Craven, 2006) can be also employed in the comparison of means. These models allow for reasonably continuous data, smaller sample sizes, and tend to be more parsimonious when compared to multigroup models.

For noninvariant measures the factor loadings and/or intercepts (or thresholds) contribute differentially to the means, thus inhibiting valid and comparable score estimates. Factor loading invariance occurs when item contribution to the overall score is equal across groups. Differences could emerge if (1) the conceptual meaning (often for cultural reasons) of the construct differs across groups, (2) particular items are more applicable for one group than another, (3) the scale was not translated accurately, and/or (4) certain groups respond to extreme items differently (Chen, 2008).

Potential causes of measurement noninvariance

Intercept (scale origin or scalar) invariance denotes that subjects with the same latent factor score will have similar responses on average for an item (i.e., observed score) when the latent factor score is zero. When testing for intercept invariance, the researcher assumes that the observed variables (e.g., items) are continuous. When the intercepts are noninvariant, this is commonly referred to as *differential item functioning* within the IRT literature. Although different in many ways (Millsap & Yun-Tein, 2004), threshold invariance is analogous to intercept invariance with the observed variables treated as ordered categorical.

Intercept or threshold noninvariance could occur due to (1) social desirability reasons or social norms, (2) particular groups displaying a propensity to respond more strongly to an item despite having the same latent trait or factor mean, and/or (3) certain groups having different reference points when making statements about themselves (Chen, 2008). Other factors could also contribute to the lack of strong factorial invariance, thus the item content should be inspected carefully to ascertain the reason. These differences must be idiosyncratic to a particular item or set of items. When all items are equally influenced by the aforementioned factors, MI would likely remain, even though these measurement concerns or biases still likely exist.

Historically, testing for MI has been encouraged as a prerequisite to comparison of latent factor means or structural coefficients (Millsap & Meredith, 2007).

Considerations when testing measurement invariance

To supplement the increase in MCFA use, considerable empirical research has been conducted. These developments have focused on three major issues: (1) setting the factor scale, (2) assessing model fit of invariant models, (3) determining the appropriate estimator and invariance approach, and (4) considerations for noninvariant measures.

Assessing model fit

Sample and Configural Invariance Model

When conducting an invariance test, it is critical to first assess the model fit for each group separately to ensure adequate factorial validity. After obtaining an adequate model for each group separately, a test of configural invariance (i.e., the number of factors and pattern of indicator factor loadings is identical between groups) is conducted to obtain a baseline model that is later used for comparison purposes with more restrictive invariance models. As with any model, an assortment of model fit statistics should be evaluated that consider the various model components (e.g., model complexity, sample size, etc.).

The chi-square statistic is valuable because it allows researchers to make inferences regarding model differences in the population. Given the limitations of the chi-square and approximate fit indices, researchers often need to make a subjective decision associated with what constitutes “good model fit.” As a result, researchers must provide an impartial and evidence based assessment of whether invariance exists. Although there is no universal approach for evaluating model fit in invariance testing, a typical approach taken is to consider the (1) statistical significance of the chi-square after a Bonferroni adjustment, (2) change in approximate fit statistics, and (3) magnitude of difference between the parameter estimates.

A rich body of literature addresses the various types of invariance models (Chen, Sousa, & West, 2005; Cheung & Rensvold, 2000; Vandenberg & Lance, 2000); most methodologies conform to the following sequence: individual groups, configural invariance model, factor loading invariance model, and intercept or threshold invariance model. Muthén and Muthén (1998–2010, pp. 433–435) propose for testing the factor loadings and intercepts (or thresholds) in array given that they both influence the item characteristic curve simultaneously. Furthermore, any indication of item noninvariance, whether the factor loadings or intercepts (or thresholds), is concerning for item quality, and the source of this noninvariance can be detected with follow-up analyses.

Researchers have the option of testing an array of other equality constraints (e.g., residual variances, interfactor covariance, etc.) that may prove helpful in understanding measurement or structural differences across groups. The most common approach is the *forward approach* (sequentially adding more model constraints), whereas the *backward approach* (sequentially removing model constraints) appears less common (Dimitrov, 2010).

In terms of model estimation, data assumed to be continuous generally utilizes maximum likelihood estimation and focus primarily on assessing factor loading and intercept invariance. Ordered categorical data should employ a more appropriate estimation method (e.g., weighted least squares multiple variables) designed specifically for noncontinuous data that may not be multivariate normal, or researchers should consider a maximum likelihood estimation method with robust standard errors.

Assessing measurement invariance of scales

Measurement invariance has a crucial role in the context of scale construction and validation, and to address some of the key decisions and challenges researchers face in applying these techniques. Although the conceptual development of the analysis of MI is on multiple-group applications as approached within a SEM framework, the concepts and methods presented here are readily extended to several other contexts. First, in a manner analogous to that used for evaluating MI between groups, MI may also be examined between repeated measurement occasions in longitudinal contexts, thereby addressing the stability of an LV model over time (Little, 2013; Widaman, Ferrer, & Conger, 2010). Second, questions of MI, particularly for tests, can also be addressed in the framework of IRT. In the IRT framework, bias is typically defined and examined by identifying differential item functioning (DIF) between groups. For measurement models involving dichotomous measures, IRT models can be parameterized such that they yield results equivalent to CFA-based specifications (Kamata & Bauer, 2008), and comparable procedures for evaluating MI have been described across these frameworks (e.g., Meade & Lautenschlager, 2004; Stark, Chernyshenko, & Drasgow, 2006).

Assessing MI/DIF with multiple groups models

Currently, the primary alternative to the multiple groups model for evaluating MI/DIF is the MIMIC model. At its inception, the MIMIC model was defined by the presence of a single LV that was both measured by multiple items (i.e., the multiple indicators) and also predicted by multiple exogenous observed variables (i.e., the multiple causes; Jöreskog & Goldberger, 1975).

KEY CONCEPTS IN NETWORK ANALYSIS

Networks consist of nodes and edges. Nodes represent the objects of study and edges the connections between them. In psychopathology networks, nodes represent symptoms and associations between symptoms. Networks can consist of either weighted edges or unweighted edges. An unweighted edge merely signifies that two symptoms are connected, whereas a weighted edge signifies the magnitude of the connection (e.g., a Pearson correlation coefficient), represented by thickness of the edge. The association between two symptoms can be either positive or negative.

Instead of focusing on symptoms associated to a specific disorders, network analysis estimates metrics of node centrality (Freeman, 1978/1979). Five measures of centrality comprise *degree*, *strength*, *expected influence*, *closeness*, and *betweenness*. Highly central nodes are those of greatest importance in the network analysis, typically serving as targets for

clinical intervention assuming that edges reflect potentially causal connections between symptoms. For example, spousal bereavement arouses the symptom of loneliness, which in turn activates other symptoms of depression. This means that if early interventions succeed in reducing loneliness in recently bereaved individuals, they should prevent the emergence of depression.

By focusing on patterns of symptom dynamics, the network approach may potentially yield insights into how the dynamics of psychopathology relate to intra- and interindividual differences (Bringmann et al., 2013). Despite this key advantage of network analysis, there are no techniques that evaluate the differences in the dynamical structure of individuals' symptom dynamics. Bringmann et al. (2013) suggest that the starting point of symptom network dynamics may be found in the analysis of symptoms measured over different time intervals. Such time series data have recently become available due to the rising popularity of the experience sampling method (ESM). With ESM information about the experiences and affect of participants in their daily lives are regularly collected over time (e.g., Bolger, Davis, & Rafaeli, 2003).

In a recent study, Bringmann et al. (2013) present a multilevel approach to track vector autoregressive (VAR) modeling that utilizes the nested structure that typically arises in ESM protocols. The multilevel-VAR method provides information about interindividual differences (random effects) in the network, in addition to the population average network. Through the random effects we can construct networks of individual variability and infer a network for each subject of the ESM study separately.

Bringmann et al. (2013) take a random effect approach to estimate interindividual differences, and assume that these person-specific parameters are drawn from a multivariate normal distribution with a zero mean vector and an unstructured covariance matrix (e.g., Verbeke & Molenberghs, 2000). Other approaches to deal with interindividual differences are *fixed-effects analysis* (i.e., constructing a dummy variable for each subject; Baltagi, 2005) and *conditional analysis* (e.g., Verbeke, Spiessens, & Lesaffre, 2001). In the multilevel-VAR method a random-effects approach is taken to avoid possible problems related to the two previously mentioned approaches. The modeling technique combines time series with individual differences. This strategy allows dealing with the peculiarities of ESM data (e.g., short time series, significant individual differences) but also opens up unique possibilities for studying individual differences in dynamic structure.

The multilevel-VAR method combines a nomothetic approach, which makes it possible to generalize findings to a population level, with an idiographic approach, which models dynamical processes at the level of the individual person. In addition, individual heterogeneity can be easily assessed using the random effects estimated in the model. This method successfully combines nomothetic and idiographic approaches to data analysis. Thus, the presented methodology enables the use of network approaches in clinical research and investigates the structure of disorders, not only by inferring and visualizing the interaction between the variables, but also by further analyzing the new inferred networks.

Network analysis and psychopathology

Denny Borsboom and his coworkers have proposed a novel network model of psychopathology (e.g., Borsboom & Cramer, 2013; Borsboom, 2008; Borsboom, Epskamp, Kievit, Cramer, & Schmittmann, 2011). The major purpose of network analysis is to identify the causal relations among symptoms and not simply their correlations as correlations, which constitute a necessary, but insufficient condition for causal inference (McNally, 2016).

Among the controversies surrounding the development of the DSM-5 was the debate over whether disorders should be categorized as categorical or dimensional and the important issue of comorbidity (the joint occurrence of two or more mental disorders).

The network approach conceptualizes symptoms as mutually interacting or reciprocally reinforcing elements of a complex network (Borsboom & Cramer, 2013). Thus, instead of conceptualizing symptoms as indexes of a latent disorder, symptoms are interpreted as part of a causal system (Borsboom, 2008). From this perspective mental disorders are understood as networks of interacting symptoms (Cramer, Waldorp, van der Maas, & Borsboom, 2010) that form mechanistic property clusters (Kendler, Zachar, & Craver, 2011). Such patterns of symptom interaction are likely to vary across individuals. For instance, some people have a higher degree of emotional variability than others, and such differences are known to be related to personality traits, such as neuroticism (Kuppens, Oravecz, & Tuerlinckx, 2010). By focusing on patterns of symptom dynamics, the network approach may potentially yield important insights into how the dynamics of psychopathology relate to intra- and interindividual differences.

By focusing on the interaction between symptoms, the network analysis posits that clinical symptoms coevolve dynamically (Ebner-Priemer, Eid, Kleindienst, Stabenow, & Trull, 2009), Borsboom and his coworkers (e.g., Borsboom & Cramer, 2013; Borsboom, 2008; Borsboom, Cramer, Schmittmann, Epskamp, & Waldorp, 2011) proposed a network approach to psychopathology whereby LV is not the common cause of symptom covariance. Instead, it derives from the dynamic, causal interactions among symptoms. Thus, symptoms do not simply reflect underlying mental disorders but are

constituents of mental disorders. Thus, a mental disorder constitutes a causal system of dynamically interacting, possibly self-reinforcing symptoms (McNally, 2016).

Despite the differences between the categorical and dimensional models regarding the latent structure or the causal factors of psychopathology, both approaches assume that symptoms reflect the presence of a latent structure that triggers their emergence and covariance (e.g., Borsboom, Mellenbergh, & van Heerden, 2003).

Scholars in the field of causal inference and Bayesian network analysis agree that correlation alone does not signify causation. Nevertheless, they argue that under a certain set of assumptions one can reasonably make causal inferences from correlational, observational data (e.g., Pearl, 2011). First, there cannot be any unobserved variables influencing those in the network. That is, if there is another variable (e.g., unmeasured symptom of another disorder) that produces a strong causal effect on symptoms modeled by the directed acyclic graph, then spurious associations between symptoms will be wrongly be interpreted as causal connections. Second, the causal Markov assumption must be met. That is, given its causes, each symptom must be separated from its direct and indirect noneffects. Third, certain assumptions about the probability distribution of each symptom must be met. Fourth, sometimes it is difficult to identify the single best causal Bayesian network.

Scholars have applied network methods to illuminate causal interactions among symptoms of depression (e.g., Cramer, Borsboom, Aggen, & Kendler, 2012; Fried et al., 2015), obsessive-compulsive disorder (McNally, Mair, Mugno, & Riemann, 2016), posttraumatic stress disorder (McNally et al., 2015), schizophrenia (van Kampen, 2014), or childhood disorders (Boschloo, Schoevers, van Borkulo, Borsboom, & Oldehinkel, 2016; Saxe et al., 2016).

SUMMARY

In this chapter we explore the recent development in latent variable models starting with the overarching framework of growth or finite mixture models. Growth mixture models are person-centered statistical frameworks that interpret population heterogeneity. We continue with latent class analysis, which is a latent variable model that is person centered, in contrast to factor analysis, which is variable centered and is increasingly employed in developmental research. Most statistical frameworks place special emphasis on the longitudinal study of personality, and most models extend to incorporate longitudinal adjustments. Examples of such models are the multitrait-multimethod and the confirmatory factor analysis–multitrait-multimethod model. Integrative frameworks typically include confirmatory factor analysis, exploratory structural equation modeling, and bifactor models. Factor mixture modeling is an extension of factor analysis that allows for latent subgroups and is useful in the study of the latent structure of personality disorders. Mediation analysis is a group of methods that explore the causal mechanisms by which a predictor affects an outcome. Finally, network analysis provides valuable information on the latent dynamics of psychopathology.

REFERENCES

- Allemand, M., Zimprich, D., & Hertzog, C. (2007). Cross-sectional age difference and longitudinal age changes of personality in middle adulthood and old age. *Journal of Personality, 75*(2), 323–358.
- Allemand, M., Zimprich, D., & Martin, M. (2008). Long-term correlated change in personality traits in old age. *Psychology and Aging, 23*(3), 545–557.
- Arias, V. B., Ponce, F. P., Martínez-Molina, A., Arias, B., & Núñez, D. (2016). General and specific attention-deficit/hyperactivity disorder factors of children 4 to 6 years of age: an exploratory structural equation modeling approach to assessing symptom multidimensionality. *Journal of Abnormal Psychology, 125*(1), 125–137.
- Asparouhov, T., & Muthén, B. O. (2007). *Wald test of mean equality for potential latent class predictors in mixture modeling* (Online technical report). Available from: <http://www.statmodel.com/download/MeanTest1.pdf>
- Asparouhov, T., & Muthén, B. O. (2009). Exploratory structural equation modeling. *Structural Equation Modeling: A Multidisciplinary Journal, 16*(3), 397–438.
- Baltagi, B. H. (2005). *Econometric analysis of panel data* (3rd ed.). Chichester, UK: Wiley.
- Bartholomew, D. J. (1987). *Latent variable models and factor analysis*. New York, NY: Oxford University Press.
- Bartholomew, D. J., Knott, M., & Moustaki, I. (2011). *Latent variable models and factor analysis: A unified approach* (3rd ed.). New York, NY: Wiley.
- Bastiaansen, L., Rossi, G., Schotte, C., & De Fruyt, F. (2011). The structure of personality disorders: comparing the DSM-IV-TR Axis II classification with the five-factor model framework using structural equation modeling. *Journal of Personality Disorders, 25*(3), 378–396.
- Bauer, D. J., & Curran, P. J. (2004). The integration of continuous and discrete latent variable models: potential problems and promising opportunities. *Psychological Methods, 9*(1), 3–29.
- Bentley, J. P. (2011). *An examination of statistical methods for longitudinal mediation modeling*. Available from: <http://www.mhsl.uab.edu/dt/2011p/bentley.pdf>
- Blanchard, E. B., Jones-Alexander, J., Buckley, T. C., & Forneris, C. A. (1996). Psychometric properties of the PTSD checklist (PCL). *Behaviour Research and Therapy, 34*(8), 669–673.

- Blonigen, D. M., Timko, C., & Moos, R. H. (2013). Alcoholics anonymous and reduced impulsivity: a novel mechanism of change. *Substance Abuse, 34*(1), 4–12.
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: capturing life as it is lived. *Annual Review of Psychology, 54*, 579–616.
- Bollen, K. A. (1989). *Structural equations with latent variables*. Hoboken, NJ: Wiley.
- Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation approach*. Hoboken, NJ: Wiley.
- Bonifay, W. E., Reise, S. P., Scheines, R., & Meijer, R. R. (2015). When are multidimensional data unidimensional enough for structural equation modeling? An evaluation of the DETECT Multidimensionality Index. *Structural Equation Modeling: A Multidisciplinary Journal, 22*(4), 504–516.
- Booth, T., & Hughes, D. J. (2014). Exploratory structural equation modeling of personality data. *Assessment, 21*(3), 260–271.
- Borsboom, D. (2008). Psychometric perspectives on diagnostic systems. *Journal of Clinical Psychology, 64*(9), 1089–1108.
- Borsboom, D., & Cramer, A. O. J. (2013). Network analysis: an integrative approach to the structure of psychopathology. *Annual Review of Clinical Psychology, 9*, 91–121.
- Borsboom, D., Cramer, A. O. J., Schmittmann, V. D., Epskamp, S., & Waldorp, L. J. (2011a). The small world of psychopathology. *PLoS One, 6*(11), e27407.
- Borsboom, D., Epskamp, S., Kievit, R. A., Cramer, A. O. J., & Schmittmann, V. D. (2011b). Transdiagnostic networks: commentary on Nolen-Hoeksema and Watkins. *Perspectives on Psychological Science, 6*(6), 610–614.
- Borsboom, D., Mellenbergh, G. J., & van Heerden, J. (2003). The theoretical status of latent variables. *Psychological Review, 110*(2), 203–219.
- Boschloo, L., Schoevers, R. A., van Borkulo, C. D., Borsboom, D., & Oldehinkel, A. J. (2016). The network structure of psychopathology in a community sample of preadolescents. *Journal of Abnormal Psychology, 125*(4), 599–606.
- Bringmann, L. F., Vissers, N., Wichers, M., Geschwind, N., Kuppens, P., Peeters, F., Borsboom, D., & Tuerlinckx, F. (2013). A network approach to psychopathology: new insights into clinical longitudinal data. *PLoS One, 8*(4), e60188.
- Bullock, J. G., Green, D. P., & Ha, S. E. (2010). Yes, but what's the mechanism? (don't expect an easy answer). *Journal of Personality and Social Psychology, 98*(4), 550–558.
- Burns, G. L., de Moura, M. A., Beauchaine, T. P., & McBurnett, K. (2014). Bifactor latent structure of ADHD/ODD symptoms: predictions of dual-pathway/trait-impulsivity etiological models of ADHD. *Journal of Child Psychology and Psychiatry, 55*(4), 393–401.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81–105.
- Campbell, D. T., & Kenny, D. A. (1999). *A primer on regression artifacts*. New York, NY: Guilford Press.
- Chen, F. F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology, 95*(5), 1005–1018.
- Chen, F. F., Sousa, K. H., & West, S. G. (2005). Testing measurement invariance of second-order factor models. *Structural Equation Modeling, 12*(3), 471–492.
- Cheong, J. (2011). Accuracy of estimates and statistical power for testing mediation in latent growth curve modeling. *Structural Equation Modeling, 18*(2), 195–211.
- Cheung, G. W., & Rensvold, R. B. (2000). Assessing extreme and acquiescence response sets in cross-cultural research using structural equations modeling. *Journal of Cross-Cultural Psychology, 31*(2), 187–212.
- Clarkin, J. F., Yeomans, F., & Kernberg, O. F. (2006). *Psychotherapy of borderline personality: Focusing on object relations*. Washington, DC: American Psychiatric Publishing.
- Clogg, C. C. (1995). Latent class models. In G. Arminger, C. C. Clogg, & M. E. Sobel (Eds.), *Handbook of statistical modeling for the social and behavioral sciences* (pp. 311–359). New York, NY: Plenum Press.
- Collins, L. M., & Lanza, S. T. (2010). *Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences*. New York, NY: Wiley.
- Cramer, A. O. J., Borsboom, D., Aggen, S. H., & Kendler, K. S. (2012). The pathoplasticity of dysphoric episodes: differential impact of stressful life events on the pattern of depressive symptom inter-correlations. *Psychological Medicine, 42*(5), 957–965.
- Cramer, A. O. J., Waldorp, L. J., van der Maas, H. L. J., & Borsboom, D. (2010). Comorbidity: a network perspective. *Behavioral and Brain Sciences, 33*(2–3), 137–193.
- Cudeck, R., & MacCallum, R. C. (2007). *Factor analysis at 100: Historical developments and future directions*. Mahwah, NJ: Lawrence Erlbaum.
- De Ayala, R. J. (2009). *The theory and practice of item response theory*. New York, NY: Guilford Press.
- De Fruyt, F., Bartels, M., Van Leeuwen, K. G., De Clercq, B., Decuyper, M., & Mervielde, I. (2006). Five types of personality continuity in childhood and adolescence. *Journal of Personality and Social Psychology, 91*(3), 538–552.
- Dimitrov, D. M. (2010). Testing for factorial invariance in the context of construct validation. *Measurement and Evaluation in Counseling and Development, 43*(2), 121–149.
- Durrett, C., & Westen, D. (2005). The structure of Axis II disorders in adolescents: a cluster- and factor-analytic investigation of DSM-IV categories and criteria. *Journal of Personality Disorders, 19*(4), 440–461.
- Ebner-Priemer, U. W., Eid, M., Kleindienst, N., Stabenow, S., & Trull, T. J. (2009). Analytic strategies for understanding affective (in)stability and other dynamic processes in psychopathology. *Journal of Abnormal Psychology, 118*(1), 195–202.
- Eid, M. (2000). A multitrait-multimethod model with minimal assumptions. *Psychometrika, 65*(2), 241–261.
- Eid, M., & Diener, E. (2006). Introduction: the need for multimethod measurement in psychology. In M. Eid, & E. Diener (Eds.), *Handbook of multimethod measurement in psychology* (pp. 3–8). Washington, DC: American Psychological Association.

- Eid, M., Lischetzke, T., & Nussbeck, F. W. (2006). Structural equation models for multitrait-multimethod data. In M. Eid, & E. Diener (Eds.), *Handbook of multimethod measurement in psychology* (pp. 283–299). Washington, DC: American Psychological Association.
- Eid, M., Lischetzke, T., Nussbeck, F. W., & Trierweiler, L. I. (2003). Separating trait effects from trait-specific method effects in multitrait-multimethod models: a multiple-indicator CT-C (M-1) model. *Psychological Methods, 8*(1), 38–60.
- Eid, M., Nussbeck, F. W., Geiser, C., Cole, D. A., Gollwitzer, M., & Lischetzke, T. (2008). Structural equation modeling of multitrait-multimethod data: different models for different types of methods. *Psychological Methods, 13*(3), 230–253.
- Enders, C. K., & Tofghi, D. (2008). The impact of misspecifying class-specific residual variances in growth mixture models. *Structural Equation Modeling, 15*(1), 75–95.
- Ferrer, E., & McArdle, J. J. (2010). Longitudinal modeling of developmental changes in psychological research. *Current Directions in Psychological Science, 19*(3), 149–154.
- Fischer, R., Ferreira, M. C., Assmar, E., Redford, P., Harb, C., Glazer, S., & Achoui, M. (2009). Individualism-collectivism as descriptive norms: development of a subjective norm approach to culture measurement. *Journal of Cross-Cultural Psychology, 40*(2), 187–213.
- Fontaine, J. (2005). Equivalence. In K. Kempf-Leonard (Ed.), *Encyclopedia of social measurement* (pp. 803–813). (Vol. 1). Amsterdam, Holland: Elsevier.
- Fossati, A., Beauchaine, T. P., Grazioli, F., Borroni, S., Carretta, I., De Vecchi, C., & Maffei, C. (2006). Confirmatory factor analysis of DSM-IV Cluster C personality disorder criteria. *Journal of Personality Disorders, 20*(2), 186–203.
- Fossati, A., Maffei, C., Bagnato, M., Battaglia, M., Donati, D., Donini, M., & Prolo, F. (2000). Patterns of covariation of DSM-IV personality disorders in a mixed psychiatric sample. *Comprehensive Psychiatry, 41*(3), 206–215.
- Frangakis, C. E., & Rubin, D. B. (2002). Principal stratification in causal inference. *Biometrics, 58*(1), 21–29.
- Freeman, L. C. (1978/1979). Centrality in social networks: conceptual clarification. *Social Networks, 1*(3), 215–239.
- Fried, E. I., Bockting, C., Arjadi, R., Borsboom, D., Amshoff, M., Cramer, A. O. J., & Stroebe, M. (2015). From loss to loneliness: the relationship between bereavement and depressive symptoms. *Journal of Abnormal Psychology, 124*(2), 256–265.
- Gawronski, B., & Bodenhausen, G. V. (2014). *Theory and explanation in social psychology*. New York, NY: Guilford Press.
- Geiser, C., Eid, M., Nussbeck, F. W., Courvoisier, D. S., & Cole, D. A. (2010). Multitrait-multimethod change modelling. *ASTA Advances in Statistical Analysis, 94*(2), 185–201.
- Goodman, L. A. (1974). Exploratory latent structure analysis using both identifiable and unidentifiable models. *Biometrika, 61*(2), 215–231.
- Grice, J. W. (2001). Computing and evaluating factor scores. *Psychological Methods, 6*(4), 430–450.
- Haberman, S. J. (1979). *Analysis of qualitative data. Vol. 2: New developments*. New York, NY: Academic Press.
- Haberman, S., Sinharay, S., & Puhon, G. (2009). Reporting subscores for institutions. *British Journal of Mathematical and Statistical Psychology, 62*(1), 79–95.
- Hagenaars, J. A. (1990). *Categorical longitudinal data: Log-linear panel, trend, and cohort analysis*. Newbury Park, CA: Sage.
- Hagenaars, J. A., & McCutcheon, A. (2002). *Applied latent class analysis*. Cambridge: Cambridge University Press.
- Hallquist, M. N., & Lenzenweger, M. F. (2013). Identifying latent trajectories of personality disorder symptom change: growth mixture modeling in the longitudinal study of personality disorders. *Journal of Abnormal Psychology, 122*(1), 138–155.
- Hallquist, M. N., & Wright, A. G. C. (2014). Mixture modeling methods for the assessment of normal and abnormal personality, part 1: cross-sectional models. *Journal of Personality Assessment, 96*(3), 256–268.
- Hancock, G. R., & Mueller, R. O. (2001). Rethinking construct reliability within latent variable systems. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural equation modeling: Present and future* (pp. 195–216). Lincolnwood, IL: Scientific Software International.
- Heckman, J., Pinto, R., & Savelyev, P. (2013). Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *American Economic Review, 103*(6), 2052–2086.
- Heck, R. H., Thomas, S. L., & Tabata, L. N. (2013). *Multilevel and longitudinal modeling with IBM SPSS*. New York, NY: Routledge.
- Henry, K. L., & Muthén, B. O. (2010). Multilevel latent class analysis: an application of adolescent smoking typologies with individual and contextual predictors. *Structural Equation Modeling, 17*(2), 193–215.
- Hertzog, C., & Nesselroade, J. R. (2003). Assessing psychological change in adulthood: an overview of methodological issues. *Psychology and Aging, 18*(4), 639–657.
- Holland, P. W. (1988). Causal inference, path analysis, and recursive structural equation models. *Sociological Methodology, 18*, 449–484.
- Huprich, S. K., Schmitt, T. A., Richard, D. C. S., Chelminski, I., & Zimmerman, M. A. (2010). Comparing factor analytic models of the DSM-IV personality disorders. *Personality Disorders: Theory, Research, and Treatment, 1*(1), 22–37.
- Jackson, J. J., Thoemmes, F., Jonkmann, K., Lüdtke, O., & Trautwein, U. (2012). Military training and personality trait development: does the military make the man, or does the man make the military? *Psychological Science, 23*(3), 270–277.
- Jo, B. (2008). Causal inference in randomized experiments with mediational processes. *Psychological Methods, 13*(4), 314–336.
- Johnson, W., Hicks, B. M., McGue, M., & Iacono, W. G. (2007). Most of the girls are alright, but some aren't: personality trajectory groups from ages 14 to 24 and some associations with outcomes. *Journal of Personality and Social Psychology, 93*(2), 266–284.
- Jöreskog, K. G. (1971). Statistical analysis of sets of congeneric tests. *Psychometrika, 36*(2), 109–133.
- Jöreskog, K. G., & Goldberger, A. S. (1975). Estimation of a model with multiple indicators and multiple causes of a single latent variable. *Journal of the American Statistical Association, 70*(351), 631–639.
- Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass, 2*(1), 302–317.
- Kamata, A., & Bauer, D. J. (2008). A note on the relation between factor analytic and item response theory models. *Structural Equation Modeling: A Multidisciplinary Journal, 15*(1), 136–153.

- Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, 3, 1–27.
- Kendler, K. S., Zachar, P., & Craver, C. (2011). What kinds of things are psychiatric disorders? *Psychological Medicine*, 41(6), 1143–1150.
- Klimstra, T. A., Hale, W. W., III, Raaijmakers, Q. A., Branje, S. J., & Meeus, W. H. (2009). Maturation of personality in adolescence. *Journal of Personality and Social Psychology*, 96(4), 898–912.
- Knott, M., & Bartholomew, D. J. (1999). *Latent variable models and factor analysis* (2nd ed.). London: Edward Arnold.
- Koch, T. (2013). *Multilevel structural equation modeling of multitrait-multimethod-multioccasion data*. Berlin, Germany: Freie Universität, Available from: http://www.diss.fu-berlin.de/diss/receive/FUDISS_thesis_00000094645.
- Koch, T., Schultze, M., Eid, M., & Geiser, C. (2014). A longitudinal multilevel CFA-MTMM model for interchangeable and structurally different methods. *Frontiers in Psychology*, 5, 311.
- Kuppens, P., Oravecz, Z., & Tuerlinckx, F. (2010). Feelings change: accounting for individual differences in the temporal dynamics of affect. *Journal of Personality and Social Psychology*, 99(6), 1042–1060.
- Kyriakopoulos, M., Stringaris, A., Manolesou, S., Radobuljac, M. D., Jacobs, B., Reichenberg, A., & Frangou, S. (2015). Determination of psychosis-related clinical profiles in children with autism spectrum disorders using latent class analysis. *European Child & Adolescent Psychiatry*, 24(3), 301–307.
- Lazarsfeld, P. F. (1950). The logical and mathematical foundation of latent structure analysis. In S. A. Stouffer, L. Guttman, E. A. Suchman, P. F. Lazarsfeld, S. A. Star, & J. A. Clausen (Eds.), *Measurement and prediction* (pp. 361–412). Princeton, NJ: Princeton University Press.
- Lincoln, K. D., & Takeuchi, D. T. (2010). Variation in the trajectories of depressive symptoms: results from the Americans' Changing Lives Study. *Biodemography and Social Biology*, 56(1), 24–41.
- Little, T. D. (2013). *Longitudinal structural equation modeling*. New York, NY: Guilford Press.
- Littlefield, A. K., Sher, K. J., & Wood, P. K. (2010). Do changes in drinking motives mediate the relation between personality changes and “maturing out” of problem drinking? *Journal of Abnormal Psychology*, 119(1), 93–105.
- Lubke, G. H., & Muthén, B. O. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods*, 10(1), 21–39.
- Lubke, G. H., Muthén, B. O., Moilanen, I. K., McGough, J. J., Loo, S. K., Swanson, J. M., & Smalley, S. L. (2007). Subtypes versus severity differences in attention-deficit/hyperactivity disorder in the Northern Finnish birth cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46(12), 1584–1593.
- MacKinnon, D. P. (2008). Introduction to statistical mediation analysis. *Multivariate applications series*. New York, NY: Taylor & Francis Group/Lawrence Erlbaum.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, 58, 593–614.
- MacKinnon, D. P., Lockhart, G., Baraldi, A. N., & Gelfand, L. A. (2013). Evaluating treatment mediators and moderators. In J. S. Comer, & P. C. Kendall (Eds.), *The Oxford handbook of research strategies for clinical psychology* (pp. 262–286). New York, NY: Oxford University Press.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: distribution of the product and resampling methods. *Multivariate Behavioral Research*, 39(1), 99–128.
- MacKinnon, D. P., & Pirlott, A. G. (2015). Statistical approaches for enhancing causal interpretation of the M to Y relation in mediation analysis. *Personality and Social Psychology Review*, 19(1), 30–43.
- Malone, P. S., Van Eck, K., Flory, K., & Lamis, D. A. (2010). A mixture-model approach to linking ADHD to adolescent onset of illicit drug use. *Developmental Psychology*, 46(6), 1543–1555.
- Marsh, H. W., Lüdtke, O., Muthén, B. O., Asparouhov, T., Morin, A. J. S., Trautwein, U., & Nagengast, B. (2010). A new look at the big five factor structure through exploratory structural equation modeling. *Psychological Assessment*, 22(3), 471–491.
- Marsh, H. W., Morin, A. J. S., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modelling: an integration of the best features of exploratory and confirmatory factor analyses. *Annual Review of Clinical Psychology*, 10, 85–110.
- Marsh, H. W., Nagengast, B., Morin, A. J. S., Parada, R. H., Craven, R. G., & Hamilton, L. R. (2011). Construct validity of the multidimensional structure of bullying and victimization: an application of exploratory structural equation modeling. *Journal of Educational Psychology*, 103(3), 701–732.
- Marsh, H. W., Tracey, D. K., & Craven, R. G. (2006). Multidimensional self-concept structure for preadolescents with mild intellectual disabilities: a hybrid multigroup-MIMC approach to factorial invariance and latent mean differences. *Educational and Psychological Measurement*, 66(5), 795–818.
- Masyn, K. E., Henderson, C. E., & Greenbaum, P. E. (2010). Exploring the latent structures of psychological constructs in social development using the dimensional-categorical spectrum. *Social Development*, 19(3), 470–493.
- McArdle, J. J. (2001). A latent difference score approach to longitudinal dynamic structural analyses. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural equation modeling: Present and future* (pp. 342–380). Lincolnwood, IL: Scientific Software International.
- McDonald, R. A., Seifert, C. F., Lorenzet, S. J., Givens, S., & Jaccard, J. (2002). The effectiveness of methods for analyzing multivariate factorial data. *Organizational Research Methods*, 5(3), 255–274.
- McGlashan, T. H., Grilo, C. M., Sanislow, C. A., Ralevski, E., Morey, L. C., Gunderson, J. G., & Pagano, M. (2005). Two-year prevalence and stability of individual DSM-IV criteria for schizotypal, borderline, avoidant, and obsessive-compulsive personality disorders: toward a hybrid model of Axis II disorders. *American Journal of Psychiatry*, 162(5), 883–889.
- McLachlan, G. J., & Peel, D. (2000). *Finite mixture models*. New York, NY: Wiley.
- McNally, R. J. (2016). Can network analysis transform psychopathology? *Behaviour Research and Therapy*, 86, 95–104.
- McNally, R. J., Mair, P., Mugno, B. L., & Riemann, B. C. (2016, May). Comorbid obsessive-compulsive disorder and depression: a network analytic perspective. In C. D. van Borkulo & A. O. Cramer (Co-Chairs), *Mental disorders: What are they and how do they behave from a network perspective?* Symposium conducted at the meeting of the Association of Psychological Science, Chicago, IL.
- McNally, R. J., Robinaugh, D. J., Wu, G. W. Y., Wang, L., Deserno, M., & Borsboom, D. (2015). Mental disorders as causal systems: a network approach to posttraumatic stress disorder. *Clinical Psychological Science*, 3(6), 836–849.

- Meade, A. W., & Lautenschlager, G. J. (2004). A comparison of item response theory and confirmatory factor analytic methodologies for establishing measurement equivalence/invariance. *Organizational Research Methods*, 7(4), 361–388.
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58(4), 525–543.
- Milfont, T. L., Duckitt, J., & Wagner, C. (2010). The higher order structure of environmental attitudes: a cross-cultural examination. *Revista Interamericana de Psicología*, 44(2), 263–273 Available from: <http://www.redalyc.org/pdf/284/28420641007.pdf>.
- Millsap, R. E., & Meredith, W. (2007). Factorial invariance: historical perspectives and new problems. In R. Cudeck, & R. C. MacCallum (Eds.), *Factor analysis at 100: Historical developments and future directions* (pp. 131–152). Mahwah, NJ: Lawrence Erlbaum.
- Millsap, R. E., & Yun-Tein, J. (2004). Assessing factorial invariance in ordered-categorical measures. *Multivariate Behavioral Research*, 39(3), 479–515.
- Morin, A. J. S., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation modeling framework for the identification of distinct sources of construct-relevant psychometric multidimensionality. *Structural Equation Modeling: A Multidisciplinary Journal*, 23(1), 116–139.
- Morin, A. J. S., Marsh, H. W., & Nagengast, B. (2013). Exploratory structural equation modeling. In G. R. Hancock, & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (2nd ed., pp. 395–436). Charlotte, NC: Information Age Publishing.
- Murray, A. L., & Johnson, W. (2013). The limitations of model fit in comparing the bi-factor versus higher-order models of human cognitive ability structure. *Intelligence*, 41(4), 407–422.
- Muthén, B. O. (2001). Latent variable mixture modeling. In G. A. Marcoulides, & R. E. Schumacker (Eds.), *New developments and techniques in structural equation modeling* (pp. 1–33). Mahwah, NJ: Lawrence Erlbaum.
- Muthén, B. O. (2008). Latent variable hybrids: overview of old and new models. In G. R. Hancock, & K. M. Samuelsen (Eds.), *Advances in latent variable mixture models* (pp. 1–24). Charlotte, NC: Information Age Publishing.
- Muthén, L. K., & Muthén, B. O. (1998–2010). *Mplus user's guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Nadorff, M. R., Anestis, M. D., Nazem, S., Harris, H. C., & Winer, E. S. (2014). Sleep disorders and the interpersonal-psychological theory of suicide: independent pathways to suicidality? *Journal of Affective Disorders*, 152–154, 505–512.
- Nagin, D. S. (2005). *Group-based modeling of development*. Cambridge, MA: Harvard University Press.
- Normand, S., Flora, D. B., Toplak, M. E., & Tannock, R. (2012). Evidence for a general ADHD factor from a longitudinal general school population study. *Journal of Abnormal Child Psychology*, 40(4), 555–567.
- Pearl, J. (2011). The mathematics of causal relations. In P. E. Shrouf, K. M. Keyes, & K. Ornstein (Eds.), *Causality and psychopathology: Finding the determinants of disorders and their cures* (pp. 47–65). Oxford: Oxford University Press.
- Preacher, K. J. (2015). Advances in mediation analysis: a survey and synthesis of new developments. *Annual Review of Psychology*, 66, 825–852.
- Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures*, 6(2), 77–98.
- Ram, N., & Grimm, K. J. (2009). Growth mixture modeling: a method for identifying differences in longitudinal change among unobserved groups. *International Journal of Behavioral Development*, 33(6), 565–576.
- Raykov, T. (2001). Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. *British Journal of Mathematical and Statistical Psychology*, 54(2), 315–323.
- Reise, S. P. (2012). The rediscovery of bifactor measurement models. *Multivariate Behavioral Research*, 47(5), 667–696.
- Reise, S. P., Moore, T. M., & Haviland, M. G. (2013a). Applying unidimensional item response theory models to psychological data. In K. F. Geisinger, B. A. Bracken, J. F. Carlson, J. I. C. Hansen, N. R. Kuncel, S. P. Reise, & M. C. Rodriguez (Eds.), *APA handbook of testing and assessment in psychology, Vol. 1: Test theory and testing and assessment in industrial and organizational psychology* (pp. 101–119). Washington, DC: American Psychological Association.
- Reise, S. P., Scheines, R., Widaman, K. F., & Haviland, M. G. (2013b). Multidimensionality and structural coefficient bias in structural equation modeling: a bifactor perspective. *Educational and Psychological Measurement*, 73(1), 5–26.
- Revelle, W., & Zinbarg, R. E. (2009). Coefficients alpha, beta, omega, and the GLB: comments on Sijtsma. *Psychometrika*, 74(1), 145–154.
- Roberts, B. W., & Mroczek, D. (2008). Personality trait change in adulthood. *Current Directions in Psychological Science*, 17(1), 31–35.
- Roberts, B. W., Wood, D., & Smith, J. L. (2005). Evaluating five factor theory and social investment perspectives on personality trait development. *Journal of Research in Personality*, 39(1), 166–184.
- Robins, J. M., Hernán, M. A., & Brumback, B. (2000). Marginal structural models and causal inference in epidemiology. *Epidemiology*, 11(5), 550–560.
- Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Applying bifactor statistical indices in the evaluation of psychological measures. *Journal of Personality Assessment*, 98(3), 223–237.
- Roth, D. L., & MacKinnon, D. P. (2012). Mediation analysis with longitudinal data. In J. T. Newsom, R. N. Jones, & S. M. Hofer (Eds.), *Longitudinal data analysis: A practical guide for researchers in aging, health, and social sciences* (pp. 181–216). New York, NY: Routledge/Taylor & Francis Group.
- Sass, D. A. (2011). Testing measurement invariance and comparing latent factor means within a confirmatory factor analysis framework. *Journal of Psychoeducational Assessment*, 29(4), 347–363.
- Saxe, G. N., Statnikov, A., Fenyo, D., Ren, J., Li, Z., Prasad, M., & Aliferis, C. (2016). A complex systems approach to causal discovery in psychiatry. *PLoS One*, 11(3), e0151174.
- Selig, J. P., & Preacher, K. J. (2009). Mediation models for longitudinal data in developmental research. *Research in Human Development*, 6(2–3), 144–164.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological Methods*, 7(4), 422–445.
- Sijtsma, K. (2009). On the use, the misuse, and the very limited usefulness of Cronbach's alpha. *Psychometrika*, 74(1), 107–120.

- Sijtsma, K., & Molenaar, I. W. (2002). *Introduction to nonparametric item response theory*. Thousand Oaks, CA: Sage.
- Skodol, A. E., Gunderson, J. G., Shea, M. T., McGlashan, T. H., Morey, L. C., Sanislow, C. A., & Stout, R. L. (2005). The Collaborative Longitudinal Personality Disorders Study (CLPS): overview and implications. *Journal of Personality Disorders, 19*(5), 487–504.
- Sobel, M. E. (2008). Identification of causal parameters in randomized studies with mediating variables. *Journal of Educational and Behavioral Statistics, 33*(2), 230–251.
- Sprong, M., Becker, H. E., Schothorst, P. F., Swaab, H., Ziermans, T. B., Dingemans, P. M., & van Engeland, H. (2008). Pathways to psychosis: a comparison of the pervasive developmental disorder subtype multiple complex developmental disorder and the “at risk mental state”. *Schizophrenia Research, 99*(1–3), 38–47.
- Stahl, D., & Sallis, H. (2012). Model-based cluster analysis. *WIREs Computational Statistics, 4*(4), 341–358.
- Stark, S., Chernyshenko, O. S., & Drasgow, F. (2006). Detecting differential item functioning with confirmatory factor analysis and item response theory: toward a unified strategy. *Journal of Applied Psychology, 91*(6), 1292–1306.
- Steele, F. (2008). Multilevel models for D. *Journal of the Royal Statistical Society, Series A: Statistics in Society, 171*(1), 5–19.
- Steyer, R. (2005). Analyzing individual and average causal effects via structural equation models. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences, 1*(1), 39–54.
- Steyer, R., & Eid, M. (2001). *Messen und Testen* (2nd ed.). Berlin Heidelberg, Germany: Springer.
- Strahan, R., & Gerbasi, K. C. (1972). Short, homogenous versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28*(2), 191–193.
- Stringaris, A., Stahl, D., Santosh, P., & Goodman, R. (2011). Dimensions and latent classes of episodic mania-like symptoms in youth: an empirical enquiry. *Journal of Abnormal Child Psychology, 39*(7), 925–937.
- Stucky, B. D., & Edelen, M. O. (2014). Using hierarchical IRT models to create unidimensional measures from multidimensional data. In S. P. Reise, & D. A. Revicki (Eds.), *Handbook of item response theory modeling: Applications to typical performance assessment* (pp. 183–206). New York, NY: Routledge/Taylor & Francis Group.
- Stucky, B. D., Thissen, D., & Edelen, M. O. (2013). Using logistic approximations of marginal trace lines to develop short assessments. *Applied Psychological Measurement, 37*(1), 41–57.
- Teh, Y. W., Seeger, M., & Jordan, M. I. (2005, January). Semiparametric latent factor models. In: *Proceedings of the 10th International Workshop on Artificial Intelligence, Statistics, AISTATS 2005* (pp. 333–340). Available from: <https://people.eecs.berkeley.edu/~jordan/papers/teh-seeger-jordan04.pdf>
- Toplak, M. E., Pitch, A., Flora, D. B., Iwenofu, L., Ghelani, K., Jain, U., & Tannock, R. (2009). The unity and diversity of inattention and hyperactivity/impulsivity in ADHD: evidence for a general factor with separable dimensions. *Journal of Abnormal Child Psychology, 37*(8), 1137–1150.
- Trull, T. J., Vergés, A., Wood, P. K., & Sher, K. J. (2013). The structure of DSM-IV-TR personality disorder diagnoses in NESARC: a reanalysis. *Journal of Personality Disorders, 27*(6), 727–734.
- van de Vijver, F. J. R., & Fischer, R. (2009). Improving methodological robustness in cross-cultural organizational research. In R. S. Bhagat, & R. M. Steers (Eds.), *Handbook of culture, organizations, and work* (pp. 491–517). Cambridge: Cambridge University Press.
- van de Vijver, F. J. R., & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Thousand Oaks, CA: Sage.
- van de Vijver, F. J. R., & Leung, K. (2000). Methodological issues in psychological research on culture. *Journal of Cross-Cultural Psychology, 31*(1), 33–51.
- van de Vijver, F. J. R., & Poortinga, Y. H. (2005). Conceptual and methodological issues in adapting tests. In R. K. Hambleton, P. F. Merenda, & C. D. Spielberger (Eds.), *Adapting educational and psychological tests for cross-cultural assessment* (pp. 39–63). Mahwah, NJ: Lawrence Erlbaum.
- van Kampen, D. (2014). The SSQ model of schizophrenic prodromal unfolding revised: an analysis of its causal chains based on the language of directed graphs. *European Psychiatry, 29*(7), 437–448.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*(1), 4–69.
- Verbeke, G., & Molenberghs, G. (2000). *Linear mixed models for longitudinal data*. New York, NY: Springer.
- Verbeke, G., Spiessens, B., & Lesaffre, E. (2001). Conditional linear mixed models. *American Statistician, 55*(1), 25–34.
- Vermunt, J. K. (1997). *LEM: A general program for the analysis of categorical data*. Tilburg, The Netherlands: Tilburg University.
- Vermunt, J. K. (2003). Multilevel latent class models. *Sociological Methodology, 33*(1), 213–239.
- Vermunt, J. K. (2008). Latent class and finite mixture models for multilevel data sets. *Statistical Methods in Medical Research, 17*(1), 33–51.
- Wagner, F., Martel, M. M., Cogo-Moreira, H., Maia, C. R. M., Pan, P. M., Rohde, L. A., & Salum, G. A. (2015). Attention-deficit/hyperactivity disorder dimensionality: the reliable “g” and the elusive “s” dimensions. *European Child & Adolescent Psychiatry, 25*(1), 83–90.
- Weisbrot, D. M., Gadow, K. D., DeVincent, C. J., & Pomeroy, J. (2005). The presentation of anxiety in children with pervasive developmental disorders. *Journal of Child and Adolescent Psychopharmacology, 15*(3), 477–496.
- West, S. G., Ryu, E., Kwok, O. M., & Cham, H. (2011). Multilevel modeling: current and future applications in personality research. *Journal of Personality, 79*(1), 2–50.
- Widaman, K. F., Ferrer, E., & Conger, R. D. (2010). Factorial invariance within longitudinal structural equation models: measuring the same construct across time. *Child Development Perspectives, 4*(1), 10–18.
- Widiger, T. A., & Trull, T. J. (2007). Plate tectonics in the classification of personality disorder: shifting to a dimensional model. *American Psychologist, 62*(2), 71–83.
- Willoughby, M. T., & Blanton, Z. E. & the Family Life Project Investigators. (2015). Replication and external validation of a bi-factor parameterization of attention deficit/hyperactivity symptomatology. *Journal of Clinical Child and Adolescent Psychology, 44*(1), 68–79.
- Winer, E. S., Cervone, D., Bryant, J., McKinney, C., Liu, R. T., & Nadorff, M. R. (2016). Distinguishing mediational models and analyses in clinical psychology: atemporal associations do not imply causation. *Journal of Clinical Psychology, 72*(9), 947–955.

- Winer, E. S., Veilleux, J. C., & Ginger, E. J. (2014). Development and validation of the Specific Loss of Interest and Pleasure Scale (SLIPS). *Journal of Affective Disorders, 152–154*, 193–201.
- Wright, A. G. C., & Hallquist, M. N. (2014). Mixture modeling methods for the assessment of normal and abnormal personality part II: longitudinal models. *Journal of Personality Assessment, 96*(3), 269–282.
- Wright, A. G. C., Pincus, A. L., & Lenzenweger, M. F. (2012). Interpersonal development, stability, and change in early adulthood. *Journal of Personality, 80*(5), 1339–1372.
- Wright, A. G. C., & Zimmermann, J. (2015). At the nexus of science and practice: answering basic clinical questions in personality disorder assessment and diagnosis with quantitative modeling techniques. In S. K. Huprich (Ed.), *Personality disorders: Toward theoretical and empirical integration in diagnosis and assessment* (pp. 109–144). Washington, DC: American Psychological Association.
- Yuan, Y., & MacKinnon, D. P. (2009). Bayesian mediation analysis. *Psychological Methods, 14*(4), 301–322.
- Zanarini, M. C., Frankenburg, F. R., Hennen, J., Reich, D. B., & Silk, K. R. (2005). The McLean Study of Adult Development (MSAD): overview and implications of the first six years of prospective follow-up. *Journal of Personality Disorders, 19*(5), 505–523.
- Zanarini, M. C., Frankenburg, F. R., Hennen, J., Reich, D. B., & Silk, K. R. (2006). Prediction of the 10-year course of borderline personality disorder. *American Journal of Psychiatry, 163*(5), 827–832.
- Zimmerman, D. W. (1975). Probability spaces, Hilbert spaces, and the axioms of test theory. *Psychometrika, 40*(3), 395–412.

Chapter 5

Executive Function, Theory of Mind, and Adaptive Behavior

Chapter Outline

| | | | |
|---|------------|---|------------|
| Executive function | 91 | Measures of adaptive behavior | 114 |
| The assessment of executive function | 93 | Adaptive behavioral assessment system, 2nd edition | 114 |
| Cognitive flexibility and set shifting | 94 | Scales of independent behavior–revised | 114 |
| Measures of cognitive flexibility/set shifting | 94 | Vineland adaptive behavior scales, 2nd edition | |
| Response inhibition | 95 | (VABS-II) | 115 |
| Working memory | 95 | The diagnostic adaptive behavior scale (DABS) | 115 |
| Comprehensive measures of executive function | 97 | Behavior assessment system for children | 115 |
| Empirical research on executive function | 99 | Performance measures | 116 |
| Theory of mind and mindblindness theory | 101 | Empirical studies | 116 |
| The relationship between theory of mind | | Conceptual reasoning, problem solving, and adaptive | |
| and relational frame theory | 102 | ability in ASD | 116 |
| Developmental functions of ToM | 102 | Association between ADHD and ASD | 117 |
| ToM across the life span advancement | 103 | Comparison of adaptive behavior measures | |
| The reciprocal relationship between executive | | for children with HFASDs | 117 |
| functions and theory of mind | 106 | Longitudinal studies of adaptive behavior | |
| The assessment of ToM | 106 | and executive functions in ASD | 118 |
| ASD and ToM | 109 | Adaptive functioning and IQ in schizophrenia | |
| ToM as a severity index in ASD | 109 | spectrum disorders | 118 |
| ToM assessment measures for ASD disorders | 110 | Summary | 118 |
| Historical background of adaptive behavior | 111 | References | 119 |
| Meanings of intelligence and adaptive behavior | 112 | | |
| Adaptive behavior, executive function, and ASD | 113 | | |

EXECUTIVE FUNCTION

Executive functions (EFs) are higher-level cognitive processes that allow us to respond in an adaptive manner to the environment: to break out of habits, make decisions and evaluate risks, plan for the future, prioritize and sequence actions, and cope with novel situations. According to [Lezak, Howieson, Bigler, and Tranel \(2012\)](#), EFs consist of several processes: (1) anticipation and deployment of attention, (2) impulse control and self-regulation, (3) initiation of action, (4) working memory (WM), (5) mental flexibility and utilization of feedback, (6) planning ability and organization, (7) selection of efficient problem-solving strategies, and (8) monitoring of performance ([Anderson, 2008](#)). EFs are essential for dealing successfully with daily activities. Impairments in EFs have serious consequences, which may be as important to quality of life and functional outcomes as affective symptoms.

The Executive Control System ([Fig. 5.1](#); [Anderson, 2002](#)) is a conceptual framework largely influenced by factor analytic and developmental studies (e.g., [Brocki & Bohlin, 2004](#)). It conceptualizes EF as an overall control system that consists of four distinct domains: *attentional control*, *cognitive flexibility*, *goal setting*, and *information processing*.

Moreover, this model defines three key aspects of EFs: (1) working memory capacity (WMC), which plays a primary role determining people's ability to resist the influence of visual distractors in various cognitive tasks ([Kane, Bleckley, Conway, & Engle, 2001](#)), (2) shifting (between tasks or mental sets), and (3) inhibition or suppressing a prepotent response. Both theoretical speculations and empirical evidence (e.g., [Friedman et al., 2008](#); [Miyake et al., 2000](#)) suggest that, apart

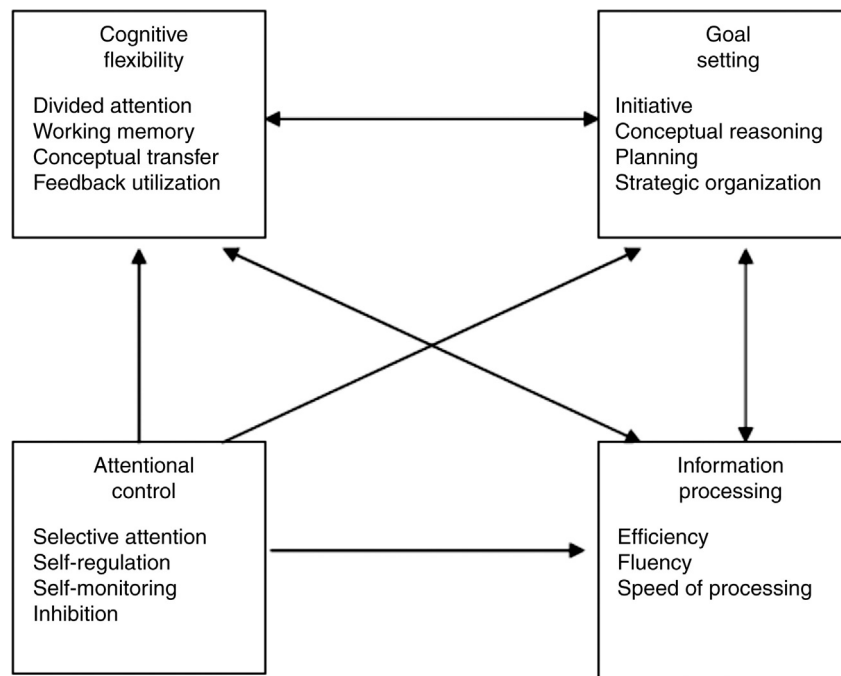


FIGURE 5.1 The executive control system. (Reprinted from Anderson, P. (2002). *Assessment and development of executive function (EF) during childhood*. *Child Neuropsychology*, 8(2), 71–82, with permission. Copyright 2002 by Taylor and Francis.)

from the several EF components, there is also a common mechanism across EFs. This common mechanism is the ability to maintain goal and context information in WM (Miyake et al., 2000). This view is compatible with theoretical implications of the underlying neurological substructure of EFs. These accounts highlight the central role of the frontal lobes to the active maintenance of goals, plans, and other task-relevant information in WM (e.g., Hazy, Frank, & O’Reilly, 2007). “Frontal lobe tasks” and EFs are often synonymously expressed in the literature, as EFs rely heavily on the prefrontal cortex. However, EF tasks are associated with broader neural networks, such as the posterior cortical and subcortical areas and their interconnections.

One influential model of EF is the *three-component model* (Friedman et al., 2008; Miyake et al., 2000). The three-component model describes three key aspects of EF: (1) *updating* (adding relevant information and removing no longer relevant information from WM), (2) *shifting* between tasks or mental sets, and (3) *inhibiting* prepotent responses, as well as a *common EF* component tapped by all EF tasks (and which may subsume inhibition) (Friedman et al., 2008).

Moreover, poor EF predicts rumination (e.g., Whitmer & Banich, 2007; De Lissnyder et al., 2012; Demeyer, De Lissnyder, Koster, & De Raedt, 2012; Zetsche, D’Avanzato, & Joormann, 2012), worry (Crowe, Matthews, & Walkenhorst, 2007; Snyder et al., 2010; Snyder et al., 2014), and poor use of adaptive emotion regulation strategies (e.g., reappraisal; McRae, Jacobs, Ray, John, & Gross, 2012; Andreotti et al., 2013), which are all potent risk factors for multiple forms of psychopathology (e.g., Ruscio et al., 2007; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Abela & Hankin, 2011; McLaughlin & Nolen-Hoeksema, 2011). Thus, it has been proposed that EF deficits may serve as transdiagnostic intermediate phenotypes or risk factors for emotional, behavioral, and psychotic disorders (e.g., Nolen-Hoeksema & Watkins, 2011; Buckholtz & Meyer-Lindenberg, 2012; Goschke, 2014).

Some authors (e.g., Chan, Shum, Touloupoulou, & Chen, 2008; McDonald, 2013) have proposed the EFs can be classified into “cold” and “hot” processes (Fig. 5.2). Cold processes are associated with the prefrontal cortical regions and include planning cognitive flexibility (CF), WM, behavioral monitoring, and inhibition (Chan et al., 2008). Hot processes are associated with the orbito-frontal cortices, and mobilize behaviors that are related to emotional awareness, for example, empathy and theory of mind (ToM).

McDonald, Flanagan, Rollins, and Kinch (2003) and McDonald et al. (2006) developed The Awareness of Social Inference Test (TASIT), a dynamic audiovisual assessment, to evaluate social cognition skills required during social interaction. Performance on social cognition measures, such as TASIT is likely to be influenced by both hot and cold EFs (McDonald et al., 2006).

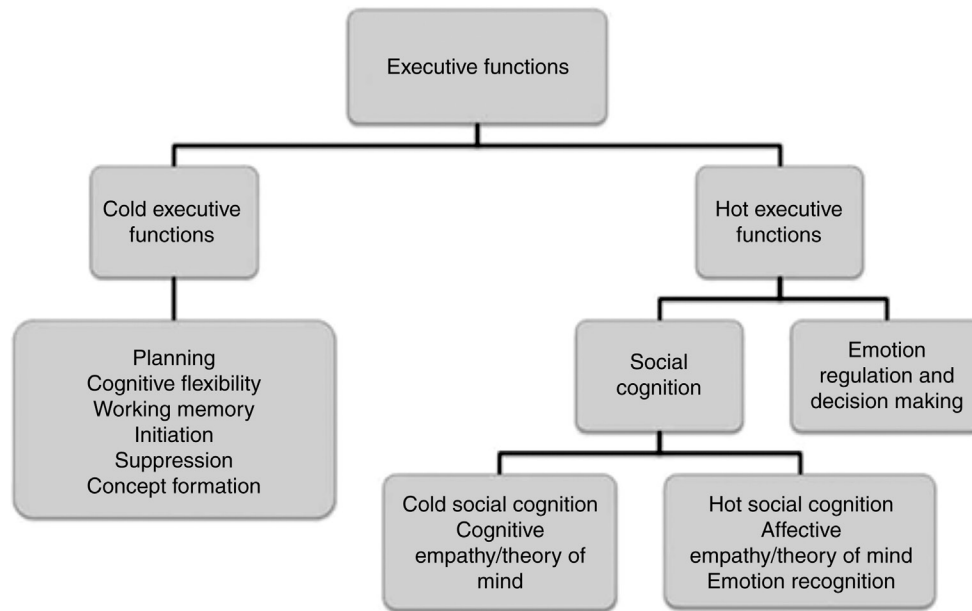


FIGURE 5.2 Framework of executive function processes. [Adapted from Chan, R. C., Shum, D., Touloupoulou, T., and Chen, E. Y. (2008). *Assessment of executive functions: review of instruments and identification of critical issues*. Archives of Clinical Neuropsychology, 23(2), 201–216; McDonald, S. (2013). *Impairments in social cognition following severe traumatic brain injury*. Journal of the International Neuropsychological Society, 19(03), 231–246. Reprinted from Zimmerman, D. L., Ownsworth, T., O’Donovan, A., Roberts, J., & Gullo, M. J. (2016). *Independence of hot and cold executive function deficits in high-functioning adults with autism spectrum disorder*. Frontiers in human neuroscience, 10, 24, with permission. Copyright 2016 by the authors (open access).]

THE ASSESSMENT OF EXECUTIVE FUNCTION

Traditionally, EF measures have included novel and complex tasks that involve the integration of information (Walsh, 1978). Such tasks require the examinee to focus, formulate a plan, and employ self-regulation. Most EF measures are multidimensional and thus examine multiple cognitive processes, both executive and nonexecutive (Anderson, 2002). Such multidimensionality complicates the differentiation among cognitive deficits. One approach to overcome this limitation is the incorporation of quantitative (e.g., success/failure, latency, number of errors, and so on), qualitative (e.g., motivation, attention, concentration, and so on), and cognitive (e.g., process, strategies, action, and so on.) methodologies (Anderson, 2002).

The variability in the assessment of EF is typically linked to the complexity of EF construct. Theoretically, EFs are conceptualized as a key domain-general cognitive process, and thus modality of assessment (e.g., verbal or visuospatial tasks) can restrain interpretation of results. Additionally, contextual variables may affect performance on EF tasks. For example, traditionally laboratory-based assessment when compared to real-world conditions might alter performance on EF tasks.

To address this problem, Parsons and Carlew (2016) provide an example of controlling modern technology to allow for more dynamic assessment. Specifically, they utilized virtual reality to adapt a Stroop-like classroom-based task incorporating additional demands. They discovered that including distractions with the task (which may simulate the disturbing conditions of real-world contexts) elicits deficits in autism spectrum disorder (ASD), unlike a task without distractors.

There are a number of standardized neuropsychological tests that are widely used in both the clinical and research arenas to assess EF. Commonly used tests include the Wisconsin Card Sorting Test, Tower of London/Hanoi, Trail Making Test, Stroop, verbal fluency tasks, negative priming tests, intradimensional–extradimensional shift tests, and Go/No-Go tasks. Due to methodological limitations, these tasks have a number of measurement issues: (1) They often tap into multiple EF processes that cannot be disentangled; (2) they rely on both EF and non-EF processes; (3) they use cumulative/end point scores that do not measure the active processes of reasoning, problem solving, planning, and so forth; and (4) they have questionable ecological validity. As a result, people often perform inconsistently (i.e., low correlations among EF tasks and dissociations in performance) when assessed with a battery of several EF measures (Jurado & Rosselli, 2007).

Cognitive flexibility and set shifting

One component of EF is CF. It appears that cognitive inflexibility deficits are clearly related to a behavioral rigidity. Thus difficulties can be observed in modifying strategies during daily activities or adapting perspectives during social interactions. A general definition of CF refers to the ability to switch cognitive sets to adapt to environmental modifications or alterations (Dennis & Vander Wal, 2010).

Set shifting refers to the ability to shift back and forth between different tasks, and is considered one of the core functions of executive processes. The task switching becomes more stressful when the shift clashes with the proceeding set of responses (i.e., incongruent trials). Intermediate phenotypes encompass cognitive processes that serve as a link between the observed behavioral symptoms of neurodevelopmental and psychiatric disorders and the brain or genetic structure (Gottesman & Gould, 2003). Set shifting develops significantly across childhood, as children progress from following single rules to shifting between two competing sets of rules (e.g., Bunge & Zelazo, 2006; Chatham, Yerys, & Munakata, 2012). Successful set shifting is linked with adaptive and academic functioning in typical development and in children with ASD (e.g., Lopata et al., 2012; Pugliese et al., 2015). Accurate measurement of set shifting depends on accurate decomposition of the construct and its neural correlates (Yerys et al., 2015).

Measures of cognitive flexibility/set shifting

Review of literature reveals that the findings regarding CF deficits in individuals with autism are rather inconsistent, despite manifested behavioral inflexibility. Several self-report questionnaires have been developed to evaluate CF in an effort to provide less frustrating and more time-efficient measures that may provide more utility in a clinical setting (Dennis & Vander Wal, 2010). These include self-report questionnaires designed to measure CF using communication competence. According to Geurts, Corbett, and Solomon (2009), current measures cannot capture the multitude or complexity of environmental factors that affect an individual with autism behavior in daily life. They suggest the use of ecologically valid measures that could also help in consolidating the associations between observed behavior and measured CF. More specifically, they propose that “isolating the crucial cognitive processes while considering influential bottom up processes will aid in ultimately resolving the paradox between behavioral and cognitive inflexibility in autism” (p. 81).

The Intradimensional/Extradimensional (ID/ED) Shift Test From the Cambridge Neuropsychological Test Automated Battery

The Intradimensional/Extradimensional (ID/ED) test measures flexibility in a systematic fashion that allows for controlled increases in shifting demands (Cambridge Cognition, 1996). It consists of nine stages, which encompass three types of tasks: (1) simple object discrimination; (2) shifting within a single dimension (e.g., shape: ID shift); and (3) shifting attention from one dimension to another (e.g., ignore shape and attend to previously ignored line: ED shift). Embedded in ID and ED shifting is a reversal shift that requires participants to maintain the same rule but select an alternate exemplar. Success on the ID/ED test is measured both by the ability to pass a stage (number of stages completed) and by the number of errors made while passing a stage (errors to criterion).

Wisconsin Card Sorting Test (WCST)

The Wisconsin Card Sorting Test (WCST) is a neuropsychological test that is frequently used to measure such higher-level cognitive processes as attention, perseverance, WM, abstract thinking, CF, and set shifting. It is particularly used in clinical fields to measure perseverative behaviors that refer to an individual's insistence on wrong behavior. Moreover, to be able to change category, one needs to have high intellectual flexibility and ability in concept formation.

The WCST consists of two card packs having four stimulus cards and 64 response cards in each. Each card measures 7×7 cm, and there are various geometric shapes in different colors and numbers. The participants are expected to accurately sort every response card with one of four stimulus cards through the feedback (right or wrong) given to them based on a rule. Among various versions, the version of WCST with 128 cards developed by Heaton was used in this study. The test was applied individually, and 12 scores were obtained (Heaton, Chelune, Talley, Kay, & Curtis, 1993). A reliability study could not be conducted due to the nature of the test. The validity studies, on the other hand, were conducted on both sick and healthy groups, and it was shown that the test was valid for a Turkish sample (Kafadar, 2004).

Response inhibition

Response inhibition, the ability to suppress prepotent behavior that is inappropriate or no longer required, is critical for goal-directed behavior in everyday life (Chambers, Garavan, & Bellgrove, 2009). Inhibition is the most commonly assessed EF process with regard to ASD and attention-deficit/hyperactivity disorder (ADHD). Response inhibition is commonly measured with some form of a continuous performance task that requires withholding a motor response. Findings from several studies (e.g., Lundervold et al., 2012; Yerys et al., 2009; Yerys, Kenworthy, Jankowski, Strang, & Wallace, 2013) suggest that ADHD symptoms may relate to poor performance on inhibition tasks in ASD. Taken together, the findings suggest that ADHD symptoms may be implicated as contributing to poor performance on inhibition tasks in ASD.

Response inhibition is considered an operationalization of certain aspects of impulsivity and compulsivity (Bari & Robbins, 2013). Response inhibition is not a unitary construct and consists of *motor response inhibition* and *interference control*. Motor response inhibition involves the inhibition of prepotent and automatic motor responses, and can be further differentiated into action restraint (or action suppression) and action cancellation (Schachar et al., 2007).

Measures

Stop-Signal Task and Stop-Signal Reaction Time

The stop-signal task is a widely used measure of response inhibition and the main dependent variable of the task, stop-signal reaction time (SSRT), provides an individualized measure of inhibitory control. Participants are presented with a series of Go stimuli to which they are instructed to respond quickly; for example, participants see a series of left- or rightward pointing arrows and are instructed to press the right button for a right arrow and a left button for a left arrow. On a subset of trials, the Go stimulus is followed, after a variable delay, by a stop signal (for example, a beep or an upward pointing arrow), to which participants are instructed to inhibit their response. The onset of the stop signal, or stop-signal delay (SSD), is varied and depends on the participant's performance, such that it is decreased after a previous failure to inhibit and increased after a previous inhibition (resulting in SSD staircases across the course of the task). This one-up/one-down tracking procedure ensures that participants inhibit on approximately half of all trials and controls for difficulty level across participants.

Go/No-Go Task Go and no-go trials of the task assess processing speed and response inhibition, respectively (e.g., Brocki & Bohlin, 2004). One of four shapes (circle, square, triangle, or diamond) is randomly designated as a nontarget for each participant. On each trial, a shape appears at the center of a screen and remains visible until the participant presses the space bar or 2000 ms elapse. Participants are instructed to respond as fast and as accurately as possible anytime a target shape appears (i.e., go trial) but to withhold their response whenever the nontarget shape appears (i.e., no-go trial). Feedback is provided after each response.

The Hayling Sentence Completion Test

The Hayling Sentence Completion Test (Burgess & Shallice, 1997) aims to detect difficulties in suppressing prepotent responses, and it consists of two parts. In the first part, the subject is required to complete the end of each sentence with a prepotent response to make a meaningful connection—for instance, responding with the word “ship” to the sentence “the captain went down with the sinking....” In the second part, in contrast, the testee is required to inhibit the prepotent response by providing irrelevant words to complete the given sentences. For example, responding with the word “cow” to the sentence “the captain went down with the sinking....” Therefore, the first part of the test is supposed to capture initiation, whereas the second part is supposed to measure suppression or inhibition.

Working memory

The term *working memory* (WM) has been shaped through the work of Baddeley and Hitch (1974), who proposed one of the most influential WM models in the last century. The concept of WM describes the temporary storage and manipulation of information as necessary for complex cognitive tasks like reasoning or language comprehension (Baddeley, 2000). The model includes a visuospatial sketchpad and a phonological loop, which are responsible for visual and verbal WM tasks, respectively. Another influential model in current experimental WM research has been proposed by Oberauer, Süß, Schulze, Wilhelm, and Wittmann (2000). These authors define their model of WM as a “set of limiting factors for performance in complex cognitive tasks.” They define two facets of an overall WM structure: (1) content and (2) function. The content facet comprises verbal numerical material and spatial material, whereas the functional facet is divided into the components “coordination,” “supervision,” and “simultaneous storage and processing.”

WM is one of the most influential theoretical constructs in cognitive psychology, and it has recently been included as a component of short-term memory. It involves temporary storage and manipulation of information, and the amount of information to be held is very limited. Numerous studies have demonstrated the relationship between WM and intelligence (e.g., Kane, Hambrick & Conway, 2005), as well as WM and EFs (McCabe, Roediger, McDaniel, Balota, & Hambrick, 2010). ToM deficits characterize neurodevelopmental disorders, such as schizophrenia, attention deficit disorder (ADD), Alzheimer's disease, and reading disability (e.g., Kane, Conway, Hambrick, & Engle, 2007).

During the past years, research has distinguished between two components of WM: the *scope* and the *control* of attention (Cowan et al., 2005). The scope of attention refers to the amount of information that can be actively maintained at a given time, whereas the control of attention refers to the ability to focus on relevant information and discard irrelevant information.

Classification of Working Memory Span Tasks

Complex span tasks (Daneman & Carpenter, 1980) follow a procedure that is similar to simple span tasks, with the exception that test takers are required to complete a simple processing task (e.g., mathematical operation, symmetry judgment) between the presentation of each item. In contrast to the simple span, the complex span has proven to be a reliable predictor of cognitive ability (Daneman & Merikle, 1996; Unsworth & Engle, 2007).

Schmiedek, Lövdén, and Lindenberger (2013) proposed the following classification of paradigms. First, the *memory updating* paradigm (Salthouse, Babcock, & Shaw, 1991) comprises tasks in which several elements (e.g., digits or spatial positions) have to be stored and then simultaneously be updated according to a series of operations (e.g., arithmetic operations or spatial movements), before the end results have to be recalled. Second, *sorting span* tasks require the storage of a list of elements (e.g., letters or objects) and the simultaneous ordering of them according to some dimension (e.g., alphabetical order or size). Third, *N-back* tasks require permanently updating memory to store the last *n* elements (e.g., digits or spatial positions) of a sequence and making decisions as to whether the most recent element matches that one *n* steps back in the sequence. What is common to the three paradigms is that they all require simultaneous storage and processing—that is, WM as commonly defined (e.g., Baddeley, 2007). They differ on a number of dimensions, such as the applicability of different strategies (e.g., Shing, Schmiedek, Lövdén, & Lindenberger, 2012), the different degrees to which familiarity information might be used (Oberauer, 2005), the different degrees to which shifting the focus of attention is required (Oberauer, 2003), and the involvement of retrieval processes from long-term memory (Unsworth & Engle, 2007).

N-Back Task

The *N-back* task was originally introduced by Kirchner (1958) as a visuospatial task with four load factors (“0-back” to “3-back”), and by Mackworth (1959) as a visual letter task with up to six load factors. *N-back* tasks are continuous-recognition measures that present stimulus sequences, such as letters or pictures; for each item in the sequence, people judge whether it matches the one presented *n* items ago.

The *N-back* task, which requires not only the storage and continual updating of information in WM, but also interference resolution, has been used widely in WM training studies that explore transfer to Gf. The *N-back* task involves serial presentation of a stimulus (e.g., a shape), spaced several seconds apart. The participant must decide whether the current stimulus matches the one displayed *n* trials ago, where *n* is a variable number that can be adjusted up or down to respectively increase or decrease cognitive load (Au et al., 2015). In the context of WM training, efforts have focused on flexibly adapting the task difficulty in accordance with the participant's fluctuating performance level by increasing and decreasing the level of *n*. The idea is to keep the participant's WM system continuously engaged at its limit, thereby stimulating an increase in WM function, which may then be converted into more general improvements in tasks that rely on the integrity of WM skills, such as Gf (Jaeggi, Buschkuhl, Jonides, & Perrig, 2008).

Despite its widespread use in neuroimaging, the psychometric properties of the *N-back* task as a WM measure have been rarely addressed. In addition, not much is known about individual differences in *N-back* performance and their relation to individual differences in other cognitive ability measures (Jarrold & Towse, 2006). The *N-back* task has face validity as a WM task because participants must maintain and update a dynamic rehearsal set while responding to each item (Kane, Conway, Miura, & Colflesh, 2007).

Digit Span Backwards Task

The forward and backward conditions of the Digit Span subtest from the Wechsler Intelligence Scale for Children—III (Wechsler, 1991) assesses WM storage and updating, respectively. The task requires that participants listen to a series of digits and repeat the series in correct forward or backward order. Two trials were presented at each level of difficulty. Presentation began with two digits in a series. As the level of difficulty increased, the number of digits presented in a series

increased by one to a maximum of nine. The test was discontinued when both trials at a given level of difficulty were incorrectly recalled. One point is allocated for each correct response for a maximum of 16 points. The number of points recorded in the forward and backward conditions was selected as an indicator for the LVA.

In clinical neuropsychology, the “digit span backwards” task (DSB) is considered one of the prevalent approaches in the assessment of WM capacity (Ramsay & Reynolds, 1995). In line with this notion, several psychological test batteries, such as the “Wechsler Adult Intelligence Scales” (WAIS; Wechsler, 2008), include this task in order to assess the WM capacity.

Comprehensive Measures

Working Memory Test Battery for Children (WMTB-C)

The Working Memory Test Battery for Children (WMTB-C; Pickering & Gathercole, 2001) consists of three subtests designed to assess verbal WM: Listening Recall, Counting Recall, and Backward Digits Recall. The authors chose to assess verbal aspects for WM because: (1) it has been proposed that deficits of verbal WM (and not visual-spatial WM) underlie language difficulties in specific language impairment (SLI) (Adams & Gathercole, 1996), and (2) significant correlations have been found between verbal WM and receptive grammar in children with SLI and in typically developing (TD) children (Montgomery, 1995). The “phonological loop” is made up of four subtests: Digit Recall, Word List Recall, Non-Word List Recall, and World List Matching. On all of these subtests, verbal information is presented and the task is to temporarily store the presented information.

Wechsler Memory Scale (WMS-IV)

The Wechsler Memory Scale (WMS-IV; Wechsler, 2009) was first published in 1945 (Wechsler, 1945), and has undergone several revisions since the original publication (e.g., Russell’s WMS: Russell, 1975, 1988; WMS-III: Wechsler, 1997).

Two batteries were developed for the WMS-IV: the Adult and Older Adult batteries. The Adult battery can be used for ages 16–69, and the Older Adult battery is used for individuals ages 65–90 (either battery can be used in the overlapping ages of 65–69). The content of the auditory memory subtests differs across the two batteries, with fewer stimuli in the Older Adult battery subtests. These changes have reduced the testing time and improved the subtest floors for older adults.

The WMS-IV Adult battery contains seven subtests, including six primary subtests and one optional subtest. Four of the primary subtests have immediate-recall (I), delayed-recall (II), and delayed-recognition conditions. Scores from the primary subtests combine to create five index scores: the Auditory Memory Index (AMI), the Visual Memory Index (VMI), the Visual Working Memory Index (VWMI), the Immediate Memory Index (IMI), and the Delayed Memory Index (DMI). The WMS-IV Older Adult battery contains five subtests, including four primary subtests and one optional subtest. Three of the primary subtests have both immediate- and delayed-recall conditions and a delayed-recognition condition, which are combined to form four index scores. The VWMI is not available in the Older Adult battery. Unlike the overall full-scale IQ in the WAIS-IV, there is not an overall memory ability score; index scores are related to specific domains of memory.

Psychometric Properties of the WMS-IV The WMS-IV was standardized on 900 individuals for the Adult battery sample and 500 individuals in the Older Adult battery sample. The stratification of the normative sample matches 2005 US census data closely on five key demographic variables: age, gender, race/ethnicity, educational level, and geographic region. The reliabilities for the WMS-IV range from moderate to high (Groth-Marnat, 2009; Wechsler, 2009), as indicated by internal-consistency and test-retest reliability estimates and interscorer agreement rates. There is strong evidence to support the validity of the WMS-IV (Drozdick, Holdnack, & Hilsabeck, 2011; Groth-Marnat, 2009; Wechsler, 2009). The confirmatory factor analytic studies reported in the WMS-IV technical and interpretive manual provide strong evidence of construct validity for the AMI, VMI, and VWMI. A further evidence of construct validity has also been provided by independent examinations of the Adult battery normative sample. A series of exploratory principal component analyses conducted by Hoelzle, Nelson, and Smith (2011) on each of the Adult battery normative age bands supported a two-factor structure for the WMS-IV, differentiating auditory and visual factors.

Comprehensive measures of executive function

A comprehensive assessment of EF calls for the administration of multiple measures that collectively assess all executive domains and preferably across various modalities.

Cambridge Neuropsychological Test Automated Battery (CANTAB)

The Cambridge Neuropsychological Test Automated Battery (CANTAB) is a computerized neuropsychological assessment battery originally written and developed by Barbara Sahakian, Trevor Robbins, and coworkers at Cambridge

University in the 1980s (Fray, Robbins, & Sahakian, 1996; Luciana & Nelson, 2002; Robbins et al., 1998; Sahakian et al., 1988). The first aim of CANTAB was to assess the patterns of cognitive decline in dementia in elderly individuals. However, it has been used in a wide variety of clinical populations (Fray et al., 1996; Levaux et al., 2007; Rasmussen, Soleimani, Carroll, & Hodlevskyy, 2009) with different levels of ability and ages. It has also been employed in neuropsychological research across age groups to study the development of a set of cognitive functions (De Luca et al., 2003; Luciana & Nelson, 2002).

CANTAB incorporates a wide variety of executive and memory tasks that are adapted for use with humans in paradigms developed from the evaluation of damage to specific brain areas in experimental animals (Lowe & Rabbitt, 1998), especially damage to temporal and frontal cortical regions. The relationships between the scores on component tests of CANTAB and evidence of impairment in specific cognitive functions and psychiatric disorders have been demonstrated in a very extensive set of data (Hadwin, Brogan, & Stevenson, 2005; Liotti et al., 2007; Palade & Benga, 2007; Steele, Minshew, Luna, & Sweeney, 2007; Torgersen, Helland, Flaatten, & Wester, 2010; Da Young et al., 2011).

The 22 tests that constitute CANTAB (CANTABeclipse) examine various areas of cognitive function, including visual memory, visual attention, learning and memory, WM, planning, set shifting, sustained attention, and fluid intelligence. The tests are divided into six main groups: motor and visual memory, EF, WM and planning, attention, verbal/semantic memory, and decision making and response control (Cambridge Cognition, 2006).

The CANTAB includes the following modules: (1) Psychomotor Coordination and Motor Speed, (2) Reasoning and Planning Abilities, (3) Memory, and (4) Attention. The CANTAB tests are administered using a computer with a touch-sensitive screen. Application of the test and feedback are given in a standardized manner (Fray et al., 1996). Computer-administered tests are becoming more common because of the advantages offered to the neuropsychologist. The normative data for CANTAB have been obtained from more than 2000 studies with normal subjects aged 4–90 years who participated in several studies conducted primarily in the United Kingdom (Cambridge Cognition, 2006).

The Behavior Rating Inventory of Executive Function (BRIEF)

The Behavior Rating Inventory of Executive Function (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000) is an 86-item parent report questionnaire designed to assess executive functioning in children aged 5–18 years. BRIEF is a questionnaire developed for parents and teachers of school-age children and designed to assess the abilities of a broad range of children and adolescents. The BRIEF is useful when working with children who have learning disabilities and attention disorders, traumatic brain injuries, lead exposure, pervasive developmental disorders, depression, and other developmental, neurological, psychiatric, and medical conditions. Parents rate whether their child's behavior is "never," "sometimes," or "often" a problem, with higher ratings indicative of greater perceived impairment. The BRIEF is composed of eight clinical scales (Initiate, Working Memory, Plan/Organize, Organization of Materials, Monitor, Inhibit, Shift, Emotional Control) that generate two broad indexes: Metacognition Index and Behavioral Regulation Index. An overall score is obtained (the Global Executive Composite) from the raw scores of the Metacognition Index and the Behavioral Regulation Index. The Behavioral Regulation Index includes the Inhibit, Shift, and Emotional Control subscales (Gioia et al., 2000). The Metacognition Index is made up of the following subscales: Initiate, Working Memory, Plan/Organize, Organization of Materials, and Monitor (Gioia et al., 2000). It also has two validity scales to identify the informants' response styles. The BRIEF was normed on 1419 control children and 852 children from referred clinical groups. Adequate test-retest reliability, internal consistency, content and construct validity, and convergent and discriminate validity have been demonstrated.

The BRIEF2 (Gioia, Isquith, Guy, & Kenworthy, 2015) is as efficient, comprehensive, and consistent with current models of EF as its predecessor but now includes quick screening forms and enhanced features, and contains more concise scales. It has increased sensitivity to EF problems in key clinical groups, such as ADHD and ASD. In addition, it has new 12-item Parent, Teacher, and Self-Report (for ages 11–18 years) screening forms that indicate whether further EF assessment is needed. Regarding test structure, the improved empirical scale structure includes separate Task-Monitor and Self-Monitor scales. It also includes the improved internal structure, with scales supported by factor analysis and three indexes consistent with widely accepted theory: Behavior Regulation, Emotion Regulation, and Cognitive Regulation. In addition, it includes two validity indicators from the original BRIEF and a new Infrequency scale to identify unusual responding.

The Comprehensive Executive Function Inventory (CEFI)

The Comprehensive Executive Function Inventory (CEFI; Naglieri & Goldstein, 2013) is a new EF rating scale for children and youths ages 5–18 years. The CEFI strives to accurately assess EF abilities based on self, parent, and teacher reports, and provides specific and individualized intervention recommendations. The CEFI assesses behaviors that are associated with EF (e.g., inhibitory control, WM), and determines an individual's profile of EF strengths and weaknesses. Test items were

constructed based on the premise that EFs are involved in higher-order cognition, as well as the regulation and control of spontaneous actions toward goal-directed behavior.

The CEFI provides an overall full-scale executive functioning standard score and individual subtest standard scores on nine components of EF: Attention, Emotion Regulation, Flexibility, Inhibitory Control, Initiation, Organization, Planning, Self-Monitoring, and Working Memory. In addition, each rater's responses are analyzed on a Consistency Index, Negative and Positive Impression scales, and number of omitted items. Such analyses serve to identify biased (overly positive or negative) and/or inconsistent responses to strengthen reliability and validity of the ratings.

The CEFI may be administered individually or in a group setting through a paper-and-pencil or online format. There are three different types of forms: Parent (for children ages 5–11 and 12–18), Teacher (ages 5–11 and 12–18), and Self-Report (ages 12–18).

The CEFI consists of 100 questions for each form. The raters are instructed to respond to each item based on the behaviors observed during the past 4 weeks. The use of multiple forms allows the administrators to attain a comprehensive understanding of the child's EF skills from two valuable sources (e.g., parent and teacher). The authors further suggest providing the CEFI forms to several teachers to understand performance across multiple classroom settings (Naglieri & Goldstein, 2013). This information, along with the results from other assessments, could be utilized to create a thorough intervention plan and monitor treatment progress.

Empirical research on executive function

Even prior to the publication of *DSM-5* and the ability to diagnose both ASD and ADHD in the same individual, scientists questioned whether comorbid ADHD symptoms contributed to the inconsistent EF findings in ASD (e.g., Corbett, Constantine, Hendren, Rocke, & Ozonoff, 2009). Many studies investigating EF performance in individuals with ASD have not always accounted for ADHD symptoms in their interpretations.

Executive Function Among individuals With Tourette's Syndrome, ADHD, and ASD

Self-regulation is a central prerequisite for adaptive functioning and is commonly assessed via scales. EFs scales have solid associations with neurobiological bases of EF (Isquith, Roth, & Gioia, 2013) and are often employed to assess clinical conditions associated with EF (Barkley, 2011). One of the most used EF assessment scales is the Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2000).

Hovik et al. (2014) examined everyday EF behavior that may differentiate children with Tourette's syndrome (TS) from typically developing children and children with ADHD-C, ADHD-I, or ASD. In the study, parents completed the BRIEF scale. While there was considerable overlap in reported EF problems in children with TS, ADHD-C, ADHD-I, and ASD, comparison of ratings on selected scales helped distinguish between children with TS and children with ADHD-C, ADHD-I, or ASD. This suggests that children with a range of common developmental disorders show EF difficulties in general, but that there may be more specific characteristics in everyday EF for specific groups. In particular, children with TS were shown to have more problems with executive control (EC) than cognitive flexibility (CF) compared to children with ASD, more problems with EC than inhibitory control compared to children with ADHD-C, and more problems with EC than planning/organizing compared to children with ADHD-I. Identifying the specific deficit in EF for individual children may guide treatment toward more targeted interventions versus a global omnibus EF rating or intervention.

Poor inhibition has been conceptualized either as the core deficit or as an independent pathway to ADHD (e.g., Sonuga-Barke, Wiersema, van der Meere, & Roeyers, 2010). In the studies in which ADHD symptoms in children with ASD have been accounted for, the findings indicate that inhibition is related mainly to ADHD (Bühler, Bachmann, Goyert, Heinzl-Gutenbrunner, & Kamp-Becker, 2011; Happé, Booth, Charlton, & Hughes, 2006).

Whereas some scholars conceptualize WM deficits to be a core feature or endophenotype of ADHD (Alderson, Rapport, Hudec, Sarver, & Kofler, 2010), others consider WM deficits as secondary. With regard to ASD, research has indicated that WM has a major role in social cognition and interpersonal interaction (Barendse et al., 2013). Findings derived from studies that have investigated WM performance of children with ADHD and ASD suggest that WM deficits are best associated with ADHD (Happé et al., 2006; van der Meer et al., 2012; Yerys et al., 2009).

Executive Functions and Learning Disabilities

Children with learning disabilities often witness significant problems in EFs (WM, inhibition of impulses, and shifting). They often face difficulties in assessing, organizing, prioritizing, and coordinating information in simultaneous mental activities (e.g., reading, writing). They express poor self-regulatory skills, lack effective strategies for problem solving, and

have limited thinking flexibility (e.g., Meltzer & Krishnan, 2007; Hofmann, Schmeichel, & Baddeley, 2012; Graham, Harris & McKeown, 2013). Moreover, students with learning disabilities have difficulty with metacognitive skills, and have inadequate planning and self-monitoring skills (Mason, Harris, & Graham, 2011).

The assessment of EFs in students with learning disabilities focuses on concepts, such as academic achievement, socialization, and the inhibition of maladaptive behaviors. Jacobson, Williford, and Pianta (2011) investigated the relationship between EFs assessed in elementary school and students' academic and social behavior achievements in sixth grade. They found that those students with poorer EFs were less successful and had more difficulties adjusting to middle school, where there are fewer external supports than in elementary school. Mattison and Mayes (2012) compared 437 students with LD with 158 children without LD, from 6 to 16 years, and found that those students with LD performed significantly worse in EF measures than those without LD. Those students with comorbid LD and ADHD had more executive dysfunction. The researchers also found a significant correlation among IQ, EF, and achievement. Furthermore, students with impaired EFs are at risk for engaging in impulsive or hostile responses to stressful situations (Riccio, Hewitt, & Blake, 2011). Because EF deficits are present in many students with LD, strategies to improve EFs are an essential component of classroom instruction.

Hawley and Newman (2010) suggest five stages for teaching EF skills: (1) *engagement* (i.e., attention and motivation), (2) *awareness of strengths and needs*, (3) *goal setting* (i.e., identifying realistic and measurable goals), (4) *skill mastery*, and (5) *generalization*. Because EFs include cognitive processes that coordinate, integrate, and control processes, strategies to promote EFs generally address three main areas: *self-regulation* (i.e., ability to monitor one's own performance and reflect on it), *WM*, and *metacognition*, all of which allow students to engage in problem solving and goal-directed behavior.

Cognitive Training in Reducing Executive Function Difficulties in Children With Intellectual Disabilities

An increasing number of studies have explored the impact of EF training in typically developing children, including those within the general intellectual range of the typically developing population, such as children with ADHD. These studies have reported positive effects on early WM (e.g., Alloway, Bibile, & Lau, 2013) and emotional control skills (Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005). Although EF difficulties are present in various clinical groups, such as in children with ADHD, it is the severity of these difficulties that distinguishes them from individuals with EF difficulties originating from a specific neurological basis. Unlike children with ADHD, who are primarily referred to interventions for their behavioral problems (Pelham, Fabiano, & Massetti, 2005), those with ID have a wide range of cognitive deficits, as well as behavioral difficulties, such as behavioral attention difficulties characterized by poor inhibition, low concentration, and impulsivity. In particular, attention difficulties are highly prevalent in children with IDs, such as Down syndrome (Capone, Goyal, Ares, & Lannigan, 2006; Cooper et al., 2009), Williams syndrome (Leyfer, Woodruff-Borden, Klein-Tasman, Fricke, & Mervis, 2006), fragile X syndrome (Bailey, Raspa, Olmsted, & Holiday, 2008), and autism (Elsabbagh et al., 2012).

The prevalence of ADHD among children with Down syndrome, the most common genetic cause of ID, has been shown to be as high as 44% (Ekstein, Glick, Weill, Kay, & Berger, 2011). Equally, Williams syndrome, another genetic disorder, has significant comorbidity with ADHD (Rhodes, Riby, Matthews, & Coghill, 2011); 65% of children aged between 4 and 16 years meet the criteria for ADHD (Leyfer et al., 2006).

One of the few studies that have assessed the efficacy of cognitive training in children with ID examined the feasibility of the Cogmed Working Memory Training program (Söderqvist, Bergman Nutley, Ottersen, Grill, & Klingberg, 2012). Forty-one children with ID (defined as an IQ below 70) were randomly allocated to either an adaptive or a nonadaptive version of the CWMT program. After a 5-week training period involving purely visuospatial tasks, improvements in tasks assessing verbal WM and language functions were observed in the adaptive training group. The authors note that these findings are highly significant for those individuals with ID, as verbal WM deficits are often shown to be more severe than visuospatial deficits (Van der Molen, Van Luit, Jongmans, & Van der Molen, 2009). The authors also highlight that the effects of the treatment were shown to vary significantly between children, with some children showing little if any progress at all during training. The strongest predictors for progress were gender, comorbidity (an additional diagnosis alongside ID; e.g., neurological disorders, epilepsy), and baseline capacity on verbal WM.

From the current training studies, it appears that there are significant inconsistencies in the training regimes that are implemented. Both the intensity and the duration of training appear to differ substantially across studies; crucially, these are factors that have been emphasized as key predictors of training success (Jaeggi et al., 2008). The importance of training frequency and its impact on reported results are highlighted by Alloway et al. (2013), who demonstrate that WM training benefits are greater after high-frequency training.

THEORY OF MIND AND MINDBLINDNESS THEORY

The most successful politician is he who says what the people are thinking most often in the loudest voices.

Theodore Roosevelt

The concept of ToM emerged in the 1970s when [Premack and Woodruff \(1978\)](#) defined ToM as one's ability to attribute mental states to oneself and to others. By the late 1980s and early 1990s, deficits in ToM had become associated with autism ([Baron-Cohen, 1995](#)). Progressively increasing evidence revealed that ToM deficits are not limited to ASD but are associated with other neurodevelopmental disorders, such as ADHD and schizophrenia as well. Until recently ToM was perceived as a unitary construct, whereby reasoning about the mental states of self and others was considered to be one and the same cognitive ability. In the past 15 years, however, neuroimaging studies have revealed that ToM is not a unitary construct. Instead, there are several different dimensions or types of ToM, each having a distinct neurophysiological and/or neuroanatomical substructure (e.g., [Abu-Akel & Shamay-Tsoory, 2011](#); [Shamay-Tsoory, 2011](#)).

ToM is defined as the ability to infer and represent the intentions, beliefs, and desires of others. ToM is also referred to as “commonsense psychology,” “naive psychology,” “folk psychology,” “mind reading,” and “mentalizing.” ToM has been employed more or less interchangeably with terms like “perspective taking,” “social cognition,” “metacognition,” and “folk psychology” (e.g., [Astington & Baird, 2005](#); [Flavell, Miller, & Miller, 2002](#)).

ToM has expanded across various fields, such as developmental psychology, social neuroscience, and psychopathology. Evidence from the evolutionary perspective suggests that social cognition may comprise a set of abilities (including ToM) that are independent from general cognition. The term was first introduced in [Premack and Woodruff's \(1978\)](#) seminal article entitled “Does the Chimpanzee Have a Theory of Mind?” Since then there has been a growing research interest in the role of ToM in child development and its diagnostic contribution in mental disorders, such as ASD and psychosis. Confusion regarding the meaningfulness of the term has arisen for several reasons. ToM has been associated to early cognitive development, whereas other researchers have associated it to adult social cognition; some relate it to understanding of the self, whereas it has also been related to the perception of others; some refer to logical inferences, whereas others refer to emotional or empathic reactions ([Schaafsma, Pfaff, Spunt, & Adolphs, 2015](#)).

ToM provides information for the following functions: (1) *comprehend and explain* (see a meaning in the behavior of others), (2) *predict* (predict others' behavior), and (3) *manipulate* (influence and manipulate the behavior of others by controlling the information available to them) ([Poletti, Enrici, & Adenzato, 2012](#)). ToM is related to individual differences in EFs ([Sabbagh, Xu, Carlson, Moses, & Lee, 2006](#)) and general skills ([Pellicano, 2010](#)), among other factors ([Amodio & Frith, 2006](#)).

[Hiatt and Trafton \(2010\)](#) note that there are three competing views for how ToM is expressed at a cognitive level. They are typically described in the context of “belief and desire” reasoning. ToM postulates that different people can have different beliefs, not all of which may be actually true; people can also have internal desires that influence their behaviors. Thus, there is a distinction between “true beliefs” or beliefs that are true in the physical world and “false beliefs,” which are not actually true. Thus, the ability to understand a false-belief task indicates that a person can appreciate the distinction between the mind and the world ([Wellman, Cross, & Watson, 2001](#)). Conceptual change (commonly known as *theory-theory*) is one possible explanation for ToM ([Wellman et al., 2001](#)). Theory-theorists believe that children learn a set of causal laws, or theories about the beliefs and desires of people in general ([Gopnik, 1993](#)). As a result, children employ these causal laws to explain others' behavior; to predict desires and behaviors, and to perform other-related ToM tasks.

A second view is referred to as *simulation theory* ([Gallese & Goldman, 1998](#)). This view posits that when a person (A) tries to understand another (B), A simulates what he or she would do in B's place and attributes the result to B. [Gallese and Goldman \(1998\)](#) describe the distinction between this and *theory-theory* as being that, while theory-theory is performed as a “detached theoretical activity,” simulation theory involves efforts to copy or impersonate the mental state of another.

A third perspective claims that the mind has two separate mechanisms that collaborate to provide ToM ([Leslie, Friedman, & German, 2004](#)). The theory of mind mechanism (ToMM) allows people to generate and represent multiple possible beliefs.

The “mindblindness” (MB) theory ([Baron-Cohen, 1995](#)) proposed that in autism a “theory of mind,” or cognitive empathy, is impaired to varying degrees. Toddlers with autism are impaired on tasks of two precursors of ToM: *joint attention* and *pretend play*, both generated around 18 months (e.g., [Baron-Cohen, 1987, 1989](#)).

The MB theory proposes that children with ASD are still in the development of their ToM, leaving them with degrees of MB. As a result, they find others' behavior confusing and unpredictable. According to [Baron-Cohen \(2007\)](#), children with ASD tend to believe that people are always telling the truth and are shocked when this is not the case.

Some of the advantages of the theory are: (1) It can make sense of the social and communication difficulties in ASD; (2) degrees of MB are universal, as they apply to all individuals on the autistic spectrum, in that when age-appropriate and mental-age-appropriate tests are used, deficits are found across the life course and independent of IQ; and (3) functional

neuroimaging studies have identified key areas of the “social brain” that are highly activated during mind-reading tasks in the typical brain whereas they are underactive in the autistic brain (e.g., Baron-Cohen et al., 1999b; U. Frith & Frith, 2003; Happé et al., 1996).

The relationship between theory of mind and relational frame theory

Impairments in social cognition and *perspective-taking* play an important role in the psychopathology and social functioning of individuals with social anxiety, autism, or schizophrenia-spectrum disorders, among other clinical populations.

Over the past few decades, the study of perspective taking has gained much interest in clinical and developmental settings. Perspective taking is an important feature of social cognition and interpersonal communication, and difficulties in this area can result in poor social functioning. Specifically, difficulties in perspective taking are commonly observed in individuals with autism (Baron-Cohen, Tager-Flusberg, & Doherty, 2000) or schizophrenia spectrum disorders (Bora, Yucel, & Pantelis, 2009; Sprong, Schothorst, Vos, Hox, & Van Engeland, 2007), as well as in other clinical presentations, such as schizotypy (Pickup, 2006), frontotemporal dementia (Gregory et al., 2002), depression (Ladegaard, Larsen, Videbeck, & Lysaker, 2014), anxiety (Samson, Lackner, Weiss, & Papousek, 2012), and obsessive-compulsive disorder (Sayin, Oral, Utku, Baysak, & Candansayar, 2010).

More recently, another approach to the study of perspective taking has arisen through relational frame theory (RFT) (Hayes, Barnes-Holmes, & Roche, 2001). As a contextual and behavioral account, RFT postulates that perspective taking and other forms of complex cognitive functioning can be examined by analyzing the interactions between a person and his or her social environment. From this point of view, young children learn to take perspective by responding to questions about one’s own perspective and the perspective of others. In order to respond to questions, one must change from an “I-here-now” to an “I-there-then” or “you-there-then” perspective. Thus, perspective taking requires that people understand and respond to interpersonal (I-you), spatial (here-there), and temporal (now-then) relations. Through repeated exposure to these relations, specific “relational frames” emerge, enabling people to generalize these relations to novel situations. In RFT terms, this generic ability (there are other types of relational frames) is referred to as “derived relational responding.” In order to examine the ability and flexibility to use these perspective-taking relations, a protocol was developed by Barnes-Holmes (2001), that assesses relational perspective taking at three levels of complexity. A “simple” trial in the Barnes-Holmes protocol simply requires participants to respond to an I-you, here-there, or now-then relation, for example, “I have a green brick and you have a red brick. Which brick do I have?”

Empirical evidence on RFT across several decades supports the theory’s core concept of arbitrarily applicable relational responding (i.e., deriving relations) and indicates that these complex skills expand in the absence of direct training (Hayes et al., 2001). Furthermore, studies have identified several relational frames (i.e., patterns of relating) that share the same core processes but have different formal features. These may be summarized as *coordination* (i.e., similarity or sameness), *distinction* (difference), *opposition*, *comparison*, *hierarchy*, and *perspective taking* (known in RFT as deictic relations). There is also a growing body of evidence on the relationship between these skills and language/higher cognition, IQ, developmental delays, and other clinical presentations (e.g., schizophrenia and social anxiety).

An important advantage of assessing perspective taking from an RFT point of view is the precision with which perspective-taking difficulties can be examined in individuals or specific populations. That is, with the Barnes-Holmes protocol one can determine an individual’s level of accuracy (and even speed) on the perspective-taking relations, as well as the level of complexity in using these relations. In other words, while ToM tasks provide an assessment of how perspective taking is applied in social situations (by asking participants to infer the thoughts, feelings, and actions of fictional characters), an assessment of relational perspective taking represents the basic skills that make up perspective taking. RFT could therefore play an important role in the study of perspective taking, especially in populations with potential difficulties in this domain.

Hendriks et al. (2016) focused on the relationship between the Barnes-Holmes protocol and two different ToM tests: the Faux-Pas test (Baron-Cohen, O’Riordan, Stone, Jones, & Plaisted, 1999a) and the Strange Stories test (Happé, 1994). These tests were developed to assess advanced ToM skills in older children and adults. Furthermore, the authors included a sample of participants varying in psychopathology, as well as a nonclinical sample, including individuals with an anxiety disorder and individuals with a psychotic disorder. Results showed that overall the Barnes-Holmes protocol was positively correlated with both the Faux-Pas and the Strange Stories tests. Additionally, the Barnes-Holmes protocol was found to predict ToM performance. Overall, results suggest that relational perspective taking is strongly related to ToM performance.

Developmental functions of ToM

The most famous empirical discovery in the developmental framework of ToM is the discovery of a crucial cognitive change in children between 3 and 4 years old whereby 3 year olds tend to fail a certain false-belief task. At age 3 the child

does not yet grasp the idea that a belief can be false. In lacking a representational theory of belief, the child has a “conceptual deficit” (Perner, 1991). It is believed that one’s ToM is fully developed by around the age of 5, although some studies suggest that flexibility in its use continues to develop until late adolescence (Dumontheil, Apperly, & Blakemore, 2010).

There is considerable consensus that children become increasingly proficient in ToM tasks during preschool age and that by the end of their preschool years they are able to reason correctly about most mental states, including *epistemic mental states*, such as beliefs (Doherty, 2009; Wellman et al., 2001). There is still some scope for improvement during early school years when children start to correctly solve second-order belief reasoning tasks (Perner & Wimmer, 1985), when they understand the “opacity” of mental states (Apperly & Robinson, 1998, 2003), and when they start to understand the hidden intentions in some forms of social communication, such as in the case of irony and double bluff (Capelli, Nakagawa, & Madden, 1990). It has long been proposed that conceptual change continues in ToM well into later childhood and adolescence (Chandler, Boyes, & Ball, 1990; Wellman, 1990). However, the popularity of *belief reasoning tasks* led to the belief that the peak of ToM development is around early school age.

A number of theoretical perspectives have been proposed to explain the developmental chart of ToM. For example, one approach posits that the conceptual understanding of mental states is present all along during the child’s development but that the child lacks the sufficiently sophisticated general cognitive skills that are required to solve ToM tasks (e.g., Leslie, 2005). This has been conceptualized as a *competence/performance distinction*. The second approach speculates that ToM competence develops with age, which is referred to as the *conceptual change hypothesis* (Perner, 1991; Wellman, 1990). Proponents of this view have noted the shift around the age of 4 when children progress from performance below chance to performance above chance when reasoning about representational mental states, especially false beliefs. The observed change at that age has been characterized as a qualitative change that occurs in the way children reason about mental states, and such change is enabled by more advanced understanding of mental states (Flavell, 1988; Perner, 1991; Wellman, 1990).

More recently, researchers began to investigate ToM outside the 3–5 years old age range, testing infants, as well as adults. The expansion of the age range occurred beside important changes in the methodology used to test ToM. In order to be able to test very young children, researchers created simplified social scenarios and measured looking behavior rather than recording explicit verbal or pointing responses. In order to test adults, researchers attempted to avoid ceiling effects by using parametric measures (reaction time, error rate, probability estimates) over a series of trials, instead of the classic measurement of ToM with a pass/fail criterion on a few trials. The findings revealed that (1) well before the age of 3, children are able to pass ToM tasks, even complex ones that apparently test an understanding of false beliefs (Southgate, Senju, & Csibra, 2007), and (2) adults are far from performing at ceiling in ToM tasks (e.g., Birch & Bloom, 2007).

The ability to reason about false beliefs is the most widely studied aspect of ToM (e.g., Wellman et al., 2001). Developmental studies also reveal a reliable transition of children’s ability to reason about beliefs at 3–4 years, when they pass standard false-belief tasks (e.g., Wellman et al., 2001). They also show that children’s performance on false-belief tasks is reliably associated with independent measures of language (e.g., Milligan, Astington, & Dack, 2007) and executive functioning (e.g., Sabbagh, 2006). Attention has focused on aspects of EFs (that are most strongly associated with this developmental transition in false-beliefs reasoning) and to the direction of the causal relationships.

Meltzoff, Kuhl, Movellan, and Sejnowski (2009) proposed a 25-step developmental model on social emotional development. According to this model, it appears that in the neonatal period the infant develops a reflexive intersubjectivity, as in neonatal imitation that is facilitated by intramodal visual-kinesthetic processes. During the first 2 years the infant develops an embodied mentalization, facilitated by sensorimotor developmental processes. During the preschool period, the child acquires representational capacities that lead to perspective taking of the other. This appears to be a two-step process: a first-order ToM, as revealed in the standard false-belief task, and a second-order ToM, as revealed in the eyes task. This two-step acquisition of ToM appears to correspond to the Piagetian preoperational and initial concrete operational stage of cognitive development, respectively. Next, during adolescence perceptions and perspective taking become more sophisticated, corresponding to the Piagetian stage of formal operations and abstract thinking (Young, 2011).

ToM across the life span advancement

There is an increasing interest in how ToM is expressed in later life span development. Two approaches have been advanced regarding ToM’s developmental chart. The first approach suggests that declines in ToM may be associated with declines in social functioning. A cumulative body of evidence suggests that older adults show marked reductions in aspects of fluid intelligence (e.g., Hedden & Gabrieli, 2004). Those aspects include skills, such as *WM processing*, *speed*, and *numerical ability*. The second approach proposes that “a lifetime accumulation of knowledge” about the social world may result in more efficient social interactions. According to Hedden and Gabrieli (2004), older adults show preserving “crystallized”

aspects of intelligence, such as *verbal memory*, *general knowledge*, and *vocabulary*. Thus, preservation in ToM abilities may be the outcome of greater knowledge about social relationships that does not decline in aging. In recent years, however, the majority of data converge in that there are specific measurable deficits in ToM with increasing age.

An important theoretical issue in understanding ToM deficits in late adulthood is distinguishing whether age effects reflect specific failures to decode mental states or more general changes in understanding complex texts and perceiving visual information. This issue has been addressed in some studies by including appropriate control tasks that are matched to the ToM tasks in their general cognitive demands but can be solved without any mentalistic inference. However, these studies have yielded different conclusions, with some studies finding evidence of greater age-related decline in performance on ToM tasks compared with control tasks, implying specific age-related decline in ToM (e.g., [Bailey & Henry, 2008](#); [Phillips et al., 2011](#)), but others found equivalent deficits on the ToM and control tasks that contradict this explanation (e.g., [German & Hehman, 2006](#); [Slessor, Phillips, & Bull, 2007](#)).

ToM can be differentiated into cognitive and affective. Cognitive ToM involves thinking about the thoughts, knowledge, beliefs, and intentions of others, whereas affective ToM involves thinking about and experiencing the emotions of others ([Westby & Robinson, 2014](#)). Other researchers argue that ToM can be further differentiated into interpersonal ToM (thinking about the thoughts and emotions of others) and intrapersonal ToM (reflecting about one's own thoughts and emotions (e.g., [Lucariello, Durand, & Yarnell, 2007](#); [Tine & Lucariello, 2012](#)).

Employing the cognitive-affective framework of ToM, [Baron-Cohen \(2011\)](#) delineated cognitive and affective profiles in persons suffering from various psychiatric disorders. [Lucariello et al. \(2007\)](#) and [Tine and Lucariello \(2012\)](#) reported that children from low socioeconomic backgrounds had better interpersonal than intrapersonal ToM. Both cognitive and affective ToM move through several levels of development.

First-order ToM, which develops between 4 and 5 years of age, involves thinking about what someone else is thinking or feeling. Second-order ToM, which emerges shortly after first-order ToM (or by age 7 years) in typically developing children, involves thinking about what someone else is thinking, or feeling about what someone else is thinking or feeling. Beyond second-order ToM, higher-order cognitive and affective ToM involves tasks that require recognizing lies, sarcasm, figurative language, and idioms, or understanding multiple embeddings. Precursors to these ToM stages begin in infancy ([Table 5.1](#)). They involve reciprocal interaction or emotional sharing between infants and caregivers (called primary inter-

TABLE 5.1 Development of Theory of Mind

| Age | Cognitive Theory of Mind | | Affective Theory of Mind | |
|---|---|--|--|---|
| | Interpersonal Cognitive | Intrapersonal Cognitive | Interpersonal Affective | Intrapersonal Affective |
| Primary intersubjectivity (emerges birth to 6 months) | | | | |
| Birth–6 months | | | <ul style="list-style-type: none"> • Responds to emotional reactions of others • Contagious empathy | <ul style="list-style-type: none"> • Imitates expressions |
| 6–8 months | <ul style="list-style-type: none"> • Responsive joint attention | | | <ul style="list-style-type: none"> • Displays <i>joy</i>, <i>sadness</i>, <i>disgust</i>, <i>anger</i> |
| Secondary intersubjectivity (emerges 8–12 months) | | | | |
| 8–12 months | <ul style="list-style-type: none"> • Follows line of regard • Initiates joint attention on objects | <ul style="list-style-type: none"> • Behavioral regulation; initiates behavior request | <ul style="list-style-type: none"> • Uses emotional expression of caregivers as social reference for approach-avoidance | <ul style="list-style-type: none"> • Displays emotions of being <i>happy</i>, <i>mad</i>, <i>sad</i>, <i>surprised</i>, <i>disgusted</i>, <i>afraid</i> |
| 13–17 months | <ul style="list-style-type: none"> • Understands physical relation between a person's line of sight and their behavior; one sees what one looks at | | | <ul style="list-style-type: none"> • Seeks to change affect of another by direct contact • Coordination/coregulation of interactions |
| 18 months–2 years | <ul style="list-style-type: none"> • Recognizes that different people may like different things or have different desires | <ul style="list-style-type: none"> • Emergent sense of self • Engages in pretend | <ul style="list-style-type: none"> • Consciously recognizes distress in others; predicts that receipt of broken toy will make child unhappy | <ul style="list-style-type: none"> • Emergent altruistic behavior; comforts another, changes another's or doll's affect by bringing suitable toy • Uses words <i>happy</i>, <i>sad</i>, <i>mad</i>, <i>scared</i> |

TABLE 5.1 Development of Theory of Mind (*cont.*)

| Age | Cognitive Theory of Mind | | Affective Theory of Mind | |
|------------|--|--|---|---|
| | Interpersonal Cognitive | Intrapersonal Cognitive | Interpersonal Affective | Intrapersonal Affective |
| 3 years | <ul style="list-style-type: none"> Understands that people's actions can be determined by their desires, intentions, and thoughts Understands that perceptual activity (seeing, being told) is in some way connected to knowing Understands that different people can see different things | <ul style="list-style-type: none"> Understands that imaginary objects are different from real objects Words like <i>remember, know,</i> and <i>think</i> appear in spontaneous speech | <ul style="list-style-type: none"> Matches emotion words <i>happy, sad, mad, afraid</i> to photographic faces Schematic facial recognition Knows the situations that will provoke primary emotions (can match emotion word to picture) | <ul style="list-style-type: none"> Talks about causes and consequences of emotions (e.g., "Santa will be happy if I pee in the potty.") Uses object and "friend" to change affect Begins to display self-conscious emotions <i>embarrassment, pride, shame, guilt</i> |
| 4–5 years | <p>First-order cognitive theory of mind; predicts what someone is thinking or feeling</p> <ul style="list-style-type: none"> Passes false contents and false beliefs tasks Can predict a person's actions on basis of a person's false beliefs Perspective taking; understands not only what people see but also how it appears to them | <ul style="list-style-type: none"> Understands how access to information by seeing or hearing is causally related to knowledge and how knowledge and belief can be causally related to actions in the world (beliefs cause people to act in certain ways) Future time travel for predicting physical changes Recognizes ambiguous figures | <p>First-order affective theory of mind</p> <ul style="list-style-type: none"> Predicts what someone is feeling Understands that emotions are caused by what someone thinks is the case, even if what they think conflicts with reality; predicts emotions based of false beliefs Identifies character's feelings according to whether or not wishes are fulfilled | <ul style="list-style-type: none"> Sense of self through time Episodic/ autobiographical memory and future time travel Can describe a personal situation in which they were happy, sad, mad, scared, and surprised |
| 6–8 years | <p>Second-order cognitive ToM; predicts what one person is thinking about what another person is thinking</p> <ul style="list-style-type: none"> A believes that B believes/ thinks X A intends that B believe/ think X | <ul style="list-style-type: none"> Makes appropriate judgments of situations in which one knows, remembers, forgets, or guesses | <p>Second-order affective ToM: predicts what one person thinks/feels another person feels</p> <ul style="list-style-type: none"> A believes that B feels A intends that B feel Can offer appropriate situations for emotions like jealousy, worry, pride, shame, guilt Understands that one can have first one emotion and then a second emotion in response to a situation | <ul style="list-style-type: none"> Uses words <i>proud, jealous, worried</i> Develops strategies for regulating emotions |
| 8–10 years | <p>Higher-order ToM</p> <ul style="list-style-type: none"> Understands strategies to hide deceit and to detect deceit Understands figurative language Recognizes cognitive lies | <ul style="list-style-type: none"> Uses metacognitive strategies for comprehending and monitoring comprehension | <ul style="list-style-type: none"> Understands that one can have two concurrent emotions of opposite type in response to a situation Recognizes/understands affective sarcasm Recognizes social faux pas Recognizes affective or white lies | <ul style="list-style-type: none"> Emotional dissemblance (can hide emotions) Can intentionally use facial expressions to mislead Words <i>relieve</i> and <i>disappointed</i> emerge at preadolescence Employs sarcasm Tells affective or white lies Tells presentational lies (to make oneself look good in the eyes of others) |

Source: Reprinted from Westby, C. & Robinson, L. (2014). A developmental perspective for promoting theory of mind. *Topics in Language Disorders*, 34(4), 362–382.

subjectivity), joint attention in reference to objects (called secondary intersubjectivity) (Gallagher & Hutto, 2008), a sense of self, pretend skills, emotional recognition, and mental state vocabulary (Astington & Baird, 2005).

The reciprocal relationship between executive functions and theory of mind

EFs refer to a group of cognitive processes involved in flexible goal-directed behavior. Given the diversity of these processes, there are several ways that they can be linked to ToM. A variety of explanations have been proposed concerning the associations between children's performance on false-belief tasks and measures of EFs (e.g., Leslie et al., 2004). *Emergence accounts* suggest that EF is necessary for children to learn abstract concepts by enabling disengagement from the immediate objects of attention (e.g., Carlson & Moses, 2001). Other accounts posit that belief reasoning involves EFs in both adults and children. *Competence accounts* argue that reasoning about false beliefs requires WM capacity or other aspects of EFs to construct mental representations with a certain degree of complexity (e.g., Andrews, Halford, Bunch, Bowden, & Jones, 2003).

This relationship between ToM skills and executive functioning has already been highlighted in studies of participants with typical development (Carlson, Moses, & Breton, 2002) and atypical development, such as autism (Pellicano, 2010; Pugliese et al., 2015). Moreover, other scholars (e.g., Duval, Piolino, Bejanin, Eustache, & Desgranges, 2011) have indicated that the cognitive component of ToM relies on the operation of EFs.

There is solid evidence that supports the link between ToM and these specific EF functions, such as inhibition (Hughes, 1998; Carlson & Moses, 2001; Flynn, O'Malley, & Wood, 2004), attention shifting (Frye, Zelazo, & Palfai, 1995; Hughes, 1998), and WM updating (Davis & Pratt, 1995; Keenan, Olson, & Marini, 1998) in children aged 3–5 years. Attempts to explain this link highlight a common neurological basis (prefrontal cortex), and indicate that individuals suffering from autism show impairment in both (Carlson & Moses, 2001; Hill, 2004). Inconsistent findings indicate the need for more studies that clarify the relationship between EF and ToM in older children.

Furthermore, an important and controversial question that remains unresolved concerns the causal direction of effect between EF and ToM. Perner (1998) (Perner & Lang, 1999, 2000) and Russell (1996, 1997) suggest that a functional dependency between the two constructs exists, but they make opposite predictions with regard to the direction of effect. Perner (1998) claims that the ability to represent mental states on a meta-level is needed for the development of executive control, that is, ToM enhances EF. Thus, this metarepresentational account suggests that children need to have a sufficiently developed understanding of their own minds before they will be able to engage in executive control. Russell's (1996, 1997) theory claims the exact opposite, that is, EF is a prerequisite for the emergence of ToM understanding. According to this view, EF is necessary in order to distance oneself from reality and move toward abstract mental states (ToM).

The assessment of ToM

Questions about the nature, timing, and manner in which ToM knowledge emerges have led to the development of various assessment measures ranging from tasks to tap a child's "developing understanding of conceptions of desires, emotions, beliefs, belief-desire reasoning, or psychological explanation, among others" (Wellman et al., 2001, p. 655) to assessments of the production of mental state terms (e.g., "want," "think," "know") (e.g., Miller, 2006; Tager-Flusberg, 1992, 1993).

Operationalizing based on false belief is restrictive given that ToM is defined by a large set of social cognitive skills. This problem is further complicated by the fact that such tasks are scored as pass or fail and many researchers have proposed the use of comprehensive measures in the form of task batteries that assess different components of ToM across levels of complexity (e.g., Hughes et al., 2000).

The simplest task that was developed in early ToM research was the *false-belief* paradigm, which measures a person's ability to recognize the false beliefs of others (e.g., Brüne & Brüne-Cohrs, 2006). The two most common measures that employ this paradigm are the Sally–Anne test and the Smarties test. The Sally–Anne test (Wimmer & Perner, 1983) is used for assessing the capacity of "meta representation" (the subject is required to predict a character's behavior using information integrated in a story). The Smarties test (Perner, Frith, Leslie, & Leekam, 1989) assesses the child's capacity to notice an individual's false belief. The participant is offered three boxes containing a specific item, and is then asked what a stranger would think was in the boxes.

According to Wellman and Liu (2004), a genuine understanding of others' minds cannot be equated with performance on standard inferential false-belief tests alone. To address such concerns Wellman and Liu (2004) devised a developmental scale of ToM that assesses multiple milestones in the evolution of social cognition or ToM conception. The scale includes

carefully constructed tasks that match one another in linguistic and procedural demands and their overall format and scoring. A brief description of each task follows:

- **Diverse Desires (DD):** Child judges that two persons have different beliefs about the same object.
- **Diverse Beliefs (DB):** Different people have contrasting, potentially true, beliefs about the same thing.
- **Knowledge Access (KA):** Child sees what's in a box and judges (yes/no) the knowledge of another person who does not see what is in the box).
- **Contents False Belief (FB):** Child judges another person's false belief about what is in a distinctive container when child already knows what is in the container.
- **Hidden Emotion (HE):** Child judges that a person can feel one thing but express a different emotion.

More recently designed tasks that utilize the false-belief framework include *Happé's Strange Stories* (Happé, 1994), *False-Belief Picture Sequencing* (Brüne & Bodenstein, 2005), *Subjective ToM Assessment* (Duval et al., 2011), *False-Belief Stories* (Frith & Corcoran, 1996), and the *ToM Test* (Muris et al., 1999).

Explicit cognitive-linguistic aspects of ToM can be assessed with measures, such as the Strange Stories and the Hinting Task. The Strange Stories (Happé, 1994) consist of a set of 24 short vignettes, each accompanied by a picture and two test questions. There are 12 types of stories: lie, white lie, joke, pretend, misunderstanding, persuade, appearance/reality, figure of speech, sarcasm, forget, double bluff, and contrary emotions. Both measures assess understanding of various mental states in others and have also been employed in the investigation of the links between ToM and cognitive and communication symptoms in autism (Happé, 1994), schizophrenia (Corcoran, 2001), and other disorders (Corcoran, 2001). Recently, a computerized version of a similar task has been developed (Beaumont & Sofronoff, 2008).

After the development of these instruments, more sophisticated methods were conceptualized, such as metaphor, irony, and faux pas (e.g., Brüne & Brüne-Cohrs, 2006). These paradigms involve tasks that usually use stories that involve double bluff, mistakes, persuasion, or white lies (Happé, 1994). In a metaanalysis by Bora et al. (2009), it was shown that the Hinting Test uses stories with higher-order beliefs (Frith & Corcoran, 1996), whereby the participant has to understand the meaning of a story via indirect speech. In addition, the ToM Advanced Test (Happé, 1994) consists of stories and drawings, and the subject is asked to respond to a series of open-ended questions. This test is often used in comparative studies between autistic and typically developed individuals.

As cognitive ToM extends to other abilities (Sabbagh, Moulson, & Harkness, 2004), scholars have focused their attention in the understanding of emotional states by reading the eyes or other facial cues (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001). This method is referred to as *socioperceptual* or *mental state decoding* (e.g., Bora, Eryavuz, Kayahan, Sungu, & Veznedaroglu, 2006; Gokcen, Bora, Erermis, Kesikci, & Aydin, 2009). The Reading the Mind in the Eyes (RME) test is the most representative task for the decoding of mental states. Additionally, it is sensitive to implicit nonlinguistic aspects of ToM (Baron-Cohen et al., 2001b). The RME comprises 27 pictures and has been largely utilized in research (e.g., Gokcen et al., 2009). Subjects are presented with a series of photographs of the eye region of someone's face and are asked to choose which of four words best describes what the person in the photo is thinking or feeling. This task is especially useful for investigating the link between implicit online aspects of ToM and deficits in social functioning. This task also assesses understanding of others' mental states.

Children's real-life display of online cognitive-linguistic ToM skills can be measured based on their internal-state talk or mental-state language assessed earlier during their daily activities or in predetermined settings. It has been observed that children's talk reflects four kinds of internal states: *desire*, *perception*, *cognitions*, and *emotions* (e.g., Hughes, Fujisawa, Rosie, Lecce, & Marfleet, 2006). This task can be employed to investigate the link between ToM and social functioning.

Another ToM task that assesses children's introspection skills (i.e., knowledge of own thoughts) has been developed by Flavell, Green, and Flavell (2000). Children are instructed to refrain from having any thoughts while sitting in a special "no-thinking" chair for about 1 min. They are later asked to return to their nonthinking chair and say they had or did not have any thoughts. This measure involves explicit cognitive-linguistic aspects of ToM and has been used to investigate the link between ToM and awareness of cognitive symptoms, such as intrusive thoughts in children (Sprung, 2008; Sprung & Harris, 2010). Harris and Duke (2006) devised a task to assess children's understanding of cognitive symptoms (intrusive thoughts). This task was specifically developed to study the link between ToM awareness of intrusive thoughts in clinical conditions (Sprung & Harris, 2010).

In addition to ToM tasks of caregivers' reports of children's ToM in daily life can provide a valuable assessment alternative. A relevant measure has been developed by Frith, Happé and Siddons (1994) and Happé and Frith (1996), which supplemented the Vineland Adaptive Behavior Scales (Sparrow, Balla, & Cicchetti, 1984) with additional items designed to measure social behavior related to ToM. For this interactive sociability scale, teachers or caregivers rate children's behavior on 16 items. This measure has been used with various clinical samples (i.e., children with ASD and children with

conduct disorder). It assesses implicit and explicit aspects of understanding one's own and others' mental states in everyday real-life situations.

ToM Comprehensive Measures

Although research on ToM is often based on single task measurement, more comprehensive instruments are considered more appropriate for a better understanding of ToM development (Blijd-Hoogewys, van Geert, Serra, & Minderaa, 2008).

ToM comprehensive instruments are composed of multiple tasks. The total score of such a test is a *compound* score. Research on ToM has shown compound scores to be more stable and to offer a more accurate measurement of the underlying skill (Hughes et al., 2000). In addition, to providing a single, quantitative measure of the level of ToM ability, the compound score also allows the comparison of different relevant ToM components in the same child and their trajectory during the course of development.

Examples of comprehensive ToM tests are the ToM battery of Happé (1994), the Tom-Test of Steerneman, Meesters, and Muris, 2002 (Muris et al., 1999), the ToM tasks of Tager-Flusberg (2003), and the ToM tasks of Wellman and Liu (2004). The first three comprehensive tests incorporate both simple and more advanced aspects of ToM. The ToM battery of Happé (1994) incorporates first-order belief tasks, first-order deception tasks, second-order belief tasks, and second-order deception tasks. The ToM tasks of Tager-Flusberg (2003) consist of three batteries tapping early (pretend and desire), middle (perception/knowledge, location-change false beliefs, unexpected-contents false beliefs, and sticker hiding) and more advanced ToM aspects (second-order belief, lies and jokes, traits, and moral commitment). The ToM Test (Steerneman et al., 2002; Muris et al., 1999) consists of three subscales tapping ToM precursors (e.g., recognition of emotions and pretense), first manifestations of a real ToM (e.g., first-order belief and false beliefs), and more advanced ToM aspects (e.g., second-order belief and humor). The last comprehensive test, the ToM tasks of Wellman and Liu (2004), comprises simple ToM tasks only. The tasks tap various desires, diverse beliefs, knowledge access, content false beliefs, explicit false beliefs, belief emotion, and real-apparent emotion.

The Theory of Mind Inventory–2 (ToMI-2; Hutchins, Bonazinga, Prelock, & Taylor, 2008) represents a new method for assessing ToM that addresses the limitations of traditional ToM measures. The ToMI-2 consists of 60 items designed to tap a wide range of social cognitive understandings. Each item takes the form of a statement (e.g., “My child understands whether someone hurts another on purpose or by accident”). The respondent is asked to read a statement and draw a hash mark at the appropriate point along the continuum (from definitely not to definitely). Each item was developed to serve as a face valid indicator of a particular dimension of ToM. The content of the ToMI-2 was guided by the extensive theoretical and empirical research base in this area. This involved consideration of the ToM literature for typically developing children (from infancy to late childhood and early adolescence), as well as individuals with ASD from across the autism spectrum (i.e., nonverbal to high functioning). Each of the 60 items that make up the ToMI-2 belong to one of three empirically derived subscales (i.e., Early, Basic, and Advanced) that reflect a developmental progression in ToM development. Three additional rationally derived subscales (i.e., Emotion Recognition, Mental State Term Comprehension, Pragmatics) are also available.

The Theory of Mind Assessment Scale (Th.o.m.a.s.; Bosco et al., 2009) is a semistructured interview meant to evaluate a person's ToM. It is composed of several questions organized in four scales, each focusing on one of the areas of knowledge: Scale A (I-Me) investigates first-order first-person ToM; Scale B (Other-Self) investigates third-person ToM from an allocentric perspective; Scale C (I-Other) again investigates third-person ToM, but from an egocentric perspective; and Scale D (Other-Me) investigates second-order ToM. Th.o.m.a.s. scores show good interrater agreement and internal consistency. Evidence of criterion validity was found, as Scale B scores were correlated with those of an independent instrument for the evaluation of ToM, the Strange Stories task. Confirmatory factor analysis (CFA) showed good fit of the four-factors theoretical model to the data, although the four factors were highly correlated. For each of the four scales, Rasch analyses showed that, with few exceptions, items fit the Partial Credit model and their functioning was invariant for gender and age.

The Movie for the Assessment of Social Cognition (MASC; Dziobek, Fleck, Rogers, Wolf, & Convit, 2006) is a computerized test for the assessment of implicit ToM or mentalizing abilities that resemble the demands of everyday life (Smeets, Dziobek, & Wolf, 2009). Participants are required to watch a 15 min film about four characters getting together for a dinner party. Themes of each segment cover friendship and dating issues. Participants are provided with four response options: (1) an excessive ToM (hypermentalizing) response, (2) a less ToM (undermentalizing) response, (3) a no ToM (no mentalizing) response, and (4) an accurate ToM (mentalizing) response. The MASC has proven sensitive in detecting subtle mind-reading difficulties in adults of normal IQ (Dziobek et al., 2006) and in young adults (Smeets et al., 2009), as well as in patients with bipolar disorder (Montag et al., 2009) and autism (Dziobek et al., 2006). Therefore, compared to more traditional ToM tasks, the MASC is more sensitive in detecting mind-reading difficulties than tasks that would show ceiling effects in older children and adults.

ASD AND ToM

A core deficit of autism is limited perspective taking or understanding mental states. ToM measures are designed to assess the ability of individuals with ASD not only to attribute false beliefs (Baron-Cohen, 1995) but also to infer others' beliefs and emotions in a variety of social and situational contexts (Happé, 1994; Prior, Dahlstrom, & Squires, 1990). Language provides the means by which children become aware of implicit mental states, as successful communication requires an understanding of others' minds. Developments in language are expected to parallel those in ToM. Such developments have implications for ToM assessment and treatment planning.

For 3 decades, studies on ToM have dominated research on individuals with ASD (e.g., Baron-Cohen, Leslie, & Frith, 1985). A limited ToM ability may explain the impairments in social interactions in individuals with ASD.

Children and adults with autism are impaired in tasks assessing first-order false belief (i.e., recognizing that another person holds a belief that is not true), typically understood by 4 years old (Happé, 1995); second-order false belief (i.e., recognizing that a person holds a belief that another person believes something that is not true), typically understood by 6 years old (Baron-Cohen, 1989); faux pas, typically understood by 9 years old (Baron-Cohen et al., 1999a); and reading subtle mental states from the eye region of the face (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001), the voice (Rutherford, Baron-Cohen, & Wheelwright, 2002), or in movie clips (Golan & Baron-Cohen, 2006).

Individuals with autism also score significantly lower than typically developing individuals on the Empathy Quotient (EQ), a self-report measure of empathy (Baron-Cohen & Wheelwright, 2004; Baron-Cohen et al., 2014) or a parent-report measure of empathy (Auyeung et al., 2009). Empathy has at least two components (Davis, 1994): "Cognitive empathy" is synonymous with ToM, whereas "affective empathy" entails experiencing an appropriate emotion in response to another's mental state (e.g., feeling pity in response to someone's sadness, or feeling pleasure in response to someone's happiness). Cognitive empathy is impaired in autism (Baron-Cohen, Lombardo, & Tager-Flusberg, 2013), whereas affective empathy often remains intact (Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007; Bird & Cook, 2013).

In recent years, interest in research has shifted toward explanations that go beyond the ToM, especially in studying the communicative skills of infants through face recognition, imitation, and empathy (Williams et al., 2006). However, three decades ago Baron-Cohen and his coworkers remodeled autism research when they introduced the ToM, the main behavioral symptoms that characterize autism. Their initial studies showed that most children with autism, whose mental and verbal abilities were well beyond the 4-year-old level, failed the Sally–Anne task and other related tasks (Baron-Cohen et al., 1985). Deficits in the acquisition of a ToM could be a plausible explanation for the major symptoms of autism, especially impairments in social reciprocity and communication. The original studies have been replicated many times, and it has been shown that children with autism have difficulty attributing mental states to themselves or to other people.

Questions have often been raised as to why and how some children with autism pass ToM tasks. For nonautistic children, performance on classic ToM tasks reflects intuitive social insights into people or conceptual knowledge of mental states combined with general cognitive skills. Such cognitive skills include verbal processing, memory of key narrative events, and inhibition of spontaneous responses that are central to the tasks. In contrast, studies of children with autism suggest that such children treat ToM tasks as social reasoning problems, relying primarily on language and other nonsocial cognitive processes instead of social insight (Tager-Flusberg, 2007).

Despite the ability of some high-functioning children with autism to pass false-belief tasks, these children still lack social "intuition." Some more able children with autism develop a linguistically mediated ToM that allows them to reason correctly about the social world. According to Tager-Flusberg (2001), even when individuals with autism succeed in ToM tasks, they may perform poorly in experiments that evaluate aspects of social/affective information. The earliest signs of autism, including inability to respond to social stimuli and deficits in joint attention, can be readily interpreted within a ToM framework. The link between ToM and social interaction deficits in autism seems to be mediated by linguistic competency (Joseph & Tager-Flusberg, 2004). Similarly, IQ may mediate the link between ToM and social exclusion in autism.

Even the social-communication impairments cannot be explained exclusively on the basis of ToM impairments. Nevertheless, current research (Tager-Flusberg, 2007) evinces that children and adults with autism have problems processing mental-state information; that when they are able to infer mental states, they tend not to use the same neurocognitive systems as do nonautistic people; and that performance on ToM tasks can account only for some of the social and communication difficulties that characterize this disorder.

ToM as a severity index in ASD

ToM has demonstrated potential as a *severity index* in ASD. Better ToM is associated with improved behavior toward social rules (Thirion-Marissiaux & Nader-Grosbois, 2008), better social interaction skills (Bosacki & Astington, 1999; Fombonne, Siddons, Achard, Frith, & Happé, 1994), and increased language use (Charman et al., 2000; Happé, 1993). ToM is

particularly useful in discriminating level of support needed in high-functioning children. In a study investigating potential cognitive indicators of level of special needs support in ASD, ToM significantly predicted school placement and was the only cognitive indicator apart from cognitive modifiability, executive functioning, and central coherence to discriminate between children requiring no support and children who required some support (Aljunied & Frederickson, 2011).

Behavioral and social competencies strongly predict children's ability to successfully integrate into mainstream education (Jones & Frederickson, 2010; Lyons, Cappadocia, & Weiss, 2011; Yianni-Coudurier et al., 2008). Thus, the rationale for using ToM as a specifier of severity in ASD is its potential for indicating: (1) level of support needed and (2) ability to advance in education, especially for high-functioning children by intellectual functioning.

There are several reasons why ToM could successfully characterize level of functioning in ASD: (1) The developmentally sequenced acquisition of ToM skills in childhood is well documented (Peterson, Wellman, & Slaughter, 2012); (2) ToM tests have been used in a variety of populations and cultures (Baurain & Nader-Grosbois, 2013; Henry, Phillips, Crawford, Ietswaart, & Summers, 2006); and (3) ToM deficits ostensibly underlie social-communication impairments in ASD (Baron-Cohen & Swettenham, 1997; Happé & Frith, 1996; Tager-Flusberg, 2007). Further, ToM assessment is internationally applicable: ToM skills follow similar developmental trajectories cross-culturally (Slaughter & Perez-Zapata, 2014; Wellman, Cross, & Watson, 2001; Wellman, Fang, & Peterson, 2011).

Using hierarchical cluster analysis, three ToM clusters were found: early developing ToM skills (Cluster 1), false-belief reasoning (Cluster 2), and sophisticated ToM understanding (Cluster 3). IQ, ToM, and diagnostic characteristics, as well as the average level of support needed within clusters, suggested that the clusters corresponded to (1) severe, (2) moderate, and (3) mild ASD (Hoogenhout & Malcolm-Smith, 2016).

The results of Hoogenhout and Malcolm-Smith (2016) provide a strong argument for classifying children on a dimensional rating scale based on ToM performance. First, the cluster analysis produced more homogeneous groups than the *DSM-IV* classification. The pervasive developmental disorder not otherwise specified (PDD-NOS) group in particular was very heterogeneous in ToM and IQ performance. This heterogeneity is reflected in the fact that this group did not clearly associate with any one cluster. These findings support the shift from the *DSM-IV* subtypes to a continuous category. However, findings also emphasize the need to delineate severity within a broad ASD category. ToM clustering provides a meaningful way to create homogeneous ASD subgroups. Second, better ToM predicts increased communicative adaptive functioning (Bennett et al., 2013; Joseph & Tager-Flusberg, 2004; Shimoni, Weizman, Yoran, & Raviv, 2012) and decreased symptom severity (Kamp-Becker, Ghahreman, Smidt, & Remschmidt, 2008; Lerner, Hutchins, & Prelock, 2011), over and above the effects of IQ. In toddlers with ASD, social modulation of gaze is associated with better clinical outcome (Campbell, Shic, Macari, & Chawarska, 2014). Likewise, the distribution of IQ and diagnostic categories within the current clusters suggests an inverse relationship between ToM ability and ASD severity. Third, the clusters were strongly associated with the level of support needed, as indicated by the type of school environment in which the child could be placed. The authors indicate that future research would be necessary to examine how the three ToM clusters correspond to the three severity levels identified in the *DSM-5* (Table 5.2).

ToM assessment measures for ASD disorders

ToM task batteries are important because they indicate that there is more to ToM than false-belief understanding and because they have the potential to highlight the specific ToM strengths and challenges that an individual brings to the social problem-solving situation. As on the false-belief task, performance on more comprehensive batteries may be influenced by attention, memory, linguistic, motivational, and situational factors (Tager-Flusberg, 2000). The impact of these shortcomings varies with the individual and the assessment procedures employed. To avoid these shortcomings, Hutchins et al. (2008) developed a psychometrically sound informant measure, Perceptions of Children's Theory of Mind Measure (PC-ToMM). The PCToMM-E was developed to reflect variation in the theoretical background and assessment procedures in ToM research with typically developing children and children with ASD. The measure was designed to serve as an index of caregivers' perceptions of children's ToM knowledge, as well as children's actual ToM knowledge. The developers characterize summated and averaged scores as yielding interval data that reflect a general composite of a child's ToM knowledge based on more specific component variables. The PCToMM-E consists of 33 statements. The content of the PCToMM-E was guided by a review of the ToM literature, and items were developed to reflect the diverse theoretical perspectives. Scores demonstrated high test-retest reliability and correlated with verbal mental age and ToM task battery performance. Hutchins et al. (2008) indicate that when considering evaluation of individuals with ASD, there is a need to complement a selection of more traditional tasks with qualitative and observational data.

Hutchins and Prelock (2008), in their efforts to support the development of ToM of individuals with ASD, have found a variety of qualitative assessment methods. These include: (1) observation during naturalistic activities and routines and in

TABLE 5.2 Extractable Eye Movement Measures in Theory of Mind (ToM) Research

Anticipatory eye movements. The analysis of predictive saccades and fixations is an appealing way to address ToM reasoning. If the location where someone will fruitlessly search for an item (because of a false belief about the object's location) is anticipated by predictive saccades and fixations, these eye movements are indicative of cognitive processes that account for the other's false belief (Schneider, Bayliss, Becker, & Dux, 2012; Schneider, Lam, Bayliss, & Dux, 2012; Senju, Southgate, White, & Frith, 2009; Southgate et al., 2007).

Location of first fixation. The direction of the first saccade on a scene can reveal what item is prioritized (Fletcher-Watson, Findlay, Leekam, & Benson, 2008). A tendency to direct the first saccade toward the location where the subject believes an object is, rather than toward the location where the story character falsely believes it is located, may reflect an interference from one's own perspective in a false-belief task (Rubio-Fernández & Glucksberg, 2012).

Fixation latency. How long does it take after trial onset until a certain part of a scene is fixated? The latency until the fixation of a false-belief-congruent location is informative about the characteristics of false-belief attribution (Rubio-Fernández & Glucksberg, 2012).

Number of fixations and fixation duration. Analyzing how often and for how long an item is fixated when viewing a scene provides information on the importance this item had in processing the scene and also on the influence of another's belief about that item (Keysar, Lin, & Barr, 2003). Klein, Zwickel, Prinz, and Frith (2009) employed fixation durations on items that elicited mental state attribution as an indicator of processing depth and interpreted it in terms of a high cognitive load, required when we ascribe mental states.

Probability of fixating an object as a function of time. Ferguson and Breheny (2012) showed that when another person might falsely assume an object could be in a certain location, the probability of fixating this location rose when the person started to report his or her assumption about the object's location. This procedure can reveal sensitivity to others' mental states with a crucial advantage: it serves as an online measure of ToM reasoning in a natural social interaction without overtly asking for others' mental states (cf. Tanenhaus & Spivey-Knowlton, 1996).

Pupillary dilation. It may also be worthwhile to consider pupillary dilation. Changes in the diameter of the pupil can be linked to attentional shifts and changes in mental states (Laeng, Sirois, & Gredebäck, 2012). This might be useful not only to detect if the subject reacts to another's mental state, but also to see which information at what point in time has led to such a response.

Source: Reprinted from Sodian, B., Schuwerk, T., & Kristen, S. (2015). Implicit and Spontaneous Theory of Mind Reasoning in Autism Spectrum Disorders. In Prof. Michael Fitzgerald (Ed.), *Autism Spectrum Disorder—Recent Advances* (pp. 113–135). Rijeka, Croatia: InTech, with permission. Copyright 2015. Available from: <http://dx.doi.org/10.5772/59393>.

more formal and structured testing situations and (2) triangulation to seek the impressions of parents, educators, and other professionals who know the individual well.

HISTORICAL BACKGROUND OF ADAPTIVE BEHAVIOR

Adaptive behavior is defined as the collection of conceptual social and practical skills that have been learned and are performed in daily life (Schalock et al., 2010). The construct of adaptive behavior fulfills four essential functions in the field of intellectual disability (ID). First, significant limitations in adaptive behavior, along with significant limitations in intellectual functioning and age of onset prior to age 18, define ID operationally. Second, scores on measures of adaptive behavior are used to determine whether the person experiences significant limitations in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. Third, the construct of adaptive behavior provides a framework both for charting the development of adaptive skills and for establishing education and rehabilitation goals. Fourth, adaptive behavior is an essential dimension in a multidimensional understanding of human functioning. Neidert, Dozier, Iwata, and Hafen (2010) refer to adaptive behavior as being part of developmental and intellectual disabilities. According to the Developmental Disabilities Assistance and Bill of Rights Act (US Department of Health and Human Services, 2000), intellectual and developmental disabilities (IDDs) are: (1) genetic or acquired conditions, (2) appear prior to 22 years old, (3) result in deficits in several areas of functioning (e.g., self-care, language), and (4) include relatively permanent and chronic conditions, such as mental retardation, autism, or Down syndrome. Thus, the term IDD encompasses a constellation of disorders defined for: (1) deficits in adaptive behavior, (2) slow rates of learning, and (3) behavioral dysfunction that interferes with learning (e.g., Condillac, 2007).

Doll emerged as a leader in the development of a psychometric measure of adaptive behavior, called “social maturity” at that time. His work emphasized social inadequacy due to low intelligence that was developmentally arrested as a cardinal indication of mental retardation (Doll, 1936a, p. 35). Doll objected to the definition of mental retardation in terms of mental age, which had proven problematic in IQ testing (because it resulted in classification of a significant proportion of the population). In 1936, he introduced the Vineland Social Maturity Scale (VSMS; Doll, 1936b). The VSMS, which measured performance of everyday activities, was the primary measure used to assess *adaptive behavior*, *social competence*, or *social maturity* for several decades.

During the 1960s, a wider variety of adaptive behavior measures was developed and disseminated (e.g., Allen, Cortazzo, & Adamo, 1970; Balthazar & English, 1969; Leland, Shellhaas, Nihira, & Foster, 1967). By the late 1970s, the number of available adaptive behavior measures had expanded (mostly interviews or observation, as well as checklists linked to vocational behaviors (Walls & Werner, 1977)). Measures developed in the 1960s have typically been updated in subsequent editions with enhanced psychometric characteristics and scoring (e.g., Sparrow & Cicchetti, 1985).

Over the past 25 years, novel frameworks for conceptualization of adaptive behavior have been proposed (American Association on Mental Retardation, 1992), and conventional frameworks have been endorsed for application in differential diagnosis and classification practices (Jacobson & Mulick, 1996). Finally, the difficulties and complexities of differentiating mild mental retardation from its absence or from other disabling conditions (e.g., Gresham, MacMillan, & Siperstein, 1995; MacMillan, Gresham, Siperstein, & Bocian, 1996; MacMillan, Siperstein, & Gresham, 1996) continued to challenge clinical practice and policy formulation.

The factor structure of adaptive behavior (i.e., practical, conceptual, and social skills) affirms a consistent three-factor solution dating back to 1959 and continuing through current factor analytic work. This three-factor solution of adaptive behavior was incorporated into the two most recent editions of the American Association on Intellectual and Developmental Disabilities (AAIDD) terminology and classification manual (Luckasson et al., 2002; Schalock et al., 2010) and were operationally defined as follows:

Practical skills: activities of daily living (personal care), occupational skills, use of money, safety, health care, travel/transportation, schedules/routines, and use of the telephone.

Conceptual skills: language, reading and writing, and money, time, and number concepts.

Social skills: interpersonal skills, social responsibility, self-esteem, does not show gullibility or naïveté (i.e., has wariness), follows rules/obeys laws, avoids being victimized, and social problem solving.

As a result of its growing popularity, adaptive behavior expanded into the assessment of various disorders, such as ADHD, autism, developmental delays, emotional disorders, ID, learning disorders, language disorders, motor and physical impairments, and pervasive developmental disabilities (Ditterline, Banner, Oakland, & Becton, 2008; Ditterline & Oakland, 2009, 2010; Oakland & Daley, 2013). During the 1980s, adaptive behavior measures increased both in number and in quality, thus generating the development of both norm-referenced and criterion-referenced tests (Oakland & Daley, 2013).

Meanings of intelligence and adaptive behavior

Intelligence refers to a common mental ability applied by individuals in reasoning, calculating, perceiving analogies and relationships, and/or learning new information. Intelligence also entails general mental capacity to store and effectively retrieve information and to adjust to new information, as well as fluency in language use. Therefore, intelligence is the perceived capacity not only in learning and understanding new situations, but also in adapting to those situations and/or the environment. Mental retardation is a psychological condition characterized by significant limitations in an individual's present intellectual functioning, and usually characterized by an intellectual functioning that falls below average. The condition is accompanied by limitations in adaptive skills, such as communication, social skills, and academic skills, among others (Weiten & Lloyd, 2008).

A teacher can use various teaching styles to adapt to the needs of mentally retarded learners. First, the special needs teacher ought to identify the life skills that the students ought to learn, which may include skills, such as grooming, dressing, and working ability. After life skills are identified, the instructor ought to make available a learning atmosphere that will facilitate the learning process. This approach enables the learners to effectively generalize the taught skills into their home environments. Additionally, the teacher should break the skills to be taught into simple and sequential steps that are measurable. This will enable the learners to gain knowledge of complex activities step-by-step (Weiten & Lloyd, 2008).

Classification Criteria for Intellectual Functioning

The cutoff scores for measures of general intellectual functioning are better established than the cutoff scores for measures of adaptive behavior. There is broad consensus in the major diagnostic systems that performance on the intellectual dimension must be approximately two or more standard deviations below the population mean, which translates into an IQ score of 70 or less on measures with a mean of 100 and a standard deviation of 15. The degree of flexibility around the cutoff score of 70 varies among diagnostic systems.

It should be noted that no prevalence study of people identified as having mental retardation has ever approached the level of 5% of the general population, at least in part because of the necessity of a concurrent deficit in adaptive behavior. More commonly, investigations have yielded a prevalence of 1%–1.5%.

In most diagnostic systems, the classification criteria for adaptive behavior are not developed as well or as clearly as those for intellectual functioning. Two elements are particularly relevant: (1) the degree of difference from normal or average performance that is required to determine that a limitation in adaptive functioning exists—that is, the cutoff score—and (2) the number of domains or areas in which limitations may be observed. Each of these elements has a significant influence on the number of people who might be considered for a diagnosis of mental retardation.

As noted earlier, there is far less agreement on the appropriate cutoff score(s) for adaptive behavior measures than there is for measures of intellectual functioning. Precise cutoff scores generally have not been specified in diagnostic systems, primarily because of the lack of confidence in adaptive behavior measures and the availability of multiple instruments that may be used interchangeably or somewhat arbitrarily.

Adaptive behavior, executive function, and ASD

Accumulating evidence in the study of cognitive processes between typically developing individuals and individuals with ASD has indicated three domains of differences: *social cognition* (or ToM), *EFs*, and *detail-focused processing*.

In both typical and clinical development, EF has been found to predict adaptive and maladaptive behaviors across childhood and adolescence and is closely linked to cognitive systems, such as ToM. Moreover, recent evidence highlights the association between deficits in EF in ASD and poor adaptive functioning in many areas of everyday life (e.g., [Endedijk, Denessen, & Hendriks, 2011](#); [Jahromi, Bryce, & Swanson, 2013](#)). Evidence suggests that adaptive behavior is more closely related to social functioning and independent living than intellectual ability or ASD symptomatology ([Farley et al., 2009](#); [Kanne et al., 2011](#)). To date, many of the adaptive behavior findings related to ASD are derived from studies utilizing heterogeneous samples ([Lopata et al., 2013](#)).

Well-developed adaptive behavior skills are essential to independent functioning. Adaptive behavior describes the typical performance of daily activities, and represents the ability to translate cognitive potential into real-world skills ([Sparrow et al., 1984](#)). Adaptive behaviors encompass everyday skills that are independently initiated, such as effectively communicating with others, participating in community activities, and developing meaningful relationships ([Klin et al., 2007](#)).

In typically developing individuals, adaptive behavior skills are equivalent with intellectual ability ([Sparrow, Cicchetti, & Balla, 2005](#)), and in individuals with both ASD and ID, adaptive behavior has been found to be comparable with or greater than intellectual ability (e.g., [Fenton et al., 2003](#); [Perry, Flanagan, Geier, & Freeman, 2009](#); [Kanne et al., 2011](#)). There is a wide gap between IQ and adaptive behavior in high-functioning autism spectrum disorder (HFASD), however, with ratings of adaptive behavior falling one to two standard deviations below the population mean, despite average intelligence ([Lee & Park, 2007](#)). Thus, when compared to typically developing peers matched on intellectual ability, those with HFASD demonstrate significantly lower adaptive behavior scores ([Kanne et al., 2011](#)).

IQ also appears to be a relatively weak predictor of adaptive behavior in HFASD. In a sample of predominantly HFASD, [Klin et al. \(2007\)](#) found that adaptive communication skills, which include reading, writing, and structural language skills, were linked to IQ scores but socialization skills were not. Another variable that has been examined in relation to adaptive behavior is age. Several cross-sectional studies have reported age-related declines in adaptive communication and socialization skills, but not in daily living skills. [Duncan and Bishop \(2013\)](#) indicated that age demonstrated relatively weak predictive ability for daily living skills deficits, while [Klin et al. \(2007\)](#) reported strong negative correlations between age and adaptive behaviors in the areas of communication and socialization skills. In addition to IQ and age, executive functioning is a plausible correlate of adaptive behavior. EF problems are frequently reported in ASD and play a role in the observed social and cognitive deficits in this population ([Kenworthy, Yerys, Anthony, & Wallace, 2008](#)). Behavioral manifestation of EF difficulties has been linked to difficulty with adaptive functioning in a small sample of youths with HFASD ([Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002](#)). This study revealed that social cognition (e.g., initiating activities, WM, planning, organization, and self-monitoring) significantly predicted adaptive communication and socialization skills above and beyond IQ and autism symptomatology.

In a recent study, [Pugliese et al. \(2015\)](#) examined cognitive and demographic factors related to adaptive behavior with specific attention to the role of executive functioning with HFASD between 4 and 23 years on a sample of 447 individuals. The study replicated previous findings, including: demonstrating the expected profile of adaptive skill domains with lower socialization and daily living skills compared to communication skills (e.g., [Kanne et al., 2011](#)), showing significantly lower adaptive skills than intellectual ability, and finding age-related declines in adaptive functioning scores. Moreover, the results revealed that the gap between IQ and adaptive behavior generally increased with age ([Kanne et al., 2011](#); [Klin et al., 2007](#)). Notably, IQ and age differentially predicted domain-specific variability (i.e., communication domain, daily living skills domain, and socialization domain) in adaptive scores consistent with prior findings of [Klin et al. \(2007\)](#). EF

variables also accounted for variance attributed to cognitive ability in socialization scores. Specifically, the processes of initiation, WM, organization of materials, and shifting were found to play significant roles in adaptive behavior scores.

MEASURES OF ADAPTIVE BEHAVIOR

Heber's (1961) inclusion of adaptive behavior in the operational definition of ID stimulated the need to develop tools to measure the construct. At the time of Heber (early 1960s) the only available test was the Vineland Social Maturity Scale (Doll, 1936b). One of the first standardized assessment instruments of adaptive behavior was the Adaptive Behavior Checklist (Nihira, Foster, Shellhaas, & Leland, 1968), which, after two revisions, became the AAMD Adaptive Behavior Scale. The 1980s saw the development of a plethora of adaptive behavioral measures and the application of adaptive behavior data in legal cases, as well as considerable research on the factor structure of the adaptive behavior construct (Nihira, 1999).

Currently, four comprehensive individualized, standardized, and psychometrically sound adaptive behavior scales are available. All of them have been developed specifically for the purpose of validating an ID diagnosis.

Adaptive behavioral assessment system, 2nd edition

The Adaptive Behavioral Assessment System, 2nd ed. (ABAS-II) (Harrison & Oakland, 2003) is an individualized measure of adaptive behavior for individuals 0–89 years. ABAS-II is the only test developed on the three-level model of adaptive behavior (conceptual, social, and practical domains). The conceptual domain consists of communication, functional academics, and self-direction; the social domain consists of leisure and social skills components; and the practical domain is made up of community use, school/home living, work, health and safety, and self-care components. The system is designed to provide an assessment of adaptive behavior consistent with AAMR's (1992) and (2002) definitions: a general adaptive composite, three composite domains (conceptual, practical, and social), and 10 adaptive behavior skills (communication, functional academic, health, safety, home living, leisure, self-care, self-direction, social skills, and work skills) (Harrison & Oakland, 2003).

The ABAS-II consists of five forms: parent/caregiver forms for children 0–5 years and 5–21 years, teacher forms for children 2–5 years and 5–21 years, and an adult form for individual's 16–89 years. Information on adults may be provided by another respondent or can be completed as a self-report by individuals themselves. ABAS scores help describe a person's general adaptive behavior, as well as his or her functioning. The ABAS-II provides age-based norm-referenced standard scores that are akin to those offered by most intelligence tests (e.g., the Wechsler scales of intelligence), other scales of adaptive behavior (e.g., Vineland scales), and tests of academic achievement (e.g., Woodcock–Johnson battery) based on a normal distribution with a mean of 100 and a standard deviation of 15.

The ABAS-II has two important advantages in comparison to other adaptive behavioral assessment measures: (1) It is the only standardized scale that allows self-report. Although self-report data can be beneficial in intervention planning, such data should be used cautiously when forming a diagnosis of ID (Schalock et al., 2010; Tassé, 2009). (2) It is the only instrument that provides standardized scores according to both the 10 adaptive skills areas defined by the *DSM-IV* (American Psychiatric Association, 2000) and the three adaptive behavioral domains (conceptual, practical, and social skills) defined in the 11th ed. of the AAIDD terminology (Schalock et al., 2010).

Scales of independent behavior–revised

The Scales of Independent Behavior–Revised (SIB-R) (Bruininks, Woodcock, Weatherman, & Hill, 1996) is a comprehensive adaptive behavior measure designed for use with individuals from 3 months to 80+ years. The SIB-R assesses functional independence and adaptive functioning across various settings, such as home, school, employment, and community. The SIB-R may be administered using the structured interview or a checklist method.

Assessment yields two scale scores: the Adaptive Behavior Scale score and the Problem Behavior Scale score. The adaptive behavior section yields standard scores for the Broad Independence (Full-Scale) Score plus four domains (Motor Skills, Social Interaction and Communication Skills, Personal Living Skills, and Community Living Skills). In total, the adaptive behavior section yields 14 subscales subsumed under the aforementioned four domains: Motor Skills: Gross Motor, Fine Motor; Social Interaction and Communication Skills: Social Interaction, Language Comprehension, Language Expression; Personal Living Skills: Eating and Meal Preparation, Toileting, Dressing, Personal Self-Care, Domestic Skills; Community Living Skills: Time and Punctuality, Money and Value, Work Skills, Home/Community Orientation. The adaptive behavior is rated based on the extent to which the individual completes a task independently.

The problem behavior section measures eight areas of problem behavior: Hurtful to Self, Hurtful to Others, Destructive to Property, Disruptive Behavior, Unusual or Repetitive Habits, Socially Offensive Behavior, Withdrawal or Inattentive Behavior, and Uncooperative Behavior. The problem behavior items are rated according to their frequency and severity.

The utility of the SIB-R is enhanced by the availability of an Individual Plan Recommendation form. This form facilitates intervention planning through needs identification and progress monitoring. Weaknesses of the SIB-R include relatively complex algorithms and lack of recent psychometric studies (Frick, Barry, & Kamphaus, 2010).

Vineland adaptive behavior scales, 2nd edition (VABS-II)

The Vineland Adaptive Behavior Scales, 2nd ed. (VABS-II) (Sparrow, Cicchetti, & Balla, 2005) is a substantial revision of the Vineland Social Maturity Scale published by Doll in 1936 and later revised by Sparrow et al. (1984). The VABS-II was designed to assess adaptive behavior in individuals aged 0–90 years. Its content was also designed to align with the AAIDD and *DSM-IV-TR* criteria for adaptive functioning as outlined for diagnoses of IDs or mental retardation.

The VABS-II is available in four different forms: Parent/Caregiver Rating Form (0–90 years), Teacher Form (3–18 years), Survey Form (0–90 years), and Expanded Interview Form (0–90 years). The structure of the VABS-II provides standard scores with a mean of 100 and a standard deviation of 15 for each of the five domains: Motor Skills (under 7 years and >50 years), Daily Living Skills, Communication Skills, Socialization, and Maladaptive Behavior. The Maladaptive Behavior domain is essentially a behavior problems checklist that assesses severe difficulties, such as sexual misbehavior, self-injury, bed-wetting, and truancy.

The VABS-II was standardized on a nationally representative sample of 3687 subjects 0–90 years: Research evidence concurs that there is good internal consistency for the Adaptive Behavior Composite and the domain scores. Differential validity studies demonstrate that the Adaptive Behavior Composite and domain scores differentiated among individuals with mild, moderate, or severe mental retardation. Convergent validity coefficients with the Behavior Assessment System for Children (BASC-2) and the ABAS-II were generally moderate.

The diagnostic adaptive behavior scale (DABS)

Due to the fact that measures are not exclusively focused on diagnosing, the AAIDD, formerly known as AAMR, has developed the forthcoming Diagnostic Adaptive Behavior Scale (DABS; Tassé et al., 2014). The DABS was designed within the framework of the Tripartite Model of adaptive behavior. Item response theory (IRT) has been used in its development to reliably measure individual levels of performance across the continuum of adaptive skills and ages (4–8 years old, 9–15 years old, and 16–21 years old).

The DABS is administered in the form of an interview between the examinant and a third person who knows the examinee very well. The DABS consists of 75 items for each of the three age groups (4–8, 9–15, and 16–21 years old) consisting of 25 items per domain (conceptual, social, and practical skills). Domain scores for each of the three adaptive skills areas, as well as an Overall Adaptive Behavior Standard Score (OABSS) are reported on a standard scale with a mean of 100 and a standard deviation of 15.

When evaluating the accuracy dimension of the DABS, the authors extended the sensitivity-specificity analyses with Receiver Operating Characteristics (ROC) analyses. The analyses demonstrated that the DABS correctly identified 81%–91% of individuals with ID and 89%–91% of individuals without ID (Balboni et al., 2014).

Behavior assessment system for children

Since its publication in 1992, the BASC has become one of the most widely used tools for assessing behavior and emotions in individuals ranging in age from 2 to 25 years old (Reynolds & Kamphaus, 2004). The BASC-2 (Reynolds & Kamphaus, 2006) is a comprehensive rating scale that evaluates clinical and adaptive aspects of behavior. It is the most common broad-based rating scale used by school psychologists. The BASC-2 has the potential advantage of being able to identify children in need of more extensive evaluation, as well as to identify strengths and weaknesses not necessarily associated with the diagnostic criteria for autism. In addition, it can potentially differentiate students who have comorbid problems. The BASC-2 provides a set of tools for obtaining information in different domains (behavioral, personality, and developmental), in different ways (rating scales, history taking, and direct observation), and from different sources (parents, teachers, clinicians, and children themselves; Reynolds & Kamphaus, 2004).

The BASC-2 consists of a Structured Developmental History, an Observation System, a Parent Rating Scale (PRS), a Self-Report of Personality Scale (SRP), and a Teacher Rating Scale (TRS). The PRS, SRP, and TRS provide information

on several domains of adaptive behaviors and problem or clinical behaviors. Raters' perceptions are standardized in the form of *T*-scores and percentile rankings, which allow comparison of performance in different domains relative to a national norm group and for an analysis of individual strengths and weaknesses (Reynolds & Kamphaus, 2004).

The BASC-TRS comprises three versions, the TRS-P for ages 2–5, the TRS-C for ages 6–11, and the TRS-A for ages 12–21. The BASC-TRS yields 5 composite scales, 10 clinical scales, 5 adaptive scales, and, when the TRS is scored with the BASC-2 ASSIST Plus software, 7 content scales. The broad composite scales are Externalizing Problems, Internalizing Problems, School Problems, Adaptive Skills, and the Behavioral Symptoms Index (BSI). The adaptive scales comprise Adaptability, Functional Communication, Leadership, Social Skills, and Study Skills. The clinical scales are Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Learning Problems, Somatization, and Withdrawal. The 7 content scales are Anger Control, Bullying, Developmental Social Disorders, Emotional Self-Control, Executive Functioning, Negative Emotionality, and Resiliency (Reynolds & Kamphaus, 2004).

The composite scales provide measures of a student's overall functioning in five broad areas. Each is composed of a set of clinical or adaptive scales. The BSI, which provides a broad estimate of a student's overall level of problem behavior, is composed of the Hyperactivity, Aggression, Depression, Attention Problems, Atypicality, and Withdrawal scales. The Externalizing Problems composite scale is made up of the Hyperactivity, Aggression, and Conduct Problems scales. The Internalizing Problems scale includes the Anxiety, Depression, and Somatization scales. The Adaptive Skills scale is composed of the Adaptability, Functional Communication, Social Skills, Leadership, and Study Skills scales. Finally, the School Problems composite scale consists of the Attention Problems and Learning Problems scales (Reynolds & Kamphaus, 2004).

Performance measures

The University of California at San Diego (UCSD) Performance-Based Skills Assessment (UPSA) (Patterson, Goldman, McKibbin, Hughs, & Jeste, 2001) is a performance-based measure of everyday function that comprises ecologically relevant tasks. The UPSA assesses performance in five domains of functioning: household chores, communication, finance, transportation, and planning recreational activities. Items involve performing a variety of skilled tasks, including manipulating money, making routine and emergency calls, reading maps and schedules, and performing shopping tasks. The UPSA has been found to be a valid predictor of functional abilities in clinical populations, including people with bipolar disorder, schizophrenia, psychosis, and mild cognitive impairment (e.g., Green et al., 2011; Mausbach et al., 2010). In addition to the UPSA, a brief version of the UPSA—the UPSA-B—has been developed (Mausbach, Harvey, Goldman, Jeste & Patterson, 2007).

The Test of Adaptive Behavior in Schizophrenia (TABS) (Velligan et al., 2007) is another performance-based measure to assess abilities needed to complete goal-directed adaptive behavior, such as initiation, planning and sequencing, and problem identification. The TABS comprises six functional areas: work and productivity, medication management, independent living, shopping, basic hygiene, and social skills. The TABS focuses on initiation and problem identification. Props are employed, such as pill containers in the medication management component and dull clothes in the clothes-closet component. TABS scores are calculated as percentage correct for each area. The total score is the mean of the six areas.

EMPIRICAL STUDIES

Conceptual reasoning, problem solving, and adaptive ability in ASD

A major goal of treatment in autism is to help the individual to function as independently as possible. Individuals with ASDs vary significantly in adaptive behavior (Mazefsky, Williams, & Minshew, 2008). Whereas the variability in adaptive behavior in ASD is well established, sources of variability are not always clear. Research has been quite consistent in demonstrating that adaptive behavior skills in autism tend to be much lower than would be expected based on IQ (e.g., Mazefsky et al., 2008). For example, a recent study of children with ASD reported that IQ was a strong predictor of adaptive behavior. The authors also noted that having a higher IQ did not necessarily indicate that children would perform well in the social domain (Kanne et al., 2011). The ability to solve problems is generally considered to be predictive of better adaptive functioning (Bogte, Flamma, van der Meere, & van Engeland, 2007).

The relationship between conceptual reasoning problem solving and adaptive functioning may differ in individuals with autism. Social cognitive deficits have been reported to be related to a disability in implicitly encoding and integrating contextual information, with improved performance when social information is made explicit or rule-based (Baez et al., 2012). The relationship between conceptual reasoning and adaptive functioning may also vary by age in individuals with autism.

Research (e.g., [Solomon, Buaminger, & Rogers, 2011](#)) suggests that developmental differences may occur with respect to concept identification and concept formation, two major components of abstract thinking.

[Williams, Mazefsky, Walker, Minshew, and Goldstein \(2014\)](#) examined the relationship between performance on measures of conceptual reasoning, ecologically valid measures of problem solving, and measures of adaptive behavior in children and adults with autism who had IQs in the normal range. The study employed various neuropsychological measures selected to examine different aspects of conceptual reasoning or problem solving, ecologically valid measures of problem solving, such as the Behavioral Assessment of the Dysexecutive Syndrome (BADs; [Wilson, Alderman, Burgess, Emslie, & Evans, 1996](#)). The BADs is an individually administered assessment tool employed in a laboratory setting. The test contains six subtests and is scored for organizing ability (including the number of tasks completed, rule breaking on the tasks, and maximum amount of time spent on a subtask).

The Vineland Adaptive Behavior Scales (VABS; [Sparrow et al., 1984](#)) were a measure selected to assess adaptive functioning in the natural environment. The results demonstrated that in general individuals with autism have diminished reasoning abilities compared to individuals with typical development of similar age and overall cognitive ability. As indicated by the VABS data, individuals with autism may fail to apply these reasoning abilities to real-life situations. The dissociation between performance on structured tasks and observed daily performance may help explain the rather poor outcome in adult life of individuals with autism despite their earlier academic achievements ([Farley et al., 2009](#)). The study also revealed that flexible thinking factor was also associated with better adaptive functioning in autism. In addition to flexible thinking, another significant construct was the Perceptual Reasoning factor. Abilities associated with this factor include ideational planning as measured by the Tactual Perception Test (TPT) and visual imagery and integration assessed with the Hooper Visual Organization Test.

Association between ADHD and ASD

ASD and ADHD are neurodevelopmental disorders with onset of symptoms in early childhood. ASD is characterized by impairments in communication and social reciprocity along with stereotypic and/or repetitive behaviors, with symptoms presenting by the age of 3 years ([American Psychiatric Association, 2000](#)). ADHD, the most common psychiatric disorder diagnosed in childhood, is characterized by symptoms of inattention, impulsivity, and/or hyperactivity beyond what would be expected for the developmental level, and presents before the age of 7 years ([Wilens, Biederman, & Spencer, 2002](#)).

There is overlap in the clinical presentation of ASD and ADHD. Both disorders include communication problems, restricted behaviors, and problems with attention ([Hattori et al., 2006](#)), and are more prevalent in boys than in girls, with ratios of 4:1 in ASD [[Centers for Disease Control \(CDC\), 2012](#)] and approximately 3:1 in ADHD ([CDC, 2010](#)). Moreover, epidemiological studies have identified increasing prevalence rates of ASD ([CDC, 2012](#)) and ADHD ([CDC, 2010](#)) over the past decade. Symptoms associated with both disorders cause significant behavioral, social, and adaptive problems across home, school, and community settings ([Rich, Loo, Yang, Dang, & Smalley, 2009](#)). There is preliminary evidence that when ADHD is comorbid with ASD, there is high risk for increased severity of psychosocial problems ([Holtmann, Bölte, & Poustka, 2007](#); [Yerys et al., 2009](#)). More externalizing, internalizing, and social problems ([Holtmann et al., 2007](#)), as well as more impaired adaptive functioning, and more autistic traits and maladaptive behaviors ([Yerys et al., 2009](#)) have been reported in children with ASD comorbid with ADHD than in children with ASD only.

A similar study by [Sikora, Vora, Coury, and Rosenberg \(2012\)](#) evaluated the frequency of cooccurring ADHD symptoms in a well-defined cohort of children with ASDs. They also examined the relationship between ADHD symptoms and adaptive functioning and health-related quality of life as reported by parents or other primary caregivers. Results demonstrated that children with ASD and clinically significant ADHD symptoms have greater delays in adaptive functioning and a poorer health-related quality of life in comparison with children with ASDs and fewer ADHD symptoms. Overt behavior problems, including ADHD symptoms, have been found to have a stronger negative relationship with family functioning or parental stress than autistic symptom severity in children with ASDs and level of cognitive functioning in children with developmental delay.

Comparison of adaptive behavior measures for children with HFASDs

[Lopata et al. \(2013\)](#) conducted a study to: (1) document the parent-rated VABS-II, BASC-2, and ABAS-II adaptive behavior profiles of children aged 6–11 years with HFASDs (e.g., Asperger's disorder), including relative strengths and weaknesses, (2) examine the extent to which these instruments yielded similar scores on comparable scales, and (3) assess potential discrepancies between cognitive ability and adaptive behavior across the measures. Assessment of adaptive functioning is considered one of the most critical components of comprehensive evaluations of children with HFASDs,

as it provides information on the child's functional adjustment of daily life. Children with HFASDs are considered high functioning owing to relative strengths in cognitive and formal language abilities (communication deficits are common). Although these features generally define these disorders, they do not reflect the degree of impairment in daily functioning.

Longitudinal studies of adaptive behavior and executive functions in ASD

Independent living status is more dependent on adaptive behavior than on cognitive ability or ASD phenomenology (Farley et al., 2009; Kanne et al., 2011). Although adaptive behavior is strongly correlated with IQ in typically developing individuals, for ASD individuals ratings for adaptive behavior fall one or two standard deviations below the population mean (e.g., Lee & Park, 2007).

Common correlates of adaptive behavior, such as IQ, sex, and ASD symptoms have generally been found to have small effects on adaptive behavior in ASD without ID. Recent evidence suggests that EFs may have a greater impact on the development of adaptive behavior skills than the other factors (Pugliese et al., 2015). Research findings have revealed age-related increases in parent-reported EF problems in ASD compared to typically developing individuals (Rosenthal et al., 2013); it is therefore important to evaluate EFs when predicting adaptive abilities. EF impairment plays a key role in social and cognitive deficits in ASDs (Hill, 2004; Kenworthy et al., 2008). Furthermore, EF difficulties have been found to diminish adaptive behavior (Gilotty et al., 2002) more than IQ and ASD symptomatology. For example, Pugliese et al. (2015) demonstrated that the fewer EF problems, the better the behavioral adaptation in youths with ASD without ID. In a different study, Williams et al. (2014) using a "flexible thinking factor" from EF tasks (e.g., Tower of Hanoi, Wisconsin Card Sorting Test, and so on) found that flexible thinking scores significantly correlated with VABS adaptive behavior composite scores in children and adults with ASD without ID.

In a more recent study, Pugliese et al. (2015) examined longitudinal change in adaptive behavior skills from childhood to young adulthood in a sample of 64 children and adolescents with ASD without ID. Results showed that when adaptive skills are impaired in youths with ASD without ID, there are few improvements on standardized scores over time. Findings supported prior evidence for significantly lower adaptive skills than intellectual ability in individuals without ID (Klin et al., 2007; Pugliese et al., 2015).

Adaptive functioning and IQ in schizophrenia spectrum disorders

According to Velligan et al. (1997), cognitive deficits in several different ability areas are believed to underlie much of the significant functioning impairments in schizophrenia. Deficits in psychomotor speed, attention, memory, and EFs have been found to predict community outcome, social skills deficits, ability to learn in rehabilitation programs, and quality of work.

According to Harvey, Velligan, and Bellack (2007), cognitive deficits are the best predictors, among the several features of schizophrenia, of functional outcomes. Cognitive functions, such as memory, EFs, and attention are impaired in patients with schizophrenia and are predictive of vocational and social outcomes (McGurk & Meltzer, 2000). Among the domains of cognitive function, secondary verbal memory and executive functioning have been suggested to be major predictors of functional outcomes in patients with schizophrenia.

Research (e.g., Schneider et al., 2014) has revealed that the presence of schizophrenia spectrum disorders is associated with lower intellectual functioning, whereas anxiety and mood disorders are not. Along those similar lines, studies show that psychotic spectrum disorders are associated with broad cognitive impairments (MacCabe & Murray, 2004). According to Schneider et al. (2014), adaptive functioning scores were comparable to full-scale IQ (two standard deviations below the means for the general population) and were significantly associated with the intellectual level. However, intellectual functioning explained only a small proportion of variance in adaptive functioning. Their sample was a subgroup of schizophrenia spectrum disorders with a 22q11.2 deletion syndrome. A 22q11.2 deletion is the strongest known molecular risk factor for schizophrenia. The current study, as well as other studies indicated that other factors contribute to adaptive functioning in this population, such as older age. Older age was significantly correlated with poorer socialization and communication skills. Results also indicated that psychotic, anxiety, or mood disorder did not affect socialization or communication.

SUMMARY

EF plays a critical role in regulating our daily activities with aspects of psychopathology and cognition. Recently, EFs have been divided into hot and cold. While there is a sizable number of EFs, we chose the presentation of three: cognitive/flexibility/set shifting, inhibitory control, and WM. The reason for elaborating these specific functions is related to their usage in studies of individuals with developmental disorders and in particular individuals with ASD, ADHD, learning disabilities, and IDs.

The last part of this chapter has examined the concept of adaptive behavior. Like EF, the assessment of adaptive behavior is a common practice in the assessment of neurodevelopmental disorders. Empirical studies that examine the association between adaptive behavior and ASD, ADHD, and schizophrenia are presented.

REFERENCES

- Abela, J. R., & Hankin, B. L. (2011). Rumination as a vulnerability factor to depression during the transition from early to middle adolescence: a multi-wave longitudinal study. *Journal of Abnormal Psychology, 120*(2), 259–271.
- Abu-Akel, A., & Shamay-Tsoory, S. (2011). Neuroanatomical and neurochemical bases of theory of mind. *Neuropsychologia, 49*(11), 2971–2984.
- Adams, A., & Gathercole, S. E. (1996). Phonological working memory and spoken language development in young children. *Quarterly Journal of Experimental Psychology, 49A*, 216–233.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: a meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237.
- Alderson, R. M., Rapport, M. D., Hudec, K. L., Sarver, D. E., & Kofler, M. J. (2010). Competing core processes in attention-deficit/hyperactivity disorder (ADHD): do working memory deficiencies underlie behavioral inhibition deficits? *Journal of Abnormal Child Psychology, 38*(4), 497–507.
- Aljunied, M., & Frederickson, N. (2011). Cognitive indicators of different levels of special educational support needs in autism. *Research in Autism Spectrum Disorders, 5*(1), 368–376.
- Allen, R. M., Cortazzo, A. D., & Adamo, C. (1970). Factors in an adaptive behavior check list for use with retardates. *Training School Bulletin, 67*(3), 144–157.
- Alloway, T. P., Bibile, V., & Lau, G. (2013). Computerized working memory training: can it lead to gains in cognitive skills in students? *Computers in Human Behavior, 29*(3), 632–638.
- American Association on Mental Retardation. (1992). *Mental retardation: Definition, classification and systems of supports* (9th ed.). Annapolis, MD: American Association on Mental Retardation.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th text rev.). Washington, DC: American Psychiatric Association.
- Amodio, D. M., & Frith, C. D. (2006). Meeting of minds: the medial frontal cortex and social cognition. *Nature Reviews Neuroscience, 7*(4), 268–277.
- Anderson, P. (2002). Assessment and development of executive function (EF) during childhood. *Child Neuropsychology, 8*(2), 71–82.
- Anderson, P. (2008). Towards a developmental model of executive function. In V. V. Anderson, R. Jacobs, & P. J. Anderson (Eds.), *Executive function and the frontal lobes: A lifespan perspective* (pp. 3–21). London, England: Psychology Press.
- Andreotti, C., Thigpen, J. E., Dunn, M. J., Watson, K., Potts, J., Reising, M. M., & Compas, B. E. (2013). Cognitive reappraisal and secondary control coping: associations with working memory, positive and negative affect, and symptoms of anxiety/depression. *Anxiety, Stress & Coping, 26*(1), 20–35.
- Andrews, G., Halford, G. S., Bunch, K. M., Bowden, D., & Jones, T. (2003). Concept of mind and relational complexity. *Child Development, 74*(5), 1476–1499.
- Apperly, I. A., & Robinson, E. J. (1998). Children's mental representation of referential relations. *Cognition, 67*(3), 287–309.
- Apperly, I. A., & Robinson, E. J. (2003). When can children handle referential opacity? Evidence for systematic variation in 5–6 year old children's reasoning about beliefs and belief reports. *Journal of Experimental Child Psychology, 85*(4), 297–311.
- Astington, J. W., & Baird, J. A. (2005). Introduction: why language matters. In J. W. Astington, & J. A. Baird (Eds.), *Why language matters for theory of mind* (pp. 3–25). New York, NY: Oxford University Press.
- Au, J., Sheehan, E., Tsai, N., Duncan, G. J., Buschkuhl, M., & Jaeggi, S. M. (2015). Improving fluid intelligence with training on working memory: a meta-analysis. *Psychonomic Bulletin & Review, 22*(2), 366–377.
- Auyeung, B., Wheelwright, S., Allison, C., Atkinson, M., Samarawickrema, N., & Baron-Cohen, S. (2009). The children's empathy quotient and systemizing quotient: sex differences in typical development and in autism spectrum conditions. *Journal of Autism and Developmental Disorders, 39*(11), 1509–1521.
- Baddeley, A. (2000). The episodic buffer: a new component of working memory? *Trends in Cognitive Sciences, 4*(11), 417–423.
- Baddeley, A. (2007). *Working memory, thought and action*. Oxford, UK: Oxford University Press.
- Baddeley, A. D., & Hitch, G. (1974). Working memory. In G. H. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (pp. 47–89). (Vol. 8). New York, NY: Academic Press.
- Baez, S., Rattazzi, A., Gonzalez-Gadea, M. L., Torralva, T., Vigliecca, N., Decety, J., & Ibanez, A. (2012). Integrating intention and context: assessing social cognition in adults with Asperger syndrome. *Frontiers in Human Neuroscience, 6*, 302.
- Bailey, P. E., & Henry, J. D. (2008). Growing less empathic with age: disinhibition of the self-perspective. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 63*(4), 219–226.
- Bailey, D. B., Raspa, M., Olmsted, M., & Holiday, D. B. (2008). Co-occurring conditions associated with FMR1 gene variations: findings from a national parent survey. *American Journal of Medical Genetics Part A, 146*(16), 2060–2069.
- Balboni, G., Tassé, M. J., Schalock, R. L., Borthwick-Duffy, S. A., Spreat, S., Thissen, D., & Navas, P. (2014). The diagnostic adaptive behavior scale: evaluating its diagnostic sensitivity and specificity. *Research in Developmental Disabilities, 35*(11), 2884–2893.
- Balthazar, E. E., & English, G. E. (1969). A factorial study of unstructured ward behaviors. *American Journal of Mental Deficiency, 74*(3), 353–360.
- Barendse, E. M., Hendriks, M. P., Jansen, J. F., Backes, W. H., Hofman, P. A., Thoonen, G., & Aldenkamp, A. P. (2013). Working memory deficits in high-functioning adolescents with autism spectrum disorders: neuropsychological and neuroimaging correlates. *Journal of Neurodevelopmental Disorders, 5*(1), 14.

- Bari, A., & Robbins, T. W. (2013). Inhibition and impulsivity: behavioral and neural basis of response control. *Progress in Neurobiology*, *108*, 44–79.
- Barkley, R. A. (2011). The important role of executive functioning and self-regulation in ADHD. *Journal of Child Neuropsychology*, *113*, 41–56.
- Barnes-Holmes, Y. (2001). *Analysing relational frames: Studying language and cognition in young children*. National University of Ireland, Maynooth, Ireland.
- Baron-Cohen, S. (1987). Autism and symbolic play. *British Journal of Developmental Psychology*, *5*(2), 139–148.
- Baron-Cohen, S. (1989). The autistic child's theory of mind: a case of specific developmental delay. *Journal of Child Psychology and Psychiatry*, *30*(2), 285–297.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA: MIT Press/Bradford Books.
- Baron-Cohen, S. (2007). I cannot tell a lie. *Character*, *3*, 52–59.
- Baron-Cohen, S. (2011). *The science of evil*. New York, NY: Basic Books.
- Baron-Cohen, S., Cassidy, S., Auyeung, B., Allison, C., Achoukhi, M., Robertson, S., & Lai, M. C. (2014). Attenuation of typical sex differences in 800 adults with autism vs. 3,900 controls. *PLoS One*, *9*(7), e102251.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, *21*(1), 37–46.
- Baron-Cohen, S., Lombardo, M., & Tager-Flusberg, H. (2013). *Understanding other minds: Perspectives from developmental social neuroscience*. Oxford, UK: Oxford University Press.
- Baron-Cohen, S., O’Riordan, M., Stone, V., Jones, R., & Plaisted, K. (1999a). Recognition of faux pas by normally developing children and children with Asperger syndrome or high-functioning autism. *Journal of Autism and Developmental Disorders*, *29*(5), 407–418.
- Baron-Cohen, S., Ring, H. A., Wheelwright, S., Bullmore, E. T., Brammer, M. J., Simmons, A., & Williams, S. C. R. (1999b). Social intelligence in the normal and autistic brain: an fMRI study. *European Journal of Neuroscience*, *11*(6), 1891–1898.
- Baron-Cohen, S., & Swettenham, J. (1997). Theory of mind in autism: its relationship to executive function and central coherence. In D. Cohen, & F. Volkmar (Eds.), *Handbook of autism and pervasive developmental disorders* (pp. 880–893). New York, NY: Wiley.
- Baron-Cohen, S., Tager-Flusberg, H., & Doherty, D. J. (2000). *Understanding other minds: Perspectives from developmental cognitive neuroscience* (2nd ed.). Oxford, UK: Oxford University Press.
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, *34*(2), 163–175.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001a). The “Reading the Mind in the Eyes” test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry*, *42*(2), 241–251.
- Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001b). The autism-spectrum quotient (AQ): evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders*, *31*(1), 5–17.
- Baurain, C., & Nader-Grosbois, N. (2013). Theory of mind, socio-emotional problem-solving, socio-emotional regulation in children with intellectual disability and in typically developing children. *Journal of Autism and Developmental Disorders*, *43*(5), 1080–1097.
- Beaumont, R. B., & Sofronoff, K. (2008). A new computerised advanced theory of mind measure for children with Asperger syndrome: the ATOMIC. *Journal of Autism and Developmental Disorders*, *38*(2), 249–260.
- Bennett, T. A., Szatmari, P., Bryson, S., Duku, E., Vaccarella, L., & Tuff, L. (2013). Theory of mind, language and adaptive functioning in ASD: a neuroconstructivist perspective. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *22*(1), 13–19.
- Birch, S. A. J., & Bloom, P. (2007). The curse of knowledge in reasoning about false beliefs. *Psychological Science*, *18*(5), 382–386.
- Bird, G., & Cook, R. (2013). Mixed emotions: the contribution of alexithymia to the emotional symptoms of autism. *Translational Psychiatry*, *3*(7), e285.
- Blijd-Hoogewys, E. M. A., van Geert, P. L. C., Serra, R. B., & Minderaa, R. B. (2008). Measuring theory of mind in children, psychometric properties of the ToM Storybook. *Journal of Autism and Developmental Disorders*, *38*(10), 1907–1930.
- Bogte, H., Flamma, B., van der Meere, J., & van Engeland, H. (2007). Post-error adaptation in adults with high functioning autism. *Neuropsychologia*, *45*(8), 1707–1714.
- Bora, E., Eryavuz, A., Kayahan, B., Sungu, G., & Veznedaroglu, B. (2006). Social functioning, theory of mind and neurocognition in outpatients with schizophrenia: mental state decoding may be a better predictor of social functioning than mental state reasoning. *Psychiatry Research*, *145*(2–3), 95–103.
- Bora, E., Yucel, M., & Pantelis, C. (2009). Theory of mind impairment in schizophrenia: meta-analysis. *Schizophrenia Research*, *109*(1), 1–9.
- Bosacki, S., & Astington, J. W. (1999). Theory of mind in preadolescence: Relations between social understanding and social competence. *Social Development*, *8*(2), 237–255. doi: 10.1111/1467-9507.00093.
- Bosco, F. M., Colle, L., De Fazio, S., Bono, A., Ruberti, S., & Tirassa, M. (2009). Th.o.m.a.s.: an exploratory assessment of theory of mind in schizophrenic subjects. *Consciousness & Cognition*, *18*(1), 306–319.
- Brocki, K. C., & Bohlin, G. (2004). Executive functions in children aged 6 to 13: a dimensional and developmental study. *Developmental Neuropsychology*, *26*(2), 571–593.
- Bruininks, R. H., Woodcock, R. W., Weatherman, R. F., & Hill, B. K. (1996). *Scales of independent behavior—revised*. Rolling Meadows, IL: Riverside Publishing.
- Brüne, M., & Bodenstein, L. (2005). Proverb comprehension reconsidered—“theory of mind” and the pragmatic use of language in schizophrenia. *Schizophrenia Research*, *75*(2), 233–239.
- Brüne, M., & Brüne-Cohrs, U. (2006). Theory of mind—evolution, ontogeny, brain mechanisms and psychopathology. *Neuroscience and Biobehavioral Reviews*, *30*(4), 437–455.
- Buckholtz, J. W., & Meyer-Lindenberg, A. (2012). Psychopathology and the human connectome: toward a transdiagnostic model of risk for mental illness. *Neuron*, *74*(6), 990–1004.

- Bühler, E., Bachmann, C., Goyert, H., Heinzel-Gutenbrunner, M., & Kamp-Becker, I. (2011). Differential diagnosis of autism spectrum disorder and attention deficit hyperactivity disorder by means of inhibitory control and “theory of mind”. *Journal of Autism and Developmental Disorders, 41*(12), 1718–1726.
- Bunge, S. A., & Zelazo, P. D. (2006). A brain-based account of the development of rule use in childhood. *Current Directions in Psychological Science, 15*(3), 118–121.
- Burgess, P. W., & Shallice, T. (1997). *Hayling sentence completion test*. Suffolk, England: Thames Valley Test Company.
- Cambridge Cognition. (1996). *CANTAB*. Cambridge, UK: Cambridge Cognition.
- Cambridge Cognition. (2006). *Neuropsychological test automated battery (CANTABeclipse) manual*. Cambridge, UK: Cambridge Cognition.
- Campbell, D. J., Shic, F., Macari, S., & Chawarska, K. (2014). Gaze response to dyadic bids at 2 years related to outcomes at 3 years in autism spectrum disorders: a subtyping analysis. *Journal of Autism and Developmental Disorders, 44*(2), 431–442.
- Capelli, C. A., Nakagawa, N., & Madden, C. M. (1990). How children understand sarcasm: the role of context and intonation. *Child Development, 61*(6), 1824–1841.
- Capone, G., Goyal, P., Ares, W., & Lannigan, E. (2006). Neurobehavioral disorders in children, adolescents, and young adults with Down syndrome. *American Journal of Medical Genetics Part C: Seminars in Medical Genetics, 142*(3), 158–172.
- Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children’s theory of mind. *Child Development, 72*(4), 1032–1053.
- Carlson, S. M., Moses, L. J., & Breton, C. (2002). How specific is the relation between executive function and theory of mind? Contributions of inhibitory control and working memory. *Infant and Child Development, 11*(2), 73–92.
- Centers for Disease Control (CDC). (2010). Increasing prevalence of parent-reported attention-deficit/hyperactivity disorder among children—United States, 2003 and 2007. *Morbidity & Mortality Weekly Report, 59*(44), 1439–1443.
- Centers for Disease Control (CDC). (2012). Prevalence of autism spectrum disorders: autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Morbidity & Mortality Weekly Report, 61*(3), 1–19.
- Chambers, C. D., Garavan, H., & Bellgrove, M. A. (2009). Insights into the neural basis of response inhibition from cognitive and clinical neuroscience. *Neuroscience & Biobehavioral Review, 33*(5), 631–646.
- Chan, R. C., Shum, D., Touloupoulou, T., & Chen, E. Y. (2008). Assessment of executive functions: review of instruments and identification of critical issues. *Archives of Clinical Neuropsychology, 23*(2), 201–216.
- Chandler, M., Boyes, M., & Ball, L. (1990). Relativism and stations of epistemic doubt. *Journal of Experimental Child Psychology, 50*(3), 376–395.
- Charman, T., Baron-Cohen, S., Swettenham, J., Baird, G., Cox, A., & Drew, A. (2000). Testing joint attention, imitation, and play as infancy precursors to language and theory of mind. *Cognitive Development, 15*(4), 481–498.
- Chatham, C. H., Yerys, B. E., & Munakata, Y. (2012). Why won’t you do what I want? The informative failures of children and models. *Cognitive Development, 27*(4), 349–366.
- Condillac, R. A. (2007). Behavioral intervention and intellectual disabilities. In I. Brown, & M. Percy (Eds.), *A comprehensive guide to intellectual and developmental disabilities* (pp. 363–372). Baltimore, MD: Paul H. Brookes Publishing.
- Cooper, S. -A., Smiley, E., Jackson, A., Finlayson, J., Allan, L., Mantry, D., & Morrison, J. (2009). Adults with intellectual disabilities: prevalence, incidence and remission of aggressive behaviour and related factors. *Journal of Intellectual Disability Research, 53*(3), 217–232.
- Corbett, B. A., Constantine, L. J., Hendren, R., Rocke, D., & Ozonoff, S. (2009). Examining executive functioning in children with autism spectrum disorder, attention deficit hyperactivity disorder and typical development. *Psychiatry Research, 166*(2-3), 210–222.
- Corcoran, R. (2001). Theory of mind and schizophrenia. In P. W. Corrigan, & D. L. Penn (Eds.), *Social cognition and schizophrenia* (pp. 149–174). Washington, DC: American Psychological Association.
- Cowan, N., Elliot, E. M., Saults, J. S., Morey, C. C., Mattox, S., Hismjatullina, A., & Conway, A. R. A. (2005). On the capacity of attention: its estimation and its role in working memory and cognitive aptitudes. *Cognitive Psychology, 51*(1), 42–100.
- Crowe, S. F., Matthews, C., & Walkenhorst, E. (2007). Relationship between worry, anxiety and thought suppression and the components of working memory in a non-clinical sample. *Australian Psychologist, 42*(3), 170–177.
- Da Young, Y., Hwang, S. S. H., Kim, Y., Lee, Y. H., Kim, Y. S., & Jung, H. Y. (2011). Impairments in executive functioning in patients with remitted and non-remitted schizophrenia. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 35*(4), 1148–1154.
- Daneman, M., & Carpenter, P. A. (1980). Individual differences in working memory and reading. *Journal of Verbal Learning and Verbal Behavior, 19*(4), 450–466.
- Daneman, M., & Merikle, P. M. (1996). Working memory and language comprehension: a meta-analysis. *Psychonomic Bulletin & Review, 3*(4), 422–433.
- Davis, M. H. (1994). *Empathy: A social psychological approach*. Madison, WI: Brown & Benchmark.
- Davis, H. L., & Pratt, C. (1995). The development of children’s theory of mind: the working memory explanation. *Australian Journal of Psychology, 47*(1), 25–31.
- De Lissnyder, E., Koster, E. H., Goubert, L., Onraedt, T., Vanderhasselt, M. A., & De Raedt, R. (2012). Cognitive control moderates the association between stress and rumination. *Journal of Behavior Therapy and Experimental Psychiatry, 43*(1), 519–525.
- De Luca, C. R., Wood, S. J., Anderson, V., Buchanan, J. A., Proffitt, T. M., Mahony, K., & Pantelis, C. (2003). Normative data from the CANTAB: I. Development of executive function over the lifespan. *Journal of Clinical and Experimental Neuropsychology, 25*(2), 242–254.
- Demeyer, I., De Lissnyder, E., Koster, E. H., & De Raedt, R. (2012). Rumination mediates the relationship between impaired cognitive control for emotional information and depressive symptoms: a prospective study in remitted depressed adults. *Behaviour Research and Therapy, 50*(5), 292–297.
- Dennis, J. P., & Vander Wal, J. S. (2010). The cognitive flexibility inventory: instrument development and estimates of reliability and validity. *Cognitive Therapy and Research, 34*(3), 241–253.

- Ditterline, J., Banner, D., Oakland, T., & Becton, D. (2008). Adaptive behavior profiles of students with disabilities. *Journal of Applied School Psychology, 24*(2), 191–208.
- Ditterline, J., & Oakland, T. (2009). Relationships between adaptive behavior and impairment. In S. Goldstein, & J. A. Naglieri (Eds.), *Assessing impairment* (pp. 31–48). New York, NY: Springer.
- Ditterline, J., & Oakland, T. (2010). Adaptive behavior. In E. Mpofu, & T. Oakland (Eds.), *Assessment in rehabilitation and health* (pp. 242–261). Boston, MA: Allyn & Bacon.
- Doherty, M. J. (2009). *Theory of mind: How children understand others' thoughts and feelings*. New York, NY: Psychology Press.
- Doll, E. A. (1936a). Current thoughts on mental deficiency. *Proceedings of the American Association on Mental Deficiency, 41*, 33–49.
- Doll, E. A. (1936b). *The Vineland Social Maturity Scale (No. 3)*. Vineland, NJ: Training School.
- Drozdzick, L. W., Holdnack, J. A., & Hilsabeck, R. C. (2011). *Essentials of WMS-IV assessment*. Hoboken, NJ: John Wiley & Sons.
- Dumontheil, I., Apperly, I. A., & Blakemore, S. J. (2010). Online use of mental state inferences continues to develop in late adolescence. *Developmental Science, 13*(2), 331–338.
- Duncan, A. W., & Bishop, S. L. (2013). Understanding the gap between cognitive abilities and daily living skills in adolescents with autism spectrum disorders with average intelligence. *Autism, 19*(1), 64–72.
- Duval, C., Piolino, P., Bejanin, A., Eustache, F., & Desgranges, B. (2011). Age effects on different components of theory of mind. *Consciousness & Cognition, 20*(3), 627–642.
- Dziobek, I., Fleck, S., Rogers, K., Wolf, O. T., & Convit, A. (2006). The “amygdala theory of autism” revisited: linking structure to behaviour. *Neuropsychologia, 44*(10), 1891–1899.
- Ekstein, S., Glick, B., Weill, M., Kay, B., & Berger, I. (2011). Down syndrome and attention-deficit/hyperactivity disorder (ADHD). *Journal of Child Neurology, 26*(10), 1290–1295.
- Elsabbagh, M., Divan, G., Koh, Y. J., Kim, Y. S., Kauchali, S., Marcín, C., & Yasamy, M. T. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research, 5*(3), 160–179.
- Endedijk, H., Denessen, E., & Hendriks, A. W. (2011). Relationships between executive functioning and homework difficulties in students with and without autism spectrum disorder: an analysis of student- and parent-reports. *Learning and Individual Differences, 21*(6), 765–770.
- Farley, M. A., McMahon, W. M., Fombonne, E., Jenson, W. R., Miller, J., Gardner, M., & Coon, H. (2009). Twenty-year outcome for individuals with autism and average or near-average cognitive abilities. *Autism Research, 2*(2), 109–118.
- Fenton, G., D’Ardia, C., Valente, D., Del Vecchio, I., Fabrizi, A., & Bernabei, P. (2003). Vineland adaptive behavior profiles in children with autism and moderate to severe developmental delay. *Autism, 7*(3), 269–287.
- Ferguson, H. J., & Breheny, R. (2012). Listeners’ eyes reveal spontaneous sensitivity to others’ perspectives. *Journal of Experimental Social Psychology, 48*(1), 257–263.
- Flavell, J. (1988). The development of children’s knowledge about the mind: from cognitive connections to mental representations. In J. Astington, P. Harris, & D. Olson (Eds.), *Developing theories of mind* (pp. 244–267). Cambridge, England: Cambridge University Press.
- Flavell, J. H., Green, F. L., & Flavell, E. R. (2000). Development of children’s awareness of their own thoughts. *Journal of Cognition & Development, 1*(1), 1–12.
- Flavell, J. H., Miller, P. H., & Miller, S. A. (2002). *Cognitive development* (4th ed.). Upper Saddle River, NJ: Prentice Hall.
- Fletcher-Watson, S., Findlay, J. M., Leekam, S. R., & Benson, V. (2008). Rapid detection of person information in a naturalistic scene. *Perception, 37*(4), 571–583.
- Flynn, E., O’Malley, C., & Wood, D. (2004). A longitudinal, microgenetic study of the emergence of false belief understanding and inhibition skills. *Developmental Science, 7*(1), 103–115.
- Fombonne, E., Siddons, F., Achard, S., Frith, U., & Happé, F. (1994). Adaptive behaviour and theory of mind in autism. *European Child & Adolescent Psychiatry, 3*(3), 176–186.
- Fray, P. J., Robbins, T. W., & Sahakian, B. J. (1996). Neuropsychiatric applications of CANTAB. *International Journal of Geriatric Psychiatry, 11*(4), 329–336.
- Frick, P. J., Barry, C. T., & Kamphaus, R. W. (2010). *Clinical assessment of child and adolescent personality and behavior* (3rd ed.). New York, NY: Springer.
- Friedman, N. P., Miyake, A., Young, S. E., DeFries, J. C., Corley, R. P., & Hewitt, J. K. (2008). Individual differences in executive functions are almost entirely genetic in origin. *Journal of Experimental Psychology: General, 137*(2), 201–225.
- Frith, C. D., & Corcoran, R. (1996). Exploring “theory of mind” in people with schizophrenia. *Psychological Medicine, 26*(3), 521–530.
- Frith, U., & Frith, C. D. (2003). Development and neurophysiology of mentalizing. *Philosophical Transactions of the Royal Society of London B: Biological Sciences, 358*(1431), 459–473.
- Frith, U., Happé, F. G. E., & Siddons, F. (1994). Autism and theory of mind in everyday life. *Social Development, 3*(2), 108–124.
- Frye, D., Zelazo, P. D., & Palfai, T. (1995). Theory of mind and rule-based reasoning. *Cognitive Development, 10*(4), 483–527.
- Gallagher, S., & Hutto, D. (2008). Understanding others through primary interaction and narrative practice. In J. Zlatev, T. P. Racine, C. Sinha, & E. Itkonen (Eds.), *The shared mind: Perspectives on intersubjectivity* (pp. 17–38). Amsterdam, The Netherlands: John Benjamins Publishing Company.
- Gallese, V., & Goldman, A. (1998). Mirror neurons and the simulation theory of mind-reading. *Trends in Cognitive Sciences, 2*(12), 493–501.
- German, T., & Hehman, J. A. (2006). Representational and executive selection resources in “theory of mind”: evidence from compromised belief-desire reasoning in old age. *Cognition, 101*(1), 129–152.
- Geurts, H. M., Corbett, B., & Solomon, M. (2009). The paradox of cognitive flexibility in autism. *Trends in Cognitive Sciences, 13*(2), 74–82.

- Gilotty, L., Kenworthy, L., Sirian, L., Black, D. O., & Wagner, A. E. (2002). Adaptive skills and executive function in autism spectrum disorders. *Child Neuropsychology*, 8(4), 241–248.
- Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2000). *BRIEF: Behavior rating inventory of executive function professional manual*. Odessa, FL: Psychological Assessment Resources.
- Gioia, G. A., Isquith, P. K., Guy, S. C., & Kenworthy, L. (2015). *Behavior rating inventory of executive function, second edition (BRIEF2)*. Odessa, FL: Psychological Assessment Resources.
- Gokcen, S., Bora, E., Erermis, S., Kesikci, H., & Aydin, C. (2009). Theory of mind and verbal working memory deficits in parents of autistic children. *Psychiatry Research*, 166(1), 46–53.
- Golan, O., & Baron-Cohen, S. (2006). Systemizing empathy: teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. *Development and Psychopathology*, 18(02), 591–617.
- Gopnik, A. (1993). How we know our minds: the illusions of first person knowledge of intentionality. *Behavioural and Brain Sciences*, 16(1), 1–14.
- Goschke, T. (2014). Dysfunctions of decision-making and cognitive control as transdiagnostic mechanisms of mental disorders: advances, gaps, and needs in current research. *International Journal of Methods in Psychiatric Research*, 23(S1), 41–57.
- Gottesman, I. I., & Gould, T. D. (2003). The endophenotype concept in psychiatry: etymology and strategic intentions. *American Journal of Psychiatry*, 160(4), 636–645.
- Graham, S., Harris, K. R., & McKeown, D. (2013). The writing of students with learning disabilities, meta-analysis of self-regulated strategy development writing intervention studies, and future directions: redux. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 405–438). (Vol. 2). New York, NY: Guilford Press.
- Green, M. F., Schooler, N. R., Kern, R. S., Frese, F. J., Granberry, W., Harvey, P. D., & Sonnenberg, J. (2011). Evaluation of functionally meaningful measures for clinical trials of cognition enhancement in schizophrenia. *American Journal of Psychiatry*, 168(4), 400–407.
- Gregory, C., Lough, S., Stone, V., Erzincliglu, S., Martin, L., Baron-Cohen, S., & Hodges, J. R. (2002). Theory of mind in patients with frontal variant frontotemporal dementia and Alzheimer's disease: theoretical and practical implications. *Brain*, 125(4), 752–764.
- Gresham, F. M., MacMillan, D. L., & Siperstein, G. N. (1995). Critical analysis of the 1992 AAMR definition: implications for school psychology. *School Psychology Quarterly*, 10(1), 1–19.
- Groth-Marnat, G. (2009). *Handbook of psychological assessment*. Hoboken, NJ: Wiley.
- Hadwin, J. A., Brogan, J., & Stevenson, J. (2005). State anxiety and working memory in children: a test of processing efficiency theory. *Educational Psychology*, 25(4), 379–393.
- Happé, F. G. (1993). Communicative competence and theory of mind in autism: a test of relevance theory. *Cognition*, 48(2), 101–119.
- Happé, F. G. (1994). An advanced test of theory of mind: understanding of story characters' thoughts and feelings by able autistic, mentally handicapped and normal children and adults. *Journal of Autism and Developmental Disorders*, 24(2), 129–154.
- Happé, F. G. (1995). The role of age and verbal ability in the theory of mind task performance of subjects with autism. *Child Development*, 66(3), 843–855.
- Happé, F., Booth, R., Charlton, R., & Hughes, C. (2006). Executive function deficits in autism spectrum disorders and attention-deficit/hyperactivity disorder: examining profiles across domains and ages. *Brain and Cognition*, 61(1), 25–39.
- Happé, F., Ehlers, S., Fletcher, P., Frith, U., Johansson, M., Gillberg, C., & Frith, C. (1996). "Theory of mind" in the brain: evidence from a PET scan study of Asperger syndrome. *Neuroreport*, 8(1), 197–201.
- Happé, F., & Frith, U. (1996). Theory of mind and social impairment in children with conduct disorder. *British Journal of Developmental Psychology*, 14(4), 385–398.
- Harris, P. L., & Duke, S. (2006). Understanding the flow of thoughts and feelings. In M. Schleifer, & C. Martiny (Eds.), *Talking to children about responsibility and control of emotions* (pp. 95–117). Calgary, AB, Canada: Detselig Enterprises.
- Harrison, P., & Oakland, T. (2003). *Adaptive behavior assessment system (ABAS-II)*. San Antonio, TX, US: The Psychological Corporation.
- Harvey, P. D., Velligan, D. I., & Bellack, A. S. (2007). Performance-based measures of functional skills: usefulness in clinical treatment studies. *Schizophrenia Bulletin*, 33(5), 1138–1148.
- Hattori, J., Ogino, T., Abiru, K., Nakano, K., Oka, M., & Ohtsuka, Y. (2006). Are pervasive developmental disorders and attention-deficit/hyperactivity disorder distinct disorders? *Brain and Development*, 28(6), 371–374.
- Hawley, L. A., & Newman, J. K. (2010). Group interactive structured treatment (GIST): a social competence intervention for individuals with brain injury. *Brain Injury*, 24(11), 1292–1297.
- Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2001). Relational frame theory: a précis. In S. C. Hayes, D. Barnes-Holmes, & B. Roche (Eds.), *Relational frame theory: A post-Skinnerian account of human language and cognition* (pp. 141–154). New York, NY: Springer Science & Business Media.
- Hazy, T. E., Frank, M. J., & O'Reilly, R. C. (2007). Towards an executive without a homunculus: computational models of the prefrontal cortex/basal ganglia system. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 362(1485), 1601–1613.
- Heaton, R. K., Chelune, G. J., Talley, J. L., Kay, G. G., & Curtiss, G. (1993). *Wisconsin card sorting manual*. Odessa, FL: Psychological Assessment Resources.
- Heber, R. (1961). *A manual on terminology and classification in mental retardation*. Washington, DC: American Association on Mental Deficiency.
- Hedden, T., & Gabrieli, J. D. (2004). Insights into the ageing mind: a view from cognitive neuroscience. *Nature*, 5(2), 87–96.
- Hendriks, A. L., Barnes-Holmes, Y., McEntegart, C., De Mey, H. R., Wittman, C. L., Janssen, G. T., & Egger, J. I. (2016). The relationship between theory of mind and relational frame theory: convergence of perspective-taking measures. *Clinical Neuropsychiatry*, 13(2), 17–23.
- Henry, J. D., Phillips, L. H., Crawford, J. R., Ietswaart, M., & Summers, F. (2006). Theory of mind following traumatic brain injury: the role of emotion recognition and executive dysfunction. *Neuropsychologia*, 44(10), 1623–1628.

- Hiatt, L. M., & Trafton, J. G. (2010). A cognitive model of theory of mind. In D. D. Salvucci & G. Gunzelmann (Eds.), *Proceedings of the 10th International Conference on Cognitive Modeling* (pp. 91–96). Philadelphia, PA: Drexel University.
- Hill, E. L. (2004). Executive dysfunction in autism. *Trends in Cognitive Sciences*, 8(1), 26–32.
- Hoelzle, J. B., Nelson, N. W., & Smith, C. A. (2011). Comparison of Wechsler Memory Scale–Fourth Edition (WMS-IV) and Third Edition (WMS-III) dimensional structures: improved ability to evaluate auditory and visual constructs. *Journal of Clinical and Experimental Neuropsychology*, 33(3), 283–291.
- Hofmann, W., Schmeichel, B. J., & Baddeley, A. D. (2012). Executive functions and self-regulation. *Trends in Cognitive Sciences*, 16(3), 174–180.
- Holtmann, M., Bölte, S., & Poustka, F. (2007). Attention deficit hyperactivity disorder symptoms in pervasive developmental disorders: association with autistic behavior domains and coexisting psychopathology. *Psychopathology*, 40(3), 172–177.
- Hoogenhout, M., & Malcolm-Smith, S. (2016). Theory of mind predicts severity level in autism. *Autism*, 21, 242–252.
- Hovik, K. T., Egeland, J., Isquith, P. K., Gioia, G., Skogli, E. W., Andersen, P. N., & Oie, M. (2014). Distinct patterns of everyday executive function problems distinguish children with Tourette syndrome from children with ADHD or autism spectrum disorders. *Journal of Attention Disorders*, 18.
- Hughes, C. (1998). Executive function in preschoolers: links with theory of mind and verbal ability. *British Journal of Developmental Psychology*, 16(2), 233–253.
- Hughes, C., Adlam, A., Happé, F., Jackson, J., Taylor, A., & Caspi, A. (2000). Good test-retest reliability for standard and advanced false-belief tasks across a wide range of abilities. *Journal of Child Psychology and Psychiatry*, 41(04), 483–490.
- Hughes, C., Fujisawa, K. K., Rosie, E., Lecce, S., & Marfleet, R. (2006). Cooperation and conversation about the mind: a study of individual differences in 2-year-olds and their siblings. *British Journal of Developmental Psychology*, 24(1), 53–72.
- Hutchins, T. L., Bonazinga, L. A., Prelock, P. A., & Taylor, R. S. (2008). Beyond false beliefs: the development and psychometric evaluation of the Perceptions of Children's Theory of Mind Measure–Experimental Version (PCToMM-E). *Journal of Autism and Developmental Disorders*, 38(1), 143–155.
- Hutchins, T. L., & Prelock, P. A. (2008). Supporting theory of mind development: considerations and recommendations for professionals providing services to individuals with autism spectrum disorder. *Topics in Language Disorders*, 28(4), 340–364.
- Isquith, P. K., Roth, R. M., & Gioia, G. (2013). Contribution of rating scales to the assessment of executive functions. *Applied Neuropsychology: Child*, 2(2), 125–132.
- Jacobson, J. W., & Mulick, J. A. E. (1996). *Manual of diagnosis and professional practice in mental retardation*. Washington, DC: American Psychological Association.
- Jacobson, L. A., Williford, A. P., & Pianta, R. C. (2011). The role of executive function in children's competent adjustment to middle school. *Child Neuropsychology*, 17(3), 255–280.
- Jaeggi, S. M., Buschkuhl, M., Jonides, J., & Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. *Proceedings of the National Academy of Sciences*, 105(19), 6829–6833.
- Jahromi, L. B., Bryce, C. I., & Swanson, J. (2013). The importance of self-regulation for the school and peer engagement of children with high-functioning autism. *Research in Autism Spectrum Disorders*, 7(2), 235–246.
- Jarrold, C., & Towse, J. N. (2006). Individual differences in working memory. *Neuroscience*, 139(1), 39–50.
- Jones, A. P., & Frederickson, N. (2010). Multi-informant predictors of social inclusion for students with autism spectrum disorders attending mainstream school. *Journal of Autism and Developmental Disorders*, 40(9), 1094–1103.
- Joseph, R. M., & Tager-Flusberg, H. (2004). The relationship between theory of mind and executive functions to symptom type and severity in children with autism. *Development and Psychopathology*, 16(1), 137–155.
- Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: a review of our current understanding. *Neuropsychology Review*, 17(3), 213–233.
- Kafadar, H. (2004). *Prediction of fluid intelligence through performance intelligence, verbal intelligence, executive functions, working memory, selective attention and short term memory processes*. Ankara, Turkey: Hacettepe University.
- Kamp-Becker, I., Ghahreman, M., Smidt, J., & Remschmidt, H. (2008). Dimensional structure of the autism phenotype: relations between early development and current presentation. *Journal of Autism and Developmental Disorders*, 39(4), 557–571.
- Kane, M. J., Bleckley, M. K., Conway, A. R., & Engle, R. W. (2001). A controlled-attention view of working-memory capacity. *Journal of Experimental Psychology: General*, 130(2), 169–183.
- Kane, M. J., Conway, A. R. A., Hambrick, D. Z., & Engle, R. W. (2007a). Variation in working memory capacity as variation in executive attention and control. In A. R. A. Conway, C. Jarrold, M. J. Kane, A. Miyake, & J. N. Towse (Eds.), *Variation in working memory* (pp. 21–48). (Vol. 1). New York, NY: Oxford University Press.
- Kane, M. J., Conway, A. R., Miura, T. K., & Colflesh, G. J. (2007b). Working memory, attention control, and the *N*-back task: a question of construct validity. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 33(3), 615–622.
- Kanne, S. M., Gerber, A. J., Quirnbach, L. M., Sparrow, S. S., Cicchetti, D. V., & Saulnier, C. A. (2011). The role of adaptive behavior in autism spectrum disorders: implications for functional outcome. *Journal of Autism and Developmental Disorders*, 41(8), 1007–1018.
- Kane, M. J., Hambrick, D. Z., & Conway, A. R. (2005). Working memory capacity and fluid intelligence are strongly related constructs: comment on Ackerman, Beier, and Boyle (2005). *Psychological Bulletin*, 131(1), 66–71.
- Keenan, T., Olson, D. R., & Marini, Z. (1998). Working memory and children's developing understanding of mind. *Australian Journal of Psychology*, 50(2), 76–82.
- Kenworthy, L., Yerys, B. E., Anthony, L. G., & Wallace, G. L. (2008). Understanding executive control in autism spectrum disorders in the lab and in the real world. *Neuropsychology Review*, 18(4), 320–338.

- Keysar, B., Lin, S., & Barr, D. J. (2003). Limits on theory of mind use in adults. *Cognition*, 89(1), 25–41.
- Kirchner, W. K. (1958). Age differences in short-term retention of rapidly changing information. *Journal of Experimental Psychology*, 55(4), 352–358.
- Klein, A. M., Zwickel, J., Prinz, W., & Frith, U. (2009). Animated triangles: an eye tracking investigation. *The Quarterly Journal of Experimental Psychology*, 62(6), 1189–1197.
- Klin, A., Saulnier, C. A., Sparrow, S. S., Cicchetti, D. V., Volkmar, F. R., & Lord, C. (2007). Social and communication abilities and disabilities in higher functioning individuals with autism spectrum disorders: the Vineland and the ADOS. *Journal of Autism and Developmental Disorders*, 37(4), 748–759.
- Ladegaard, N., Larsen, E. R., Videbech, P., & Lysaker, P. H. (2014). Higher-order social cognition in first-episode major depression. *Psychiatry Research*, 216(1), 37–43.
- Laeng, B., Sirois, S., & Gredebäck, G. (2012). Pupillometry: a window to the preconscious? *Perspectives on Psychological Science*, 7(1), 18–27.
- Lee, H. J., & Park, H. R. (2007). An integrated literature review on the adaptive behavior of individuals with Asperger syndrome. *Remedial and Special Education*, 28(3), 132–139.
- Leland, H., Shellhaas, M., Nihira, K., & Foster, R. (1967). Adaptive behavior: a new dimension in the classification of the mentally retarded. *Mental Retardation Abstracts*, 4(3), 359–3871967.
- Lerner, M. D., Hutchins, T. L., & Prelock, P. A. (2011). Brief report: preliminary evaluation of the theory of mind inventory and its relationship to measures of social skills. *Journal of Autism and Developmental Disorders*, 41(4), 512–517.
- Leslie, A. M. (2005). Developmental parallels in understanding minds and bodies. *Trends in Cognitive Sciences*, 9(10), 459–462.
- Leslie, A. M., Friedman, O., & German, T. P. (2004). Core mechanisms in “theory of mind”. *Trends in Cognitive Sciences*, 8(12), 528–533.
- Levaux, M. N., Potvin, S., Sepehry, A. A., Sablier, J., Mendrek, A., & Stip, E. (2007). Computerized assessment of cognition in schizophrenia: promises and pitfalls of CANTAB. *European Psychiatry*, 22(2), 104–115.
- Leyfer, O. T., Woodruff-Borden, J., Klein-Tasman, B. P., Fricke, J. S., & Mervis, C. B. (2006). Prevalence of psychiatric disorders in 4 to 16-year-olds with Williams syndrome. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 141(6), 615–622.
- Lezak, M. D., Howieson, D. B., Bigler, E. D., & Tranel, D. (2012). *Neuropsychological assessment* (5th ed.). New York, NY: Oxford University Press.
- Liotti, M., Pliszka, S. R., Perez, R., Luus, B., Glahn, D., & Semrud-Clikeman, M. (2007). Electrophysiological correlates of response inhibition in children and adolescents with ADHD: influence of gender, age, and previous treatment history. *Psychophysiology*, 44(6), 936–948.
- Lopata, C., Fox, J. D., Thomeer, M. L., Smith, R. A., Volker, M. A., Kessel, C. M., & Lee, G. K. (2012). ABAS-II ratings and correlates of adaptive behavior in children with HFASDs. *Journal of Developmental and Physical Disabilities*, 24(4), 391–402.
- Lopata, C., Smith, R. A., Volker, M. A., Thomeer, M. L., Lee, G. K., & McDonald, C. A. (2013). Comparison of adaptive behavior measures for children with HFASDs. *Autism Research and Treatment*, 2013.
- Lowe, C., & Rabbitt, P. (1998). Test/re-test reliability of the CANTAB and ISPOCD neuropsychological batteries: theoretical and practical issues. *Neuropsychologia*, 36(9), 915–923.
- Lucariello, J. M., Durand, T. M., & Yarnell, L. (2007). Social versus intrapersonal ToM: social ToM is a cognitive strength for low- and middle-SES children. *Journal of Applied Developmental Psychology*, 28(4), 285–297.
- Luciana, M., & Nelson, C. A. (2002). Assessment of neuropsychological function through use of the Cambridge Neuropsychological Testing Automated Battery: performance in 4- to 12-year-old children. *Developmental Neuropsychology*, 22(3), 595–624.
- Luckasson, R., Borthwick-Duffy, S., Buntinx, W., Coulter, D., Craig, P., Reeve, A., & Tasse, M. J. (2002). *Mental retardation: Definition, classification and systems of supports*. Washington, DC: American Association on Mental Retardation.
- Lundervold, A. J., Stickert, M., Hysing, M., Sorensen, L., Gillberg, C., & Posserud, M. B. (2012). Attention deficits in children with combined autism and ADHD: a CPT study. *Journal of Attention Disorders*, 20, 599–609.
- Lyons, J., Cappadocia, M. C., & Weiss, J. A. (2011). Brief report: social characteristics of students with autism spectrum disorders across classroom settings. *Journal on Developmental Disabilities*, 17(1), 77–88.
- MacCabe, J. H., & Murray, R. M. (2004). Intellectual functioning in schizophrenia: a marker of neurodevelopmental damage? *Journal of Intellectual Disability Research*, 48(6), 519–523.
- Mackworth, J. F. (1959). Paced memorizing in a continuous task. *Journal of Experimental Psychology*, 58(3), 206–211.
- MacMillan, D. L., Gresham, F. M., Siperstein, G. N., & Bocian, K. M. (1996a). The labyrinth of IDEA: school decisions on referred students with sub-average general intelligence. *American Journal on Mental Retardation*, 101(2), 161–174.
- MacMillan, D. L., Siperstein, G. N., & Gresham, F. M. (1996b). A challenge to the viability of mild mental retardation as a diagnostic category. *Exceptional Children*, 62(4), 356–371.
- Mason, L. H., Harris, K. R., & Graham, S. (2011). Self-regulated strategy development for students with writing difficulties. *Theory Into Practice*, 50(1), 20–27.
- Mattison, R. E., & Mayes, S. D. (2012). Relationships between learning disability, executive function, and psychopathology in children with ADHD. *Journal of Attention Disorders*, 16(2), 138–146.
- Mausbach, B. T., Harvey, P. D., Goldman, S. R., Jeste, D. V., & Patterson, T. L. (2007). Development of a brief scale of everyday functioning in persons with serious mental illness. *Schizophrenia Bulletin*, 33(6), 1364–1372.
- Mausbach, B. T., Harvey, P. D., Pulver, A. E., Depp, C. A., Wolyniec, P. S., Thornquist, M. H., & Patterson, T. L. (2010). Relationship of the Brief UCSD Performance-Based Skills Assessment (UPSA-B) to multiple indicators of functioning in people with schizophrenia and bipolar disorder. *Bipolar Disorders*, 12(1), 45–55.
- Mazefsky, C. A., Williams, D. L., & Minshew, N. J. (2008). Variability in adaptive behavior in autism: evidence for the importance of family history. *Journal of Abnormal Child Psychology*, 36(4), 591–599.

- McCabe, D. P., Roediger, H. L., III, McDaniel, M. A., Balota, D. A., & Hambrick, D. Z. (2010). The relationship between working memory capacity and executive functioning: evidence for a common executive attention construct. *Neuropsychology, 24*(2), 222–243.
- McDonald, S. (2013). Impairments in social cognition following severe traumatic brain injury. *Journal of the International Neuropsychological Society, 19*(03), 231–246.
- McDonald, S., Bornhofen, C., Shum, D., Long, E., Saunders, C., & Neulinger, K. (2006). Reliability and validity of The Awareness of Social Inference Test (TASIT): a clinical test of social perception. *Disability and Rehabilitation, 28*(24), 1529–1542.
- McDonald, S., Flanagan, S., Rollins, J., & Kinch, J. (2003). TASIT: a new clinical tool for assessing social perception after traumatic brain injury. *The Journal of Head Trauma Rehabilitation, 18*(3), 219–238.
- McGurk, S. R., & Meltzer, H. Y. (2000). The role of cognition in vocational functioning in schizophrenia. *Schizophrenia Research, 45*(3), 175–184.
- McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research and Therapy, 49*(3), 186–193.
- McRae, K., Jacobs, S. E., Ray, R. D., John, O. P., & Gross, J. J. (2012). Individual differences in reappraisal ability: links to reappraisal frequency, well-being, and cognitive control. *Journal of Research in Personality, 46*(1), 2–7.
- Meltzer, L., & Krishnan, K. (2007). Executive function difficulties and learning disabilities. In L. Meltzer (Ed.), *Executive function in education: From theory to practice* (pp. 77–105). New York, NY: Guilford Press.
- Meltzoff, A. N., Kuhl, P. K., Movellan, J., & Sejnowski, T. J. (2009). Foundations for a new science of learning. *Science, 325*(5938), 284–288.
- Miller, C. A. (2006). Developmental relationships between language and theory of mind. *American Journal of Speech-Language Pathology, 15*(2), 142–154.
- Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: meta-analysis of the relation between language ability and false-belief understanding. *Child Development, 78*(2), 622–646.
- Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: a latent variable analysis. *Cognitive Psychology, 41*(1), 49–100.
- Montag, C., Ehrlich, A., Neuhaus, K., Dziobek, I., Heekeren, H. R., Heinz, A., & Gallinat, J. (2009). Theory of mind impairments in euthymic bipolar patients. *Journal of Affective Disorders, 123*(1), 264–269.
- Montgomery, J. W. (1995). Sentence comprehension in children with specific language impairment: the role of phonological working memory. *Journal of Speech, Language, and Hearing Research, 38*, 187–199.
- Muris, P., Steerneman, P., Meesters, C., Merckelbach, H., Horselenberg, R., Van den Hogen, T., & van Dongen, L. (1999). The TOM test: a new instrument for assessing theory of mind in normal children and children with pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 29*(1), 67–80.
- Naglieri, J. A., & Goldstein, S. (2013). *Comprehensive executive function inventory*. North Tonawanda, NY: Multi-Health Systems.
- Neider, P. L., Dozier, C. L., Iwata, B. A., & Hafen, M. (2010). Behavior analysis in intellectual and developmental disabilities. *Psychological Services, 7*(2), 103–113.
- Nihira, K. (1999). Adaptive behavior: a historical overview. In R. L. Schalock (Ed.), *Adaptive behavior and its measurement: Implications for the field of mental retardation* (pp. 7–14). Washington, DC: American Association on Mental Retardation.
- Nihira, K., Foster, R., Shellhaas, M., & Leland, H. (1968). *Adaptive behavior checklist*. Washington, DC: American Association on Mental Deficiency.
- Nolen-Hoeksema, S., & Watkins, E. R. (2011). A heuristic for developing transdiagnostic models of psychopathology explaining multifinality and divergent trajectories. *Perspectives on Psychological Science, 6*(6), 589–609.
- Oakland, T., & Daley, M. (2013). Adaptive behavior: its history, concepts, assessment, and applications. In K. F. Geisinger (Ed.), *APA handbook of testing and assessment in psychology: Testing and assessment in school psychology and education* (pp. 183–212). (Vol. 3). Washington, DC: American Psychological Association.
- Oberauer, K. (2003). Selective attention to elements in working memory. *Experimental Psychology, 50*(4), 257–269.
- Oberauer, K. (2005). Binding and inhibition in working memory: individual and age differences in short-term recognition. *Journal of Experimental Psychology: General, 134*(3), 368–387.
- Oberauer, K., Süß, H. M., Schulze, R., Wilhelm, O., & Wittmann, W. W. (2000). Working memory capacity—facets of a cognitive ability construct. *Personality and Individual Differences, 29*(6), 1017–1045.
- Palade, S., & Benga, I. (2007). Neuropsychological impairments on the Cantab test battery: case reports of children with frontal and temporal lobe epilepsy. *Cognitie, Creier, Comportament/Cognition, Brain, Behavior, 11*(3), 539–552.
- Parsons, T. D., & Carlew, A. R. (2016). Bimodal virtual reality Stroop for assessing distractor inhibition in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 46*(4), 1255–1267.
- Patterson, T. L., Goldman, S., McKibbin, C. L., Hughs, T., & Jeste, D. V. (2001). UCSD Performance-Based Skills Assessment: development of a new measure of everyday functioning for severely mentally ill adults. *Schizophrenia Bulletin, 27*(2), 235–245.
- Pelham, W. E., Jr., Fabiano, G. A., & Massetti, G. M. (2005). Evidence-based assessment of attention deficit hyperactivity disorder in children and adolescents. *Journal of Clinical Child and Adolescent Psychology, 34*(3), 449–476.
- Pellicano, E. (2010). Individual differences in executive function and central coherence predict developmental changes in theory of mind in autism. *Developmental Psychology, 46*(2), 530–544.
- Perner, J. (1991). *Understanding the representational mind*. Cambridge, MA, England: MIT Press.
- Perner, J. (1998). The meta-intentional nature of executive functions and theory of mind. In P. Carruthers, & J. Boucher (Eds.), *Language and thought: Interdisciplinary themes* (pp. 270–283). Cambridge, England: Cambridge University Press.

- Perner, J., Frith, U., Leslie, A., & Leekam, S. R. (1989). Exploration of the autistic child's theory of mind: knowledge, belief and communication. *Child Development, 60*(3), 689–700.
- Perner, J., & Lang, B. (1999). Development of theory of mind and executive control. *Trends in Cognitive Sciences, 3*(9), 337–344.
- Perner, J., & Lang, B. (2000). Theory of mind and executive function: is there a developmental relationship? In S. Baron-Cohen, T. Tager-Flusberg, & D. Cohen (Eds.), *Understanding other minds: Perspectives from developmental cognitive neuroscience* (pp. 150–181). Oxford, UK: Oxford University Press.
- Perner, J., & Wimmer, H. (1985). "John thinks that Mary thinks that"—attribution of 2nd order beliefs by 5-year-old to 10-year-old children. *Journal of Experimental Child Psychology, 39*(3), 437–471.
- Perry, A., Flanagan, H. E., Geier, J. D., & Freeman, N. L. (2009). Brief report: the Vineland Adaptive Behavior Scales in young children with autism spectrum disorders at different cognitive levels. *Journal of Autism and Developmental Disorders, 39*(7), 1066–1078.
- Peterson, C. C., Wellman, H. M., & Slaughter, V. (2012). The mind behind the message: Advancing theory of mind scales for typically developing children, and those with deafness, autism, or Asperger Syndrome. *Child Development, 83*(2), 469–485.
- Phillips, L. H., Bull, R., Allen, R., Insch, P., Burr, K., & Ogg, W. (2011). Lifespan aging and belief reasoning: influences of executive function and social cue decoding. *Cognition, 120*(2), 236–247.
- Pickering, S., & Gathercole, S. E. (2001). *Working memory test battery for children (WMTB-C)*. London, UK: Psychological Corporation.
- Pickup, G. (2006). Theory of mind and its relation to schizotypy. *Cognitive Neuropsychiatry, 11*(2), 117–192.
- Poletti, M., Enrici, I., & Adenzato, M. (2012). Cognitive and affective theory of mind in neurodegenerative diseases: neuropsychological, neuroanatomical and neurochemical levels. *Neuroscience & Biobehavioral Reviews, 36*(9), 2147–2164.
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a theory of mind? *Behavioural and Brain Sciences, 1*(4), 515–526.
- Prior, M., Dahlstrom, B., & Squires, T. L. (1990). Autistic children's knowledge of thinking and feeling states in other people. *Journal of Child Psychology and Psychiatry, 31*(4), 587–601.
- Pugliese, C. E., Anthony, L., Strang, J. F., Dudley, K., Wallace, G. L., & Kenworthy, L. (2015). Increasing adaptive behavior skill deficits from childhood to adolescence in autism spectrum disorder: role of executive function. *Journal of Autism and Developmental Disorders, 45*(6), 1579–1587.
- Ramsay, M. C., & Reynolds, C. R. (1995). Separate digits tests: a brief history, a literature review, and a reexamination of the factor structure of the Test of Memory and Learning (TOMAL). *Neuropsychology Review, 5*(3), 151–171.
- Rasmussen, C., Soleimani, S., Carroll, A., & Hodlevskyy, O. (2009). Neuropsychological functioning in children with Tourette syndrome (TS). *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 18*, 307–315.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *Behavior assessment scale for children*. Bloomington, MN: Pearson Assessments.
- Reynolds, C. R., & Kamphaus, R. W. (2006). *BASC-2: Behavior assessment system for children—second edition*. Upper Saddle River, NJ: Pearson Education.
- Rhodes, S. M., Riby, D. M., Matthews, K., & Coghill, D. R. (2011). Attention-deficit/hyperactivity disorder and Williams syndrome: shared behavioral and neuropsychological profiles. *Journal of Clinical and Experimental Neuropsychology, 33*(1), 147–156.
- Riccio, C. A., Hewitt, L. L., & Blake, J. J. (2011). Relation of measures of executive function to aggressive behavior in children. *Applied Neuropsychology, 18*(1), 1–10.
- Rich, E. C., Loo, S. K., Yang, M., Dang, J., & Smalley, S. L. (2009). Social functioning difficulties in ADHD: association with PDD risk. *Clinical Child Psychology and Psychiatry, 14*(3), 329–344.
- Robbins, T. W., James, M., Owen, A. M., Sahakian, B. J., Lawrence, A. D., McInnes, L., & Rabbitt, P. M. (1998). A study of performance on tests from the CANTAB battery sensitive to frontal lobe dysfunction in a large sample of normal volunteers: implications for theories of executive functioning and cognitive aging. *Journal of the International Neuropsychological Society, 4*(05), 474–490.
- Rogers, K., Dziobek, I., Hassenstab, J., Wolf, O. T., & Convit, A. (2007). Who cares? Revisiting empathy in Asperger syndrome. *Journal of Autism and Developmental Disorders, 37*(4), 709–715.
- Rosenthal, M., Wallace, G. L., Lawson, R., Wills, M. C., Dixon, E., Yerys, B. E., & Kenworthy, L. (2013). Impairments in real-world executive function increase from childhood to adolescence in autism spectrum disorders. *Neuropsychology, 27*(1), 13–18.
- Rubio-Fernández, P., & Glucksberg, S. (2012). Reasoning about other people's beliefs: bilinguals have an advantage. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 38*(1), 211–217.
- Rueda, M. R., Rothbart, M. K., McCandliss, B. D., Saccomanno, L., & Posner, M. I. (2005). Training, maturation, and genetic influences on the development of executive attention. *Proceedings of the National Academy of Sciences of the United States of America, 102*(41), 14931–14936.
- Ruscio, A. M., Chiu, W. T., Roy-Byrne, P., Stang, P. E., Stein, D. J., Wittchen, H. U., & Kessler, R. C. (2007). Broadening the definition of generalized anxiety disorder: effects on prevalence and associations with other disorders in the National Comorbidity Survey Replication. *Journal of Anxiety Disorders, 21*(5), 662–676.
- Russell, E. W. (1975). A multiple scoring method for the assessment of complex memory functions. *Journal of Consulting and Clinical Psychology, 43*(6), 800–809.
- Russell, E. W. (1988). Renorming Russell's version of the Wechsler Memory Scale. *Journal of Clinical and Experimental Neuropsychology, 10*(2), 235–249.
- Russell, J. (1996). *Agency: Its role in mental development*. Hove, UK: Lawrence Erlbaum.
- Russell, J. (1997). How executive disorders can bring about an adequate theory of mind. In J. Russell (Ed.), *Autism as an executive disorder* (pp. 256–304). Oxford, UK: Oxford University Press.
- Rutherford, M. D., Baron-Cohen, S., & Wheelwright, S. (2002). Reading the mind in the voice: a study with normal adults and adults with Asperger syndrome and high functioning autism. *Journal of Autism and Developmental Disorders, 32*(3), 189–194.

- Sabbagh, M. A. (2006). Executive functioning and preschoolers' understanding of false beliefs, false photographs, and false signs. *Child Development*, 77(4), 1034–1049.
- Sabbagh, M. A., Moulson, M. C., & Harkness, K. L. (2004). Neural correlates of mental state decoding in human adults: an event-related potential study. *Journal of Cognitive Neuroscience*, 16(3), 415–426.
- Sabbagh, M. A., Xu, F., Carlson, S. M., Moses, L. J., & Lee, K. (2006). The development of executive functioning and theory of mind: a comparison of Chinese and U.S. preschoolers. *Psychological Science*, 17(1), 74–81.
- Sahakian, B. J., Morris, R. G., Evenden, J. L., Heald, A., Levy, R., Philpot, M., & Robbins, T. W. (1988). A comparative study of visuospatial memory and learning in Alzheimer-type dementia and Parkinson's disease. *Brain*, 111(3), 695–718.
- Salthouse, T. A., Babcock, R. L., & Shaw, R. J. (1991). Effects of adult age on structural and operational capacities in working memory. *Psychology and Aging*, 6(1), 118–127.
- Samson, A. C., Lackner, H. K., Weiss, E. M., & Papousek, I. (2012). Perception of other people's mental states affects humor in social anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*, 43(1), 625–631.
- Sayin, A., Oral, N., Utku, C., Baysak, E., & Candansayar, S. (2010). Theory of mind in obsessive-compulsive disorder: comparison with healthy controls. *European Psychiatry: The Journal of the Association of European Psychiatrists*, 25(2), 116–122.
- Schaafsma, S. M., Pfaff, D. W., Spunt, R. P., & Adolphs, R. (2015). Deconstructing and reconstructing theory of mind. *Trends in Cognitive Sciences*, 19(2), 65–72.
- Schachar, R., Logan, G. D., Robaey, P., Chen, S., Ickowicz, A., & Barr, C. (2007). Restraint and cancellation: multiple inhibition deficits in attention deficit hyperactivity disorder. *Journal of Abnormal Child Psychology*, 35(2), 229–238.
- Schalock, R. L., Borthwick-Duffy, S. A., Bradley, V. J., Buntinx, W. H., Coulter, D. L., Craig, E. M., & Shogren, K. A. (2010). *Intellectual disability: Definition, classification, and systems of supports*. Washington, DC: American Association on Intellectual and Developmental Disabilities.
- Schmiedek, F., Lövdén, M., & Lindenberger, U. (2013). Keeping it steady: older adults perform more consistently on cognitive tasks than younger adults. *Psychological Science*, 24(9), 1747–1754.
- Schneider, D., Bayliss, A. P., Becker, S. I., & Dux, P. E. (2012a). Eye movements reveal sustained implicit processing of others' mental states. *Journal of Experimental Psychology: General*, 141(3), 433–438.
- Schneider, M., Debbané, M., Bassett, A. S., Chow, E. W., Fung, W. L. A., van den Bree, M. B., & Antshel, K. M. (2014). Psychiatric disorders from childhood to adulthood in 22q11.2 deletion syndrome: results from the International Consortium on Brain and Behavior in 22q11.2 Deletion Syndrome. *American Journal of Psychiatry*, 171(6), 627–639.
- Schneider, D., Lam, R., Bayliss, A. P., & Dux, P. E. (2012b). Cognitive load disrupts implicit theory-of-mind processing. *Psychological Science*, 23(8), 842–847.
- Senju, A., Southgate, V., White, S., & Frith, U. (2009). Mindblind eyes: an absence of spontaneous theory of mind in Asperger syndrome. *Science*, 325(5942), 883–885.
- Shamay-Tsoory, S. G. (2011). The neural bases for empathy. *Neuroscientist*, 17(1), 18–24.
- Shimoni, H. N., Weizman, A., Yoran, R. H., & Raviv, A. (2012). Theory of mind, severity of autistic symptoms and parental correlates in children and adolescents with Asperger syndrome. *Psychiatry Research*, 197(1), 85–89.
- Shing, Y. L., Schmiedek, F., Lövdén, M., & Lindenberger, U. (2012). Memory updating practice across 100 days in the COGITO study. *Psychology and Aging*, 27(2), 451–461.
- Sikora, D. M., Vora, P., Coury, D. L., & Rosenberg, D. (2012). Attention-deficit/hyperactivity disorder symptoms, adaptive functioning, and quality of life in children with autism spectrum disorder. *Pediatrics*, 130(2), S91–S97.
- Slaughter, V., & Perez-Zapata, D. (2014). Cultural variations in the development of mind reading. *Child Development Perspectives*, 8(4), 237–241.
- Slessor, G., Phillips, L. H., & Bull, R. (2007). Exploring the specificity of age-related differences in theory of mind tasks. *Psychology and Aging*, 22(3), 639–643.
- Smeets, T., Dziobek, I., & Wolf, O. T. (2009). Social cognition under stress: differential effects of stress-induced cortisol elevations in healthy young men and women. *Hormones and Behaviour*, 55(4), 507–513.
- Snyder, H. R., Hutchison, N., Nyhus, E., Curran, T., Banich, M. T., O'Reilly, R. C., & Munakata, Y. (2010). Neural inhibition enables selection during language processing. *Proceedings of the National Academy of Sciences*, 107(38), 16483–16488.
- Snyder, H. R., Kaiser, R. H., Whisman, M. A., Turner, A. E., Guild, R. M., & Munakata, Y. (2014). Opposite effects of anxiety and depressive symptoms on executive function: the case of selecting among competing options. *Cognition & Emotion*, 28(5), 893–902.
- Söderqvist, S., Bergman Nutley, S., Ottersen, J., Grill, K. M., & Klingberg, T. (2012). Computerized training of non-verbal reasoning and working memory in children with intellectual disability. *Frontiers in Human Neuroscience*, 6, 271.
- Solomon, M., Buaminger, N., & Rogers, S. J. (2011). Abstract reasoning and friendship in high functioning preadolescents with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 41(1), 32–43.
- Sonuga-Barke, E. J., Wiersma, J. R., van der Meere, J. J., & Roeyers, H. (2010). Context-dependent dynamic processes in attention deficit/hyperactivity disorder: differentiating common and unique effects of state regulation deficits and delay aversion. *Neuropsychology Review*, 20(1), 86–102.
- Southgate, V., Senju, A., & Csibra, G. (2007). Action anticipation through attribution of false belief by 2-year-olds. *Psychological Science*, 18(7), 587–592.
- Sparrow, S., Balla, D., & Cicchetti, D. (1984). *Vineland adaptive behavior scales (survey form)*. Circle Pines, MN: American Guidance Service.
- Sparrow, S. S., & Cicchetti, D. V. (1985). Diagnostic uses of the Vineland adaptive behavior scales. *Journal of Pediatric Psychology*, 10(2), 215–225.
- Sparrow, S. S., Cicchetti, D. V., & Balla, D. A. (2005). *Vineland Adaptive Behavior Scales*. Minneapolis, MN: NCS Pearson.
- Sprong, M., Schothorst, P., Vos, E., Hox, J., & Van Engeland, H. (2007). Theory of mind in schizophrenia. *British Journal of Psychiatry*, 191(1), 5–13.

- Sprung, M. (2008). Unwanted intrusive thoughts and cognitive functioning in kindergarten and young elementary school-age children following Hurricane Katrina. *Journal of Clinical Child and Adolescent Psychology, 37*(3), 575–587.
- Sprung, M., & Harris, P. L. (2010). Intrusive thoughts and young children's knowledge about thinking following a natural disaster. *Journal of Child Psychology and Psychiatry, 51*(10), 1115–1124.
- Steele, S. D., Minshew, N. J., Luna, B., & Sweeney, J. A. (2007). Spatial working memory deficits in autism. *Journal of Autism and Developmental Disorders, 37*(4), 605–612.
- Steeneman, P., Meesters, C., & Muris, P. (2002). *Tom-test*. Leuven-Apeldoorn, Belgium: Garant.
- Tager-Flusberg, H. (1992). Autistic children's talk about psychological states: deficits in the early acquisition of a theory of mind. *Child Development, 63*(1), 161–172.
- Tager-Flusberg, H. (1993). What language reveals about the understanding of minds in children with autism. In S. Baron-Cohen, H. Tager-Flusberg, & D. H. Cohen (Eds.), *Understanding other minds: Perspectives from autism* (pp. 138–153). New York, NY: Oxford University Press.
- Tager-Flusberg, H. (2000). The challenge of studying language development in children with autism. In L. Menn, & N. Bernstein Ratner (Eds.), *Methods for studying language production* (pp. 313–332). Mahwah, NJ: Lawrence Erlbaum.
- Tager-Flusberg, H. (2001). A re-examination of the theory of mind hypothesis of autism. In J. Burack, T. Charman, N. Yirmiya, & P. R. Zelazo (Eds.), *Development in autism: Perspectives from theory and research* (pp. 173–193). Hillsdale, NJ: Lawrence Erlbaum.
- Tager-Flusberg, H. (2003). Exploring the relationships between theory of mind and social-communicative functioning in children with autism. In B. Rapacholi, & V. Slaughter (Eds.), *Individual differences in theory of mind: Implications for typical and atypical development* (pp. 197–212). London, England: Psychology Press.
- Tager-Flusberg, H. (2007). Evaluating the theory-of-mind hypothesis of autism. *Current Directions in Psychological Science, 16*(6), 311–315.
- Tanenhaus, M. K., & Spivey-Knowlton, M. J. (1996). Eye-tracking. *Language and Cognitive Processes, 11*(6), 583–588.
- Tassé, M. J. (2009). Adaptive behavior assessment and the diagnosis of mental retardation in capital cases. *Applied Neuropsychology, 16*(2), 114–123.
- Tassé, M. J., Schalock, R. L., Balboni, G., Bersani, H., Borthwick-Duffy, S. A., & Spreat, S. (2014). *Diagnostic adaptive behavior scale (DABS)*. Washington, DC: American Association on Intellectual and Developmental Disabilities.
- Thirion-Marissiaux, A. F., & Nader-Grosbois, N. (2008). Theory of mind and socio-affective abilities in disabled children and adolescents. *ALTER—European Journal of Disability Research/Revue Européenne de Recherche sur le Handicap, 2*(2), 133–155.
- Tine, M., & Lucariello, J. (2012). Unique theory of mind differentiation in children with autism and Asperger syndrome. *Autism Research and Treatment, 2012*, 11.
- Torgersen, J., Helland, C., Flaatten, H., & Wester, K. (2010). Reversible dyscognition in patients with a unilateral, middle fossa arachnoid cyst revealed by using a laptop based neuropsychological test battery (CANTAB). *Journal of Neurology, 257*(11), 1909–1916.
- Unsworth, N., & Engle, R. W. (2007). On the division of short-term and working memory: an examination of simple and complex span and their relation to higher order abilities. *Psychological Bulletin, 133*(6), 1038–1066.
- US Department of Health and Human Services. (2000). *The Developmental Disabilities Assistance and Bill of Rights Act of 2000*. Washington, DC: American Association of University Affiliated Programs.
- van der Meer, J. M., Oerlemans, A. M., van Steijn, D. J., Lappenschaar, M. G., de Sonnevile, L. M., Buitelaar, J. K., & Rommelse, N. N. (2012). Are autism spectrum disorder and attention-deficit/hyperactivity disorder different manifestations of one overarching disorder? Cognitive and symptom evidence from a clinical and population-based sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(11), 1160–1172.
- Van der Molen, M. J., Van Luit, J. E. H., Jongmans, M. J., & Van der Molen, M. W. (2009). Memory profiles in children with mild intellectual disabilities: strengths and weaknesses. *Research in Developmental Disabilities, 30*, 1237–1247.
- Velligan, D. I., Diamond, P., Glahn, D. C., Ritch, J., Maples, N., Castillo, D., & Miller, A. L. (2007). The reliability and validity of the Test of Adaptive Behavior in Schizophrenia (TABS). *Psychiatry Research, 151*(1), 55–66.
- Velligan, D. I., Mahurin, R. K., Diamond, P. L., Hazleton, B. C., Eckert, S. L., & Miller, A. L. (1997). The functional significance of symptomatology and cognitive function in schizophrenia. *Schizophrenia Research, 25*(1), 21–31.
- Walls, R. T., & Werner, T. J. (1977). Vocational behavior checklists. *Mental Retardation, 15*(4), 30–35.
- Walsh, K. (1978). *Neuropsychology: A clinical approach*. New York, NY: Churchill Livingstone.
- Wechsler, D. (1945). *Wechsler memory scale*. San Antonio, TX, US: Psychological Corporation.
- Wechsler, D. (1991). *The Wechsler intelligence scale for children—third edition*. San Antonio, TX, US: The Psychological Corporation.
- Wechsler, D. (1997). *Wechsler memory scale—third edition*. San Antonio, TX, US: The Psychological Corporation.
- Wechsler, D. (2008). *Wechsler adult intelligence scale—fourth edition (WAIS-IV)*. San Antonio, TX, US: NCS Pearson.
- Wechsler, D. (2009). *Wechsler memory scale—fourth edition*. San Antonio, TX, US: Pearson.
- Weiten, W., & Lloyd, M. A. (2008). *Psychology applied to modern life* (9th ed.). Wadsworth, OH: Cengage Learning.
- Wellman, H. (1990). *The child's theory of mind*. Cambridge, MA: MIT Press.
- Wellman, H. W., Cross, D., & Watson, J. (2001). Meta-analysis of theory-of-mind development: the truth about false belief. *Child Development, 72*(3), 655–684.
- Wellman, H. M., Fang, F., & Peterson, C. C. (2011). Sequential progressions in a theory-of-mind scale: longitudinal perspectives. *Child Development, 82*(3), 780–792.
- Wellman, H. M., & Liu, D. (2004). Scaling of theory of mind tasks. *Child Development, 75*(2), 523–541.
- Westby, C., & Robinson, L. (2014). A developmental perspective for promoting theory of mind. *Topics in Language Disorders, 34*(4), 362–382.
- Whitmer, A. J., & Banich, M. T. (2007). Inhibition versus switching deficits in different forms of rumination. *Psychological Science, 18*(6), 546–553.

- Wilens, T. E., Biederman, J., & Spencer, T. J. (2002). Attention deficit/hyperactivity disorder across the lifespan. *Annual Review of Medicine*, 53(1), 113–131.
- Williams, D. L., Mazefsky, C. A., Walker, J. D., Minshew, N. J., & Goldstein, G. (2014). Associations between conceptual reasoning, problem solving, and adaptive ability in high-functioning autism. *Journal of Autism and Developmental Disorders*, 44(11), 2908–2920.
- Williams, J. H., Waiter, G. D., Gilchrist, A., Perrett, D. I., Murray, A. D., & Whiten, A. (2006). Neural mechanisms of imitation and “mirror neuron” functioning in autistic spectrum disorder. *Neuropsychologia*, 44(4), 610–621.
- Wilson, B. A., Alderman, N., Burgess, P. W., Emslie, H., & Evans, J. (1996). *Behavioural assessment of the dysexecutive syndrome*. London, UK: Thames Valley Test Company.
- Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: representation and constraining function of wrong beliefs in young children’s understanding of deception. *Cognition*, 13(1), 103–128.
- Yerys, B. E., Antezana, L., Weinblatt, R., Jankowski, K. F., Strang, J., Vaidya, C. J., & Kenworthy, L. (2015). Neural correlates of set-shifting in children with autism. *Autism Research*, 8(4), 386–397.
- Yerys, B. E., Kenworthy, L., Jankowski, K. F., Strang, J., & Wallace, G. L. (2013). Separate components of emotional go/no-go performance relate to autism versus attention symptoms in children with autism. *Neuropsychology*, 27(5), 537–545.
- Yerys, B. E., Wallace, G. L., Sokoloff, J. L., Shook, D. A., James, J. D., & Kenworthy, L. (2009). Attention deficit/hyperactivity disorder symptoms moderate cognition and behavior in children with autism spectrum disorders. *Autism Research*, 2, 322–333.
- Yianni-Coudurier, C., Darrou, C., Lenoir, P., Verrecchia, B., Assouline, B., Ledesert, B., & Baghdadli, A. (2008). What clinical characteristics of children with autism influence their inclusion in regular classrooms? *Journal of Intellectual Disability Research*, 52(10), 855–863.
- Young, G. (2011). *Development and causality: Neo-Piagetian perspectives*. New York, NY: Springer Science & Business Media.
- Zetsche, U., D’Avanzato, C., & Joormann, J. (2012). Depression and rumination: relation to components of inhibition. *Cognition & Emotion*, 26(4), 758–767.

Chapter 6

Metacognition, Empathy, and Cognitive Biases in Schizophrenia and OCD

Chapter Outline

| | | | |
|---|------------|---|------------|
| Metacognition and social cognition | 131 | Theoretical models of delusions and cognitive biases in psychotic disorders | 138 |
| The interplay between social cognition and schizophrenia | 132 | Hostile attributional bias | 140 |
| Metacognitive models and assessment measures in OCD | 133 | Attributional style or bias | 140 |
| Empathy | 135 | Cognitive processes in OCD | 141 |
| The neuroscience of empathy | 136 | Cognitive biases in OCD | 142 |
| Measures of empathy | 137 | Attentional bias in euthymic BD | 143 |
| Cognitive biases | 137 | Cognitive bias and metacognitive training in schizophrenia | 143 |
| Cognitive biases as departures from normative models of rationality | 137 | Summary | 146 |
| Types and patterns of cognitive biases | 138 | References | 146 |

METACOGNITION AND SOCIAL COGNITION

Wells (1995, 2000) was one of the first scholars to study the meaning and usefulness of metacognition as a set of beliefs about mental contents. Other definitions (e.g., Dimaggio & Lysaker, 2010) highlight the functional meaning of metacognition, conceptualized as a set of skills that enable us to comprehend our own mental states, as well as those of others. Still, another definition (Semerari, Carcione, Dimaggio, Nicolò, & Procacci, 2007) defines metacognition as a comprehensive mind-reading capacity overlapping with the concept of mentalization proposed by Bateman and Fonagy (2004).

Despite the various definitions of metacognitive abilities, they all converge on the concept that individuals need to understand internal mental states in order to form interpersonal relationships (Dimaggio, Semerari, Carcione, Nicolò, & Procacci, 2007; Jorgensen, 2010). Individuals with personality disorders typically fail to develop adaptive responses to these universal life tasks (American Psychiatric Association, 2013; Livesley, 2011). For that reason, a close relationship between metacognitive impairment and personality pathology has been proposed (e.g., Dimaggio & Lysaker, 2010). According to this model, “People become trapped in emotional disturbance because their metacognitions cause a particular pattern of responding to inner experiences that maintains and strengthens negative ideas” (Wells, 2011, p. 1). This pattern of responding is referred to as the *cognitive-attentional syndrome* (CAS), which consists of verbal thoughts in the form of worry and rumination, a tendency to focus attention on threat or threat monitoring and cognitive-behavioral cognitive strategies that have paradoxical effects. The CAS appears to extend negative thinking, which eventually causes difficulties in emotion regulation. Wells and Matthews (1994) suggest that the CAS is the product of negative metacognitive beliefs (e.g., “I must worry in order to cope”).

Metacognition is a psychological function and concerns the impressions people form about themselves and others (Lysaker & Dimaggio, 2014). It is a spectrum of mental activities that involves thinking about thinking, ranging from more discrete acts in which people recognize specific thoughts and feelings to more synthetic acts in which a series of intentions, thoughts, feelings, and connections between events are integrated into larger, more complex representations

(Lysaker et al., 2013; Semerari et al., 2003). Although metacognition has been referred to as a part of social cognition (Lysaker et al., 2005), one operational difference is that more synthetic forms of metacognition are assessed through discourse analysis and not by assessing correctness of judgment (e.g., Bacon & Izaute, 2009). Synthetic metacognitive acts affect life in a different manner than do specific beliefs. Synthesized understandings lend meaning to events, and thus supply reasons to carry out a certain act and to decide what is best done to resolve a dilemma, given the unique psychology of oneself and the others in one's life (Lysaker et al., 2013). Moreover, metacognition is related to the construct of mentalizing (Fonagy, Gergely, Jurist, & Target, 2002).

The interplay between social cognition and schizophrenia

Recent conceptualizations of schizophrenia suggest that one of the greatest barriers to psychosocial functioning is a deficit in metacognition. Metacognition limits people's abilities to make sense of the biological, social, and psychological challenges presented by their conditions (e.g., Lysaker et al., 2014). Moreover, metacognition functions may be distinguished upon the basis of their focus, and include self-reflectivity, understanding of others' minds, decentration (the ability to perceive the world from various perspectives), and mastery (the ability to use knowledge of mental states to solve psychological problems (Lysaker et al., 2014). Impairments in metacognition have been found in both early and late phases of schizophrenia (e.g., Lysaker et al., 2014) and are linked with both objective and subjective indicators of wellness, independent of symptom severity (e.g., Lysaker et al., 2011b; Kukla, Lysaker, & Salyers, 2013; Rabin et al., 2014).

Social cognition has been shown to mediate the relationship between neurocognition and social functioning in schizophrenia (Bell, Tsang, Greig, & Bryson, 2009; Schmidt, Mueller, & Roder, 2011). Treatment interventions in patients with schizophrenia mostly aim to help individuals to overcome deficits in social cognition and thus improve social functioning (H.C. Jin, H. K. Jin, Lee, & Green, 2009; Horan, Kern, Green, & Penn, 2008; Kurtz & Richardson, 2012). Understanding the social cognitive constructs that most relate to social functioning would contribute to identifying the most suitable interventions.

A major step in delineating a model of how social cognitive influences function in schizophrenia is by investigating that factor structure of social cognition in schizophrenia using a range of instruments that represent distinct domains. In a recent review of such studies, Mehta et al. (2013) indicated a lack of consistency regarding the factor structure of social cognition in schizophrenia. In another study, Mancuso, Horan, Kern, and Green (2011) applied exploratory factor analysis to five social cognition tasks that tapped the domains of processing of emotion-related stimuli, social perception, attributional style, and theory of mind (ToM) in 84 patients with schizophrenia. The analyses revealed a three-factor structure solution: (1) hostile attributional style, (2) lower-level social cue detection, and (3) higher-level inferential and regulatory processes.

Factor 1 correlated with clinical symptoms and not with functional outcome, while factors 2 and 3 were related to both functional capacity and real-world functioning but not with symptomatology. None of the three factors correlated with negative symptoms. The authors concluded that social cognition should be regarded as a multidimensional hierarchical construct organized into information processing levels (Mancuso et al., 2011). In a more recent investigation, Corbera, Wexler, Ikezawa, and Bell (2013) sought to identify specific aspects of schizophrenia and their relationships to measures of social cognition, quality of life, and neurocognition on a sample of 30 patients with schizophrenia and 24 healthy controls. Lower social performance was significantly correlated with poor basic social cognition in patients and with high interpersonal discomfort in controls. While neurocognition was significantly associated with basic social cognition in both groups, it was not associated with empathy. Social cognitive interventions should emphasize improving basic social cognitive processing deficits, managing interpersonal discomfort, and utilizing preserved capacity for empathy as a potential strength in social interactions.

There is evidence that metacognitive deficits and poor self-reflectivity may limit psychosocial functions, but which functions and in what manner are not clear. Metacognitive capacity seems to be an important mediating or moderating variable in the complex interactions that determine the level of function in schizophrenia (Couture, Granholm, & Fish, 2011). The ability to recognize symptoms and treatment need is a prerequisite for consent to a participation in treatment (Osatuke, Stiles, Barkham, Hardy, & Shapiro, 2011). Poor insight has been linked with poorer social functioning (Francis & Penn, 2001). Poor insight is also believed to interfere with interpersonal relationships (Lysaker, Yanos, & Roe, 2009). To be meaningful, awareness of illness and insight are core elements of a broader subjective understanding of one's life (e.g., Williams, 2008).

One form of psychotherapy would be to specifically address diminished metacognition in schizophrenia. Fonagy et al. (2002) develop a psychotherapeutic strategy that seeks to enhance the ability to think about mental states. Lysaker et al. (2011a) conceptualize metacognition as a capacity that varies along a continuum from good to limited and that psychotherapy can assist to improve metacognitive capacities. Specifically, Chadwick (2006) introduces a psychopathology strategy that seeks to promote metacognitive insight with respect to the meaning of symptoms, negative self-schemata, and the self as a complex, contradictory, and changing process.

The Metacognition Assessment Scale (MAS-A)

The Metacognition Assessment Scale (MAS-A; [Semerari et al., 2003](#)) is a rating scale that assesses metacognitive capacity. It is a modification of the original scale, which was designed to examine psychotherapy transcripts for the purpose of the study of Indiana Psychiatric Illness Interview (IPII) transcripts for persons with psychosis ([Mayer, Salovey, Caruso, & Sitarenios, 2003](#)). The MAS-A has four subscales. The first, Self-Reflectivity, is a 9-point Likert scale that taps the ability to think about and form ideas about oneself in an increasingly plausible and integrated manner. The second, Awareness of the Mind of the Other, is a 7-point Likert scale that taps the ability to think about and form ideas about others in an increasingly complex and plausible manner. The third, Decentration, is a 3-point Likert scale that taps the ability to form ideas about oneself and others in the larger world. The fourth, Mastery, is a 9-point scale that assesses the capacity to use knowledge of oneself and others to respond to psychological and social challenges. The subscale scores can be summed to provide a total, with high scores reflecting greater capacities to synthesize discrete pieces of information about thoughts and feelings into more complex ideas about the self and others and to use that knowledge when appropriate.

Consistent with earlier use with a different sample, good reliability was found for the total score. Evidence of validity of the MAS-A includes studies indicating that persons with schizophrenia perform more poorly on this task than persons with serious and chronic, nonpsychiatric, medical illnesses ([Lysaker et al., 2012](#)) and other findings linking MAS-A performance with general awareness of illness, as well as other objective and projective tests of self-awareness. Recent work has also provided cross-cultural evidence of the validity of the construct and the use of the MAS-A to measure it ([Tas, Brown, Esen-Danaci, Lysaker, & Brüne, 2012](#)).

The Beck Cognition Insight Scale (BCIS)

The Beck Cognition Insight Scale (BCIS; [Beck, Baruch, Balter, Steer, & Warman, 2004](#)) was developed in order to increase the understanding of psychotic patients' perspective on their abnormal experiences, their attributions, and their aberrant interpretations of life events. This questionnaire is aimed at thinking styles that may limit patients' capacity to adequately evaluate and distance themselves from psychotic experiences. The BCIS is a 15-item self-report tool that measures the way individuals assess their own judgment. It consists of two subscales: nine Self-Reflectiveness items that assess objectivity, reflection, and openness to feedback, and six Self-Certainty items that tap certainty about being right and resistance to correction. A principal components analysis confirmed the validity of a two-factor solution, with each factor also shown to be internally consistent.

Metacognitive models and assessment measures in OCD

Metacognition is a general term that can be broken down into three main areas ([Flavell, 1979; Wells, 2000](#)): metacognitive knowledge, metacognitive experiences, and metacognitive strategies. It refers to beliefs about thinking and strategies used to regulate and control thinking ([Rees & Anderson, 2013](#)). [Wells \(2000\)](#) general metacognitive model proposes that a style of thinking called the cognitive attentional syndrome (CAS) is the main causal factor in extending the duration of emotional disorder.

The CAS consists of three overlapping components: first, a perseverative thinking style characterized by worry and rumination; second, unhelpful hypervigilant attention to threat; and third, counterproductive coping that prevents regulation of cognition. Wells specified which particular aspects of this model are most relevant to understanding obsessive-compulsive disorder (OCD), and proposed that intrusive thoughts activate negative metacognitive beliefs (metacognitive knowledge) that lead to the CAS. The negative metacognitive beliefs concern the dangerousness and significance of intrusive thoughts ([Fisher, 2009](#)). Wells argued that three types of metacognitive knowledge are important in the etiology and maintenance of symptoms: thought fusion beliefs, beliefs about the need to perform rituals, and criteria that signal rituals can be stopped. In this model, thought fusion beliefs are extended beyond thought–action fusion (TAF) (the belief that having a thought increases the chances of acting on it) to also include thought–event fusion (the belief that having a thought can cause an event or means that an event has happened) and thought–object fusion (the belief that thoughts or feelings can be transferred into objects). According to the model, the three overall types of metacognitive knowledge operate in a causal chain to explain obsessive-compulsive (OC) symptoms.

Maladaptive Thought Control Strategies in OCD

The cognitive-behavioral model (CBM) of OCD ([Rachman, 1998; Salkovskis, 1996](#)) proposes that a series of dysfunctional obsessive beliefs lead to the misinterpretation of intrusive thoughts in ways that generate preoccupation distress and concern about the consequences of having such thoughts ([Rachman, 1997](#)). One type of dysfunctional belief in OCD is that

the intrusive thoughts are personally meaningful and that they need to be controlled or suppressed (*Obsessive Compulsive Cognitions Working Group [OCCWG], 1997, 2005*). The CBM highlights that individuals with OCD overrely on certain thought control and thought suppression strategies (e.g., mental rituals) to the unwanted intrusions. The core of the CBM of OCD is the understanding that dysfunctional cognitions lead to OCD symptoms (*Clark, 2004*).

Research suggests that worry (i.e., replacing unwanted intrusive thoughts with other less frustrating negative thoughts) and punishment (i.e., critical self-directed statements or actions in dealing with the unwanted thought) are deleterious thought control strategies relative to nonanxious and anxious control subjects (*Abramowitz, Whiteside, Kalsy, & Tolin, 2003*). The frequency of these strategies is specifically correlated with obsession symptom severity (e.g., *Abramowitz et al., 2003*). Moreover, research indicates that worry and punishment strategies are related with beliefs about the importance and need to control thoughts (e.g., *Moore & Abramowitz, 2007*), even after controlling for general anxiety and depression (e.g., *Belloch, Morillo, & Garcia-Soriano, 2009*).

The implementation of thought control strategies may further lead to the development of obsessions. While most studies have investigated predictors of the use of thought control strategies, they have not examined the strategies as mediators in the prediction of OCD symptom severity. *Jacoby, Leonard, Riemann, and Abramowitz (2016)* extended existing research by investigating thought control strategies as mediators of the relationship between obsessive beliefs and OCD symptom dimensions in a treatment-seeking sample of 102 adults with OCD. The results of this study suggest that the use of punishment as a thought control strategy mediated the relationship between dysfunctional beliefs about the importance/control of thoughts and unacceptable obsessions. Moreover, the study allows for potential treatment implications. Findings suggest that targeting punishment thought control strategies could contribute to the cognitive-behavioral treatment of OCD. These preliminary findings indicate the potential efficacy of providing psychoeducation about the distinction between adaptive (i.e., reengaging with life) versus maladaptive (i.e., self-punishment) strategies for managing intrusive thoughts.

Measures of Metacognition in OCD

The assessment of metacognition in OCD is variable. Some measures, such as the Obsessive Beliefs Questionnaire-44 (OBQ-44), comprise scales that correspond with metacognitive constructs, but were originally designed to measure cognitive biases.

Obsessive Beliefs Questionnaire-44

The OBQ-44 (*OCCWG, 2005*) is a 44-item self-report measure of dysfunctional belief domains linked to the onset and maintenance of OCD. It was initially developed as an 87-item measure, but ensuing research by the Obsessive Compulsive Cognitions Working Group (*OCCWG, 2005*) saw three factors emerge with 44 high-loading items. This led to three factor-derived subscales: Responsibility and Threat Estimation, Perfectionism and Intolerance for Uncertainty, and Importance and Control of Thoughts. The Importance and Control of Thoughts subscale is of particular relevance to metacognitive assessment, as it specifically measures fear of the consequences of having intrusive/distressing thoughts or imagery (thought–action fusion) and the need to eliminate intrusive thoughts. This subscale has also been shown to significantly predict obsessing and mental neutralizing symptoms in OCD, and to distinguish individuals with OCD from those with other anxiety disorders (*Tolin, Woods, & Abramowitz, 2003; Tolin, Worhunsky, & Maltby, 2006*). The OBQ-44 subscales have been reported as having good internal consistency and test–retest reliability (*OCCWG, 2005; Tolin et al., 2006*).

Interpretation of Intrusions Inventory (III)

The Interpretation of Intrusions Inventory (III) (*OCCWG, 1997, 2001*) is a 31-item scale designed to assess appraisals of responsibility, overimportance of thought intrusions, and control of intrusions, demarcated as important in the persistence of obsessions. In the III, described as a “semiidiographic questionnaire” (*OCCWG, 2003, p. 868*), respondents are provided with definitions and examples of unwanted ego-dystonic mental intrusions and are then asked to record two recent intrusive thoughts, impulses, or images they have experienced. Respondents record the recency, frequency, and distress associated with these intrusions, and then rate how strongly they believe a set of statements about their intrusive thoughts, thus indicating the strength of their metacognitive beliefs. Prior studies have demonstrated that the III has robust reliability in clinical samples, nonanxious clinical populations, and student and community populations (*OCCWG, 2003; Sica et al., 2004*).

Metacognitive Beliefs Questionnaire (MCBQ)

The Metacognitive Beliefs Questionnaire (MCBQ) (*Clark, Purdon, & Wang, 2003*) is a 67-item self-report questionnaire that assesses beliefs about the importance of control of intrusive thoughts and the perceived negative consequences of

uncontrolled mental intrusions. Respondents are provided with definitions and examples of unwanted mental intrusions and are then asked to rate how strongly they agree or disagree with a range of beliefs statements about their thinking (e.g., “I believe that having control over one’s thought is a sign of good character”). The MCBQ has been reported to have established concurrent and discriminant validity, with MCBQ scale scores significantly predicting obsessional, but not anxious or depressive, symptomatology (Clark et al., 2003).

EMPATHY

It has been proposed that empathy is composed of cognitive empathy, empathic concern, and affective sharing (Bernhardt & Singer, 2012; Decety & Cowell, 2014; Zaki & Ochsner, 2012). Cognitive empathy, often employed interchangeably with ToM (e.g., Blair, 2005), refers to the ability to adopt another individual’s perspective and deduce the person’s mental state; empathic concern refers to the motivation to care for the welfare of others, and affective sharing refers to one’s capacity to share the emotional experience of another personality. The dissociation of cognitive and emotional empathy is supported by behavioral (Lockwood, Bird, Bridge, & Viding, 2013), lesion (Shamay-Tsoory, Aharon-Peretz, & Perry, 2009), and functional imaging (Fan, Duncan, de Greck, & Northoff, 2011) studies. Empathic responses and behaviors can be observed very early in life (e.g., Knafo, Zahn-Waxler, Van Hulle, Robinson, & Rhee, 2008). The affective and cognitive aspects of empathy gradually become differentiated, with the affective component preceding the cognitive (Knafo et al., 2008) (Fig. 6.1).

Baron-Cohen and Wheelwright (2004) define empathy as having two components: Cognitive empathy involves adopting another’s perspective by recognizing and labeling the person’s mental state (Feshbach, 1978; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011). This ability to attribute desires, beliefs, intentions, and emotional states to another person is also called ToM (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1986) and is a basic requirement for empathy (Declerck & Bogaert, 2008). Recent studies have used the terms cognitive empathy and ToM interchangeably (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Blair, 2005; Jones, Happé, Gilbert, Burnett, & Viding, 2010; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004).

Affective empathy includes having an appropriate emotional response triggered by the other person’s emotion (Blair, 2005; Decety & Cowell, 2014; Reniers et al., 2011). The word “appropriate” is important since affective empathy is not just any emotional response to another’s emotion (e.g., a psychopathic feeling of pleasure at someone else’s pain would not constitute affective empathy). The emotional response does not necessarily match the triggering emotion, but it should reflect that the observer cares how the other person feels (Baron-Cohen, 2011).

Within psychiatric taxonomies, there are two disorders that demonstrate empathic deficits: autism spectrum disorder (ASD) and psychopathic personality disorders, the latter categorized as a subgroup of antisocial personality disorders in the *Diagnostic*

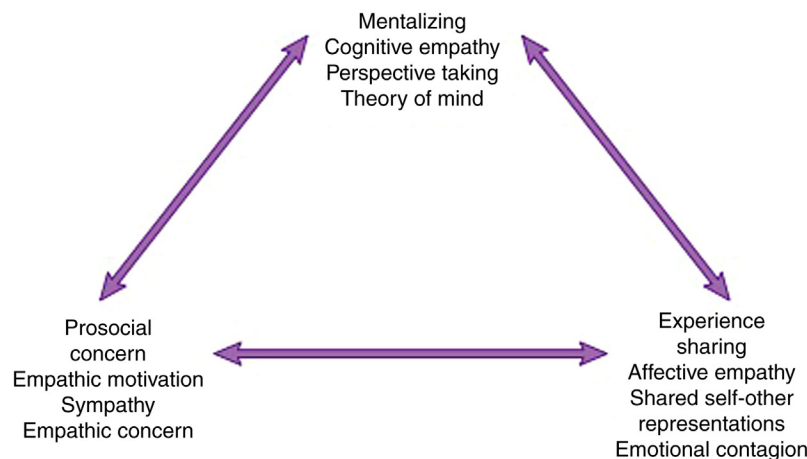


FIGURE 6.1 Three major facets of empathy. For decades, behavioral research has examined each of these processes and developed theories about the nature of and relationships between them. By contrast, the lion’s share of neuroscience research in empathy has focused on two empathic processes: the tendency to take on, resonate with, or “share” the emotions of others (experience sharing) and the ability to explicitly reason and draw inferences about their mental states (mentalizing). A third facet, the prosocial motivation to help others as a result of using one or both of the other facets to share and/or cognitively understand the emotions they are experiencing (prosocial concern), has begun receiving increasing neuroscientific attention in the past few years. Each of these empathic processes has also been described using other terms, some of which are listed here. (Reprinted from Zaki, J., & Ochsner, K. N. (2012). *The neuroscience of empathy: progress, pitfalls and promise*. *Nature neuroscience*, 15(5), 675–680, with permission. Copyright 2012 by Nature Publishing Group.)

and *Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*) (American Psychiatric Association, 2013). In a recent study, Rueda, Fernández-Berrocal, and Baron-Cohen (2015) examined the empathic profile of youths with Asperger syndrome (AS) and investigated the nature of their deficit in emotion recognition. To measure cognitive empathy they employed the perspective-taking (PT) subscale of the interpersonal reactivity index (IRI) (Davis, 1980, 1983) and the Eyes Test (Baron-Cohen et al., 2001). Findings revealed that a dissociation between cognitive and affective empathy exists, with the latter relatively preserved. Regarding their abilities to recognize emotions, the results show deficits in recognizing emotions dependent on the emotional valence. To explore these two domains, the PT subscale of the IRI was administered to measure cognitive empathy, and the empathic concern (EC) subscale to measure affective empathy. The Eyes Test was used as a performance measure of both cognitive empathy (Lawrence et al., 2004) and emotion recognition (Baron-Cohen et al., 2001; Harkness, Sabbagh, Jacobson, Chowdrey, & Chen, 2005). The AS group scored lower than controls on cognitive empathy but scored within the average range on affective empathy. A deficit in emotion recognition was found in the AS group for positive emotions. These results confirm earlier findings in cognitive empathy and provide new insight about emotion recognition abilities in this population.

The neuroscience of empathy

By now multiple studies have examined the neural mechanisms underlying empathy. Historically, a large part of this research focused on the elucidation of two subprocesses, experience sharing and mentalizing.

Given that experience sharing and mentalizing ostensibly represent two paths to the same goal (understanding and responding to another person's internal states), they are supported by disparate neural systems. Experience sharing is often tied to a mechanism known as "neural resonance": perceivers' tendency to engage overlapping neural systems when they experience a given internal state and when they observe targets experiencing (or know that targets are experiencing) that same state. Neural resonance accompanies the experience and observation of motor intentions (Rizzolatti & Sinigaglia, 2010), sensory experiences (Keysers, Kaas, & Gazzola, 2010), and visceral states, such as pain and disgust (Lamm & Singer, 2010). By contrast, mentalizing—usually examined by asking perceivers to draw explicit inferences about targets' states—engages a system of midline and superior temporal structures broadly involved in self-projection.

Distinct facets of empathy seem to be differentially affected in particular disorder. For example, psychopathic tendencies are typically linked to impaired emotional empathy, but intact cognitive empathy. In contrast, ASD has been associated with deficits in cognitive but not emotional empathy, as evidenced in the behavioral performance of youths with ASD versus those with psychopathic tendencies (Jones et al., 2010; Schwenck et al., 2012). Cognitive empathy impairments in individuals with ASD have been demonstrated via false-belief tasks (Baron-Cohen, Leslie, & Frith, 1985) and mental state inference tasks (e.g., Abell, Happé, & Frith, 2000). Furthermore, adults with autism show a cognitive empathy deficit but intact empathic concern and affective arousal on the Multifaceted Empathy Test (Dziobek et al., 2008).

The Empathizing-Systemizing theory of autism (Baron-Cohen, 2009) posits that the persistent deficits in communication and social interaction can be accounted for by an impairment in empathy, particularly cognitive empathy, whereas the restricted or repetitive behaviors and limited interests can be accounted for by a strong drive to systemize.

A study by Grove, Baillie, Allison, Baron-Cohen, and Hoekstra (2015) set out to evaluate the dimensional latent structure of empathy, systemizing, and autistic traits among individuals on the spectrum, first-degree relatives, and the general population (1034 individuals, 232 controls, 439 parents, 363 ASC group).

Structural equation modeling, including CFA, LCA, and FMM analyses, in a large sample of individuals with ASC, parents, and controls indicated that the characteristics of autism, as measured in a sample spanning the full spectrum of genetic liability, are best described by a two-factor three-class mixture model. The quantitative nature of autistic traits is best captured by two moderately correlated latent factors representing systemizing and empathy. In addition, three homogeneous latent classes of individuals could be identified by their mean scores on measures of empathy, systemizing, and autistic traits. Class one displayed superior performance on systemizing, with significantly lower scores on both self-reported and performance-based tests of empathy (Class S). Class three demonstrated the opposite effect, showing increased scores on empathy tasks and lower performance on self-report measures of systemizing (Class E). Class two appeared to be more balanced in terms of both empathy and systemizing propensity (Class B).

Pino et al. (2016) investigated empathic abilities in patients with OCD compared to a control group. The findings demonstrated that patients with OCD revealed a deficit in mentalizing ability (cognitive empathy) in comparison to the control group; that is, they were incapable of understanding the mental and emotional states of other persons.

Recent data have provided initial evidence for brain function alterations that might underlie deficits in cognitive empathy in borderline personality disorder (BPD) (Dziobek et al., 2011). Brain functioning during cognitive empathy was significantly diminished in BPD individuals compared to controls. Specifically, the brain region mostly affected comprised the left superior temporal sulcus and gyrus (STS/STG). The STS/STG region of the brain is known for its role in social

cognition and is a central part of the neural network that mediates thinking about others (e.g., [Bahnmann, Dziobek, Prehn, Wolf, & Heekeren, 2009](#)). [Dziobek et al. \(2011\)](#) reported that the reduction of STS/STG in their study was related to levels of intrusive symptoms in the BPD group. In particular, those individuals showing very low levels of activation in this brain region reported high levels of recurring traumatic memories. According to [Paus \(2005\)](#), the STS region appears to be vulnerable to psychosocial stressors, such as childhood maltreatment (e.g., [Ghiassi, Dimaggio, & Brüne, 2010](#)).

Measures of empathy

The most common psychometric tool for measuring an individual's empathy is the IRI ([Davis, 1980](#)). This questionnaire was originally validated as a multidimensional measure and consists of four subscales that are thought to measure distinct aspects of empathy: Perspective Taking (the ability to shift to another's emotional perspective), Empathic Concern (feeling warmth or compassion for others), Fantasy (the ability to put oneself in a fictional situation), and Personal Distress (feeling fear or anxiety in response to seeing others in distress).

The Basic Empathy Scale (BES), a cognitive subscale ([Jolliffe & Farrington, 2006; Albiero, Matricardi, Speltri, & Toso, 2009; Carré, Stefaniak, D'Ambrosio, Bensalah, & Besche-Richard, 2013](#)), comprises 20 items, which are scored by participants on a 5-point Likert-type scale. In the two-factor model ([Jolliffe & Farrington, 2006](#)), 9 items assess cognitive empathy, and 11 items assess affective empathy. In the two-factor conceptualization, the BES included 7 reversed items, and scores could range from 20 (empathy deficit) to 100 (high level of empathy). The BES has demonstrated good validity ([Jolliffe & Farrington, 2006; Albiero et al., 2009; Carré et al., 2013](#)). Cronbach's α coefficient was calculated to examine the internal consistency of the scale, considered globally and in its two dimensions, as yielded by the confirmatory factor.

The Empathy Quotient (EQ) ([Baron-Cohen & Wheelwright, 2004; Preti et al., 2011](#)) The EQ is a questionnaire that largely focuses on cognitive empathy and is composed of 60 questions, split into two types: 40 questions tapping empathy and 20 filler items, which were included to distract the participant from a relentless focus on empathy. Each item scores one point if the respondent records the empathic behavior mildly or two points if the respondent records the behavior strongly. Approximately half of the items were formulated to produce a disagreement response for the empathic feeling, and the other half to produce an agreement response, in order to avoid a response bias either way. The EQ has a forced choice format, so it can be self-administered.

The Multifaceted Empathy Test (MET) ([Dziobek et al., 2008](#)) is a performance-based multidimensional measure of empathy. During the MET, participants answer questions that dissociably tap cognitive and emotional empathy in response to naturalistic emotionally charged images. In a study, each question was presented on a screen that also displayed the relevant image, and slide presentation was controlled by the researcher. All ratings were provided using a 9-point Likert scale with pictograms from the Self-Assessment Manikin ([Bradley & Lang, 1994](#)). Responses were voiced aloud and recorded by the researcher. Task completion required approximately 30 min. The MET consists of 23 pairs of realistic positive and negative images: a context-only picture and a social picture with emotional individuals in this context. For each context-only picture, participants are asked to provide a valence rating and an arousal rating. For the social stimuli, cognitive empathy is indexed by asking participants how the person or people in the picture is/are feeling from four possible choices.

COGNITIVE BIASES

Cognitive biases as departures from normative models of rationality

Empirical evidence in the areas of judgment and decision making, as well as memory and reasoning has indicated that the outcomes of cognitive processes often depart from what is considered to be rational behavior. With the advent of a heuristics and biases research program in the early 1970s, these findings have been referred to as cognitive biases, also known as “cognitive illusions” ([Pohl, 2004](#)), “thinking errors” ([Stanovich, 2009](#)), and “thinking biases” ([Stanovich & West, 2008](#)), that are considered to result from heuristics—experience-based strategies that transform complex cognitive tasks to simpler mental operations (e.g., [Gilovich, Griffin, & Kahneman, 2002](#)). This aforementioned research program emphasized the conditions of predictable irrationality through the production of many cognitive bias tasks that relying on heuristics lead to systematic violations of normative models.

On the other hand, within the framework of ecological rationality, cognitive biases are not considered errors of cognitive processing, but rather the outcome of highly constrained and artificial experimental conditions since cognitive bias tasks depart significantly from those in the natural environment (e.g., [Gigerenzer, 1996, 2004](#)).

Intelligence was the major construct for predicting individual differences in cognitive biases. As a result of the most comprehensive study on this topic, [Stanovich and West \(2008\)](#) have produced lists of cognitive biases that do and do not demonstrate association with intelligence. [Stanovich and West \(2008\)](#) proposed that correlations should be expected only

when considerable cognitive effort is required in order to carry out the computation of a normatively correct response to a bias task.

Previous research has shown that low scores on the Cognitive Reflection Test (CRT), which was devised as a measure of “the ability or disposition to resist reporting the response that first comes to mind” (Frederick, 2005, p. 36), are related to *probability overestimation* (Albaity, Rahman, & Shahidul, 2014), *conjunction fallacy* (Hoppe & Kusterer, 2011; Oechssler, Roeder, & Schmitz, 2009), and *impatience in time-preference judgment* (Albaity et al., 2014; Frederick, 2005). CRT is also related to performance on a broad range of cognitive bias tasks, and it has predictive validity over and above intelligence (Toplak, West, & Stanovich, 2011, 2014).

Types and patterns of cognitive biases

Stanovich and West (1998) were the first to report significant positive correlations among belief bias, base-rate neglect, and outcome bias, as well as between overconfidence bias and hindsight bias. A number of classifications of cognitive biases available in the literature today also suggest that the population of cognitive biases is heterogeneous. Conceptually, cognitive biases differ with respect to the normative models they violate.

From a theoretical point of view, biases can be distinguished with regard to the cognitive processes they tap (Pohl, 2004; Stanovich, 2009), whether they are considered as consequences of heuristics, artificial procedures, biased error management (Haselton, Nettle, & Andrews, 2005), selective attention, motivation, or psychophysical distortions (Baron, 2008). Similar points were made by other investigators (Arnott, 2006; Carter, Kaufmann, & Michel, 2007; Stanovich, 2003). From the methodological point of view, performance on cognitive bias tasks can be evaluated in terms of consistency by comparing related responses, or in terms of accuracy relative to external criteria (Bruine de Bruin, Parker, & Fischhoff, 2007; Parker & Fischhoff, 2005). This corresponds to Kahneman’s distinction between *coherence rationality* and *reasoning rationality* (e.g., Kahneman & Frederick, 2005).

In a study, Teovanović, Knežević, and Stankov (2015) attempted to, first, estimate the reliability of cognitive bias measures; second, assess if correlations between cognitive bias measures are high enough to extract meaningful, common factors; third, estimate correlations of cognitive biases with measures that address well-established constructs, such as fluid and crystallized intelligence, openness, and need for cognition, as well as a cognitive reflection. The sample consisted of 243 undergraduates at the University of Belgrade. The authors examined a heterogeneous set of seven cognitive biases: anchoring effect, belief bias, overconfidence bias, hindsight bias, sunk cost effect, base-rate neglect, and outcome bias. *Anchoring effect* refers to a systematic influence of initially presented values on numerical judgments. A simple two-step procedure for elicitation of this phenomenon, referred to as a standard paradigm of anchoring (Epley & Gilovich, 2001; Strack & Mussweiler, 1997), was first presented in the seminal work of Tversky and Kahneman (1974). *Belief bias* is a predictable tendency to evaluate deductive arguments on the basis of believability of conclusion, rather than on the basis of logical validity (Evans, Barston, & Pollard, 1983). *Overconfidence bias* is a common inclination of people to overestimate their own abilities to successfully perform a particular task (Brenner, Koehler, Liberman, & Tversky, 1996). *Hindsight bias* is a propensity to perceive events as having been more predictable, once they have occurred (Fischhoff, 1975). In other words, judgments made with the benefit of information about the outcome of an event differ systematically from judgments made without such knowledge. *Sunk cost effect* refers to the tendency to “continue an endeavor once an investment of money, effort, or time has been made” (Arkes & Blumer, 1985, p. 124). *Base-rate neglect* refers to a tendency to ignore statistical information of prior probabilities in favor of the specific evidence concerning the individual case (Kahneman & Tversky, 1973). *Outcome bias* is the tendency to judge the quality of a decision based on the information about the outcome of that decision.

Theoretical models of delusions and cognitive biases in psychotic disorders

The threat anticipation model (TAM) (Fowler, 2000; Freeman, 2007; Freeman & Freeman, 2008) suggests that delusions are precipitated by levels of arousal and anxiety that create anomalous internal experiences among vulnerable persons (e.g., thoughts being experienced as voices, depersonalization, perceptual anomalies), which in turn elicit a “search for meaning.” In the search for meaning, preexisting beliefs about the self, others, and the world (e.g., the self as weak, others as threatening, and the world as bad) are drawn upon, determining the anticipation of threat that characterizes the persecutory delusions. Thus, the delusion is an explanation of the circumstances that have caused an intensely distressing internal state (e.g., “I feel this way because others are persecuting me”). In this model, anxiety and negative beliefs about the self and others also play a role in the development of delusions. The individual may be anxious before the occurrence of any stressor because he or she anticipates danger. As a result, they perceive danger where there is none but are also relieved when they find that a danger can be taken as the cause of their anxiety.

Finally, the development of persecutory delusions is also supposed to involve cognitive biases. An example of a cognitive bias that could play a role in this process is *jumping to conclusions (JTC)* (Dudley & Over, 2003; White & Mansell, 2009) or reaching a firm conclusion on the basis of relatively little information. This bias is more pronounced when material is emotionally relevant (Peters, Day, & Garety, 1997; Young & Bentall, 1997). Other relevant cognitive biases include the *externalizing bias*, or making external attributions (to circumstances or other people) for negative events (Kinderman & Bentall, 2000; Won & Lee, 1997); the *personalizing bias*, or blaming others rather than circumstances when negative events occur (Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001; Kinderman & Bentall, 2000); and a failure to generate or consider alternative explanations for experiences (Freeman et al., 2004).

According to Bentall's (1994) model of paranoia (Moritz, Werner, & von Collani, 2006; Trower & Chadwick, 1995), cognitive biases protect paranoid patients from an awareness of their circumscribed role in the world by restricting access to consciousness of negative or less worthy qualities they possess. When negative self-representations are dominated by threatening events, external personal attributions (blaming others) are elicited to prevent the activation of discrepancies between how the subject realistically views himself or herself ("actual self" representations) and how he or she would like to be (ideal self representations). The activation of these discrepancies would lead to a loss of self-esteem.

The TAM incorporates the attributional bias element of the theory of Bentall (1994); Bentall, Kinderman, and Kaney (1994), but according to these authors, cognitive biases may not serve the function of preventing thoughts related to low self-esteem from reaching consciousness. They instead are a typical reasoning heuristic (Bell, Halligan, & Ellis, 2006), which is triggered in vulnerable people by the emergence of disturbing experiences or heightened arousal. In general, the TAM rejects the idea of Bentall et al. that persecutory delusions are triggered in order to defend the individual from a loss of self-esteem. As evidence of this, it points to that depression does not increase, nor does self-esteem decrease, when persecutory delusions subside (Chadwick & Lowe, 1994; Freeman et al., 1998) and weak links between self-representations and delusions improve over time (Garety & Freeman, 1999) (Fig. 6.2).

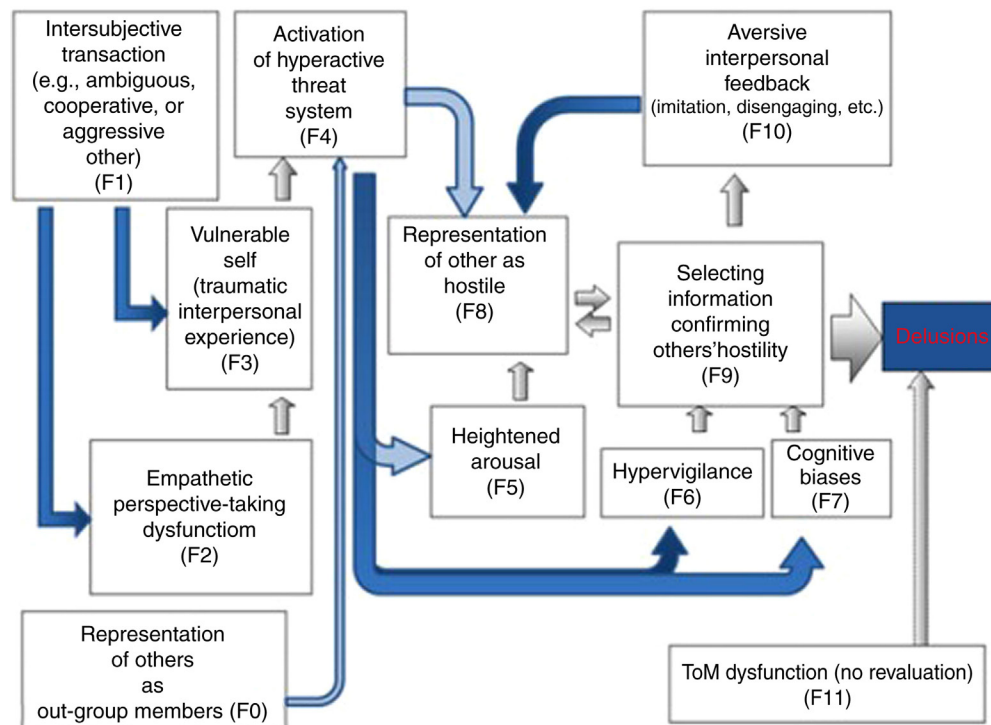


FIGURE 6.2 The model of persecutory delusions. Schematically, others are implicitly experienced as out-group members (F0). The process begins with a stressful interpersonal interaction (F1). In the face of a failure to take the perspective of others (F2) and a sense of oneself as vulnerable (F3), a person may experience an activation of the hyperactive threat/self-protection system (F4). This may in turn result in heightened arousal (F5), hypervigilance (F6), and cognitive biases (F7). These may simultaneously result in further representations of the other as hostile (F8) and selective attention to negative events, confirming others' hostility (F9). This may either lead to a paranoid delusion or elicit aversive interpersonal feedback (F10), which then reinforces representation of the other as hostile, leading to focus on threat-related signals that lead to delusions. Finally, ToM dysfunction (F11) might result in an inability to reevaluate the content of one's delusional thinking. (Reprinted from Salvatore, G., Lysaker, P. H., Popolo, R., Proccacci, M., Carcione, A., & Dimaggio, G. (2012). *vulnerable self, poor understanding of others' minds, threat anticipation and cognitive biases as triggers for delusional experience in schizophrenia: a theoretical model*. *Clinical psychology & psychotherapy*, 19(3), 247–259, with permission. Copyright 2011 by John Wiley and Sons Ltd.)

Regarding hypervigilance, the hyperactivation of the threat system determines a hypervigilant state, which seems likely to lead subjects to prefer to search for and take into account threat-related stimuli. Subsequently, it seems likely that cognitive biases, such as a bias to jump to conclusions or to see external factors as the source of internal distress (a kind of projection), could next contribute to the construction and maintenance of delusional beliefs and thus utilize a single interpretation for all events, (one that imposes itself rapidly on consciousness and resists criticism). According to the TAM, cognitive biases are not activated with the generic goal of preserving self-esteem and they are part of a more general vulnerability to delusional thought, but we add that they are more specifically activated under the pressure of the threat system (Fig. 6.1). As a result, these biases appear later in response to a problematic intersubjective context triggered by the threat system in order to defend the vulnerable self. When the vulnerable self is the active representation, cognitive biases could readily provide a person with information about the presence of a human threat so that he or she has a convenient (although delusional) justification for his or her inner turmoil. Cognitive biases could also trigger an appropriate action readiness (e.g., escape, attack), which promotes the experience of self-efficacy.

In sum, the complementary activation of the biases allows an explanation of events that tends to assign negative elements on external factors and evaluate others' behavior as persecutory and threatening. Cognitive biases and hypervigilance reinforce the tendency to select negative information—in particular, signs of others as hostile, thus reinforcing the persecutory delusion.

Hostile attributional bias

Hostile attributional bias is a type of attributional style that is based on social information processing theory (Crick & Dodge, 1994). Broadly speaking, social information processing involves five stages: encoding of social cues, interpretation of cues, response access, response evaluation, and response enactment (Mathieson et al., 2011). Hostile attribution bias is grounded in the second stage of processing: interpretation of cues. In this stage, an individual assigns meaning to social cues that have been perceived, attended to, and stored in short-term memory during the encoding stage. In hostile attribution bias, individuals interpret the intentions of others as hostile in ambiguous social situations (Andrade et al., 2011). Therefore, a hostile attribution bias is the result of a maladaptive pattern of inferring others' intentions and beliefs.

A preponderance of evidence has demonstrated an association between hostile attribution bias and subsequent aggressive behavior. The link between hostile attribution bias and aggressive behavior is robust and has been found among community populations of elementary and junior high school age youths (Andrade et al., 2011), clinical populations of youths (MacBrayer, Milich, & Hundley, 2003), incarcerated offenders (Dodge, Price, Bachorowski, & Newman, 1990), and adults (DeWall, Twenge, Gitter, & Baumeister, 2009; Dodge, 2006).

There is some discussion in the hostile attribution literature of specificity between the type of provocation situation, the hostile attribution bias, and the type of retaliatory aggression. Researchers have found some support for this hypothesized specificity. For instance, individuals who were relationally aggressive exhibited hostile attribution biases for ambiguous provocation scenarios that were relational in nature (e.g., Bailey & Ostrov, 2008; Yeung & Leadbeater, 2007).

Attributional style or bias

Attributional style is considered a central domain in social cognition, and reflects whether a person draws inferences about attributing the causes of positive and negative events to internal, external, or situational factors (Savla, Vella, Armstrong, Penn, & Twamley, 2013).

Tasks and measures that are used to assess attributional style include the Internal, Personal and Situational Attributions Questionnaire (IPSAQ) (Kinderman & Bentall, 1996) and the Ambiguous Intentions and Hostility Questionnaire (AIHQ) (Combs, Penn, Wicher, & Waldheter, 2007). Both of these measures are used to evaluate hostile social cognitive biases and to identify the tendency to attribute negative events to others rather than to situational factors. In the case of schizophrenia, some studies have found an externalizing bias whereby the causality of negative events tends to be attributed to others (Kinderman & Bentall, 1997). In a more recent study (Aakre, Seghers, St-Hilaire, & Docherty, 2009) it was found that paranoid patients tend to use more external personal attributions in negative events than nonparanoid and healthy controls.

The attribution of intentions was measured through the AIHQ (Combs et al., 2007b), which is composed of a variety of negative situations that differ in terms of intentionality. Items were developed to reflect causes that were ambiguous, intentional, and accidental in nature. The participant must indicate why he or she thinks the protagonist acts this way (AIHQ-HB subscale, Hostility Bias), whether he or she thinks the character did it on purpose (AIHQ-IS subscale, Intentionality Bias), and how much to blame the character of the story (AIHQ-BS subscale, Blame Scale). Likewise, the participant has to rate how much anger he or she would experience in that situation (AIHQ-AS subscale, Anger Bias) and what he or she would do in that situation (AIHQ-AB subscale, Aggressivity Bias). Higher scores reflect a more hostile, negative, and personal attributional style, and more aggressive attributions.

The AIHQ (Combs et al., 2007b) evaluates hostile social cognitive biases. Participants read five hypothetical negative situations with ambiguous causes (i.e., they could be intentional or accidental), imagine the scenario happening to them, and recorded a reason why the scenario occurred. Participants then use Likert scales to rate whether the other person(s) performed the action on purpose, how angry it made them feel, and how much they blamed the other person(s). Finally, the participants note how they would respond to the situation. Responses to open-ended questions are coded by two independent raters to compute a hostility bias index and an aggression bias index, respectively, ranging from 1 to 5. A blame score is computed by averaging Likert ratings to each question and then summing the three averages.

Cognitive processes in OCD

A range of etiological theories have been proposed for OCD (e.g., psychological, biological, and neuropsychological). However, cognitive-behavioral models of OCD have generated a large body of empirical research and have led to the development of effective treatments (Frost & Steketee, 2002).

Cognitive models suggest that dysfunctional beliefs and maladaptive appraisals underlie unhelpful strategies in the management of intrusive phenomena. Such strategies lead to extreme reactions to specific intrusive thoughts, images, or urges, resulting in obsessive and compulsive symptoms (Clark & Purdon, 1993; de Silva & Rachman, 1998; Rachman, 1998; Salkovskis, 1985).

Recent cognitive-behavioral research by the Obsessive Compulsive Cognitions Working Group (OCCWG, 1997) has focused on six main belief domains that play an important role in the development of obsessions from intrusive thoughts: inflated personal responsibility, overimportance of thought, beliefs about the importance of controlling one's thoughts, overestimation of threat, intolerance for uncertainty, and perfectionism. Subsequently, the OCCWG (Steketee et al., 2003; Taylor, Kyrios, Thordarson, Steketee, & Frost, 2002) reported not only a high degree of association between the identified belief domains and OC symptoms, but also high intercorrelations between scales measuring the six domains. Further, examination of the factor structure of a scale measuring these cognitive domains identified three larger factors (inflated sense of responsibility/overestimation of threat, perfectionism/intolerance for uncertainty, and importance/control of thoughts), but, again, these were highly intercorrelated (OCCWG, 2005).

Cognitive conceptualizations of OCD have implicated, explicitly or implicitly, the significance of self-perceptions and assumptions about the world in the determination of responses to intrusions. Rachman (1997, 1998) has argued that “catastrophic misinterpretations” of the personal significance of intrusive thoughts are the main cause of the development and maintenance of obsessions. According to Rachman, intrusive thoughts that are perceived by the individual as endangering his or her view of self will trigger an escalation in dysfunctional behaviors, or cause a more intense use of thought control strategies (e.g., thought suppression).

Rachman's seminal cognitive theory conceptualizes a diathesis-stress model whereby an individual's rearing under strong values increases vulnerability to OCD (Rachman, 1997). Later, learning history increases the likelihood of the obsessions being appraised as significant or meaningful. The appraisal of the obsessions as significant represents a cognitive bias. Preexisting trait anxiety may facilitate the emergence of OCD.

Relatedly, Rachman (1997) discusses the cognitive process of TAF, which is a cognitive distortion representing a moral component and an event probability component. A moral reasoning error is made when an individual has a thought about an action and then appraises that thought as being equivalent or almost equivalent to actually having engaged in the action itself. In TAF, the probability of an event occurring can be perceived as increasing simply by having a thought about the event. Both the moral reasoning and the event probability components fuse thoughts and actions. TAF is increased by the overestimation of attributions of responsibility to the self for events, which represents a cognitive distortion.

Salkovskis (1985) proposed another cognitive theory of OCD. According to this theory, obsessions can be hinted via environmental stimuli. Cuing of obsessions is aversive to the individual and therefore avoidance measures are taken. The person may or may not recognize the obsessional thought to be irrational. If the thought does not have negative ramifications for the person, this cognitive chain of events will terminate. If negative ramifications are present, *automatic* thoughts, similar to Beck's conceptualization of automatic thoughts, will occur (Beck, 1976). Automatic thoughts are more likely to occur if the current mood state is negative. These thoughts interact with a set of assumptions, including but not limited to: thought equals action, increased sense of responsibility for events, beliefs about the need to control thoughts, and self-blame for events. These negative thoughts then influence mood, which leads to attempts to reduce distress by engaging in compulsions. Negative reinforcement occurs when the distress is reduced, lending credibility to the negative automatic thoughts. Cooccurring depressed mood can also play a role via several mechanisms. The first mechanism increases the dysfunctional beliefs by increasing the stimuli that may cue an intrusive thought that could become an obsession. This can then create a transactional process by which mood increases negative automatic thoughts and, in turn, these thoughts then can increase negative mood (a vicious circle).

Cognitive biases in OCD

One promising area of research that may be implicated in OCD treatment focuses on the role of implicit cognition and biases in the development and maintenance of the disorder. Cognitive biases refer to the tendency to preferentially process negative or threatening information, either through increased allocation of attention resources (attentional bias) or via rapid assignment of negative or threatening appraisals to ambiguous information (interpretive bias) (Koster, Fox, & MacLeod, 2009). Extensive research has established that anxious individuals preferentially allocate their attention toward threat-related information (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007) and interpret ambiguous information in a negative manner (Mathews & MacLeod, 2005). However, leading authorities in the field have noted that although prominent cognitive theories of anxiety implicate attentional and interpretive biases in the onset and maintenance of anxiety disorders (Beck & Clark, 1997), the causal nature of these biases remains to be established in all disorders (MacLeod, Campbell, Rutherford, & Wilson, 2004).

“By its very nature OCD is an ideal candidate disorder to examine pathological cognitive biases” (Williams & Grisham, 2013, p. 2). While a number of studies have examined the presence of attentional biases as a form of aberrant information processing in OCD (Amir, Najmi, & Morrison, 2009; Muller & Roberts, 2005), other research has focused on interpretive biases (e.g., Rachman, 1998). Interpretive biases align with cognitive models of OCD that propose that it is the interpretation of an unwanted intrusive thought or image that leads to anxiety or distress and the associated behaviors. Evidence documents the association between negative interpretations of intrusive thoughts and OC symptoms (e.g., Steketee et al., 2003, 2005).

Experimental designs are important to establish the causal role of cognitive biases in symptomatology and maintenance in OCD. One way to test the causal hypothesis is to target biased attention and appraisals via cognitive bias modification (CBM) paradigms. CBM is a cognitive experimental methodology that modifies biases via training conditions in which participants are exposed to a series of stimuli designed to manipulate processing relevant to psychopathology. CBM procedures are designed to modify either an interpretive bias (CBM-I) or an attentional bias (CBM-A). Both types of CBM paradigms have demonstrated efficacy in modifying cognitive biases implicated in the anxiety disorders, and the resultant change in selective information processing has been shown to affect clinically relevant symptoms (MacLeod, 2012). Williams and Grisham (2013) evaluated the impact of CBM-I on measures of interpretation bias, on distress, and on responses to three OC stressor tasks in a selected sample of 89 community members reporting OC symptoms. The authors first evaluated the impact of CBM-I on measures of interpretation bias. Results supported preliminary findings of Clerkin and Teachman (2011), who reported a significant effect of CBM-I training on OC interpretation biases.

Thought–Action Fusion and OCD

TAF is a component of OCD in the two previously discussed theories (Rachman, 1997; Salkovskis, 1985). Researchers have developed assessment measures of TAF that have resulted in empirical findings supporting TAF as a process in OCD. Most commonly, TAF is measured using the TAF Questionnaire, a 19-item questionnaire composed of moral TAF, likelihood-self TAF, and likelihood-other TAF scales (Shafraan, Thordarson, & Rachman, 1996).

Thus, individuals with OCD tend to make cognitive errors in their thinking with regard to the fusion of thoughts and actions. This tends to occur in the following two ways: (1) Having a thought can be viewed as being as “bad” as having completed the action (moral TAF), and (2) thinking about the event increases the perception that the event will occur (likelihood TAF).

Inferential Confusion and OCD

A concept related to TAF is “inferential confusion” or the process of confusing imagined events and actually occurring events. According to this view, people with OCD mistake the imagined negative event for a real event, such that the imagined event becomes more realistic, creating the belief that the event has an increased probability of occurrence (O’Connor & Aardema, 2003).

Reality Monitoring and Intrusive Imagery and OCD

Reality monitoring errors occur when people confuse real and imagined events (Johnson & Raye, 1981). It has been suggested that OCD individuals have poorer reality monitoring ability due to intrusive imagery present in OCD (Brown, Kosslyn, Breiter, Baer, & Jenike, 1994). That is, with the occurrence of repeated involuntary images, those images seem real, which leads participants to confuse them with reality. Indeed, there is a large body of literature now showing that imagination leads people to believe in events that never occurred (Krackow & Rabenhorst, 2010).

Memory Biases in OCD

Negative memory biases have been theorized to play a role in psychological disorders, particularly anxiety. According to Beck (1976), negative schemata formed in childhood render an individual susceptible to drawing attention toward threatening stimuli, which is theorized to have an impact on memory for these stimuli. These schemata are activated when ambiguous or anxiety-provoking stimuli are encountered, and predispose a person toward an anxious interpretation of events. A more specific model of how anxiety influences the allocation of attention and memory has been developed (Williams, Watts, MacLeod, & Mathews, 1997). Specifically, when a stimulus is encountered in the environment, it is mapped onto existing schemata and a decision is made as to the threat level of the stimulus. When stimuli are appraised as threatening, further cognitive resources are allocated toward them.

Attentional Bias in OCD

According to theory, individuals are more vulnerable to emotional disorders when the level of emotion exceeds their capacity to control that emotion (Mathews & MacLeod, 2005). Individuals with anxiety disorders are more likely to display selective attention to threatening stimuli and experience greater difficulty in disengaging. It is also the case that the threshold for appraising a stimulus as threatening is lower in individuals with anxiety disorders. Accordingly, attention toward threat is a combination of current level of anxiety state, level of threat appraisal, and ability to modulate attention. Mathews and MacLeod (2005) suggest that attentional bias plays a role in the development of anxiety disorders.

Cognitive theories (e.g., Rachman, 1997; Tata, Leibowitz, Prunty, Cameron, & Pickering, 1996) suggest that OCD should call attention to abnormal attentional processing toward concern-related material. Thus, processing biases in OCD would be expected to contribute to the development and maintenance of intrusive obsessive thoughts. The extent of attentional biases in OCD has implications for theoretical accounts of OCD, its treatment, and nosology (Bar-Haim et al., 2007).

Attention-related processing biases can be investigated in tasks where participants search for a target among distractors (e.g., Fox, Russo, Bowles, & Dutton, 2001; Öhman, Flykt, & Esteves, 2001).

This study examined attentional bias to OC-relevant scenes using a visual search task. Controls, as well as nondepressed and depressed OCD patients searched for their personally selected positive images among their negative distractors, and vice versa. While the OCD groups were slower than healthy individuals in rating the images, there were no group differences in the magnitude of negative bias to concern-related scenes. A second experiment employing a common set of images replicated the results on an additional sample of OCD patients. Although there was a larger bias to negative OC-related images without preexposure overall, no group differences in attentional bias were observed. However, OCD patients subsequently rated the images more slowly and more negatively, suggesting postattentional processing difficulties. The results argue against a robust attentional bias in OCD patients regardless of their depression status, and speak to generalized difficulties disengaging from negative valence stimuli. Rather, postattentional processing abnormalities may account for differences in emotional processing in OCD.

Attentional bias in euthymic BD

Exploring information-processing models for bipolar disorders is quite complicated because of the two polar emotions. Research on individuals in manic episodes has identified a bias toward positive stimuli (Murphy et al., 1999) and problems with attentional control in the context of positive stimuli (García-Blanco, Perea, & Salmeron, 2013) in bipolar disorder. Peckham, Johnson, and Gotlib (2016) argue that heterogeneity in study methodology and in mood state of participants makes it difficult to draw definite conclusions on the nature of positive biases in bipolar disorder.

Peckham et al. (2016) in a study investigated whether attentional biases appear in individuals with bipolar disorders when they are in a positive mood state and whether biases are related to indexes of emotion regulation and to prior history of mood episodes. Ninety adults diagnosed with bipolar I disorder and 81 controls with no lifetime mood disorder underwent a positive mood induction and then completed an emotion face dot-probe task; participants in the bipolar disorder group also completed a self-report measure of responses to positive affect. Attentional bias was not related to a diagnosis of bipolar disorder or to symptom severity. Consistent with hypotheses, analyses within the bipolar group indicated that a decrease of positive affect was associated to significantly less attention paid to the positively valenced faces.

Cognitive bias and metacognitive training in schizophrenia

Evidence has accumulated that cognitive biases, such as JTC, are involved in the pathogenesis of schizophrenia-positive symptoms, particularly delusions. A recently developed group program called metacognitive training (MCT) is presented

as targeting these biases. MCT is a hybrid of psychoeducation, cognitive remediation, and cognitive-behavioral therapy (CBT). This review introduces new evidence on cognitive biases involved in the pathogenesis of schizophrenia and demonstrates how the MCT raises the patients' (metacognitive) awareness to detect and defuse such "cognitive traps." At the end, a new individualized variant entitled MCT is presented targeting individual delusional ideas.

Numerous reviews assert that cognitive biases, such as JTC, are putatively involved in the formation and maintenance of delusions in schizophrenia (Freeman, 2007; van der Gaag, 2006). There is emerging evidence that schizophrenia patients lack metacognitive awareness not only for neuropsychological dysfunctions (Medalia, Thysen, & Freilich, 2008; Huddy, Reeder, & Wykes, 2010) but also for cognitive biases (Perivoliotis et al., 2010). For example, despite objective JTC, they deem themselves indecisive (Freeman et al., 2006). The MCT for schizophrenia approach, which has been available since 2005, targets these specific biases (Moritz & Woodward, 2010). MCT incorporates elements of psychoeducation, cognitive remediation, and CBT.

Since the late 1980s, cognitive research has increasingly investigated cognitive biases in schizophrenia. Unlike (cold) cognitive deficits, such as impairment in speed and accuracy (Mesholam-Gately, Giuliano, Goff, Faraone, & Seidman, 2009), cognitive biases relate to the appraisal, processing, and selection of information. Most studies concur that approximately 40%–70% of patients with schizophrenia gather very little information before arriving at strong conclusions. This response pattern, termed JTC, has been predominantly verified with the so-called beads tasks (Garety, Hemsley, & Wessely, 1991). Importantly, this response pattern is active in both delusional and delusion-neutral frameworks (Lincoln, Ziegler, Mehl, & Rief, 2010).

Mounting evidence confirms that JTC is aggravated under stress and within an emotional context (Moritz et al., 2009; Lincoln, Lange, Burau, Exner, & Moritz, 2010). Patients seem to be largely unaware of their hastiness and often view themselves as rather hesitant and indecisive (Freeman et al., 2006).

Attributional Style and Self-Esteem in Schizophrenia

Patients with schizophrenia often cast blame for negative events onto other people (e.g., neighbors) and/or institutions (e.g., the Secret Service) rather than spreading blame over multiple sources. As with JTC, this style is not confined to delusional schemas but manifests itself in neutral situations. While there is a consensus that patients display attributional biases, the exact signature is the subject of an ongoing controversy. Whereas early research found evidence for a self-serving bias in the disorder (attribution of success to oneself, and attribution of failure to others or circumstances), some newer findings point to a tendency to externalize both personal positive and negative events, which may foster subjective powerlessness and could give rise to feelings of alien control (Moritz & Woodward, 2007a; Lincoln, Mehl, Exner, Lindenmeyer, & Rief, 2010). More recently, an excess of *monocausal inferences* was detected in schizophrenia patients; that is, patients did not consider multiple sources but converged onto isolated explanations more often than did controls (Randjbar, Veckenstedt, Vitzthum, Hottenrott, & Moritz, 2011).

The social consequences and especially disadvantages of extreme and monocausal attributional styles are highlighted (e.g., blaming others for failure may lead to social rejection). Then, possible causes for briefly described events should be discussed, whereby situational, as well as personal factors should be taken into account. Participants are encouraged to find and combine different possible explanations; for example, if someone says, "You don't look good," possible explanations might be illness, lack of sleep, insulting remark, expression of true concern, or skin looks pale under neon light. It has been demonstrated that schizophrenia patients are far more easily deceived for initially strongly suggested interpretations, which, however, are later discouraged by accumulating evidence. Notably, a bias against disconfirmatory evidence (BADE) has been demonstrated in both first-episode (Woodward, Moritz, Cuttler, & Whitman, 2006) and chronic patients (Moritz & Woodward, 2006), as well as in healthy participants scoring high on delusional symptoms (Buchy, Woodward, & Liotti, 2007).

Deficits in ToM are present in multiple psychiatric disorders, for example affective disorders and some disorders at the border of neurology and psychiatry (e.g., autism and dementia). Multiple studies have confirmed severe deficits in social cognition or ToM in psychosis (Bora, Yücel, & Pantelis, 2009; Brüne, 2005).

The past 2 decades have witnessed increasing support for psychological models of schizophrenia suggesting that cognitive impairments and biases, as well as dysfunctional coping styles, along with traumatic experiences (Lim, Chong, & Keefe, 2009), play an important role in the pathogenesis of the disorder. CBT (Tai & Turkington, 2009; Wykes, Steel, Everitt, & Tarrier, 2008), psychoeducation (Lincoln, Wilhelm, & Nestoriuc, 2007), cognitive and social remediation (Roder & Medalia, 2010), and more recently MCT in group, as well as individualized settings have proven to be important complementary interventions in addition to psychopharmacotherapy, particularly in cases where neuroleptics fail to exert an effect. MCT is a hybrid of the aforementioned approaches, as it aims to sensitize participants' (metacognitive) awareness of cognitive biases (psychoeducational aspect) via numerous cognitive tasks (cognitive remediation aspect) providing insight and corrective experiences, and then to apply the learning goals to daily life and symptoms (CBT aspect).

Social Cognitive Treatments of Schizophrenia

Social cognitive treatments for schizophrenia are a rapidly expanding area of research. Interest in these types of treatments has been sparked from the central role of social cognitive impairments in schizophrenia (e.g., Penn, Sanna, & Roberts, 2008). The roots of social cognitive treatments can be traced back to more traditional interventions, including social skills training, neurocognitive remediation, and CBT (Fiszdon & Reddy, 2012). In a comprehensive review of social cognitive treatments of schizophrenia, Fiszdon and Reddy (2012) provide information on 50 studies evaluating a range of social cognitive interventions, including broad-based, targeted, and comprehensive approaches.

Targeted Treatments

Targeted treatments usually focus on three cognitive domains: ToM, social perception, and emotion processing. Affect recognition training strategies include the Micro-Expressions Training Tools (METT) (Russell, Chu, & Phillips, 2006), Training in Affect Recognition (TAR) (Frommann, Streit, & Wolwer, 2003), and Emotion Management Training (EMT) (Hodel, Kern, & Brenner, 2004).

Interventions targeted to social perception have shown that deficits in social perception can be improved in schizophrenia via the use of social cognitive strategies. Such strategies include Social Cognition Enhancement Training (SCET) and the five-module Integrated Psychological Therapy (IRT).

ToM (Mazza et al., 2010) impairments can also be rectified through targeted interventions. Such interventions include Emotion and ToM Imitation Training (ETIT) and the Instrumental Enrichment Program (IEP) (Roncone et al., 2004), related to Hogarty et al.'s Cognitive Enhancement Therapy.

Comprehensive Treatments

In response to the targeted interventions, which demonstrated that performance could be improved in individual social cognitive domains, several interventions have been developed that are more comprehensive and seek to rectify performance across a broad range of social cognitive domains.

The first such comprehensive social cognitive treatment, Social Cognition and Interaction Training (SCIT), developed by Roberts and Penn, is a manualized, group-based 20- to 24-session treatment targeting a range of social cognitive deficits present in schizophrenia, including deficits in affect recognition, attributional style, and ToM (Penn, Roberts, Combs, & Sterne, 2007). SCIT is divided into three discrete sections that focus on identifying and understanding basic emotions and paranoia, learning strategies to avoid the tendency to “jump to conclusions” in social situations, and applying newly acquired social cognitive skills to real-life situations. Several studies have tested SCIT's efficacy, including a small inpatient, uncontrolled feasibility trial (Penn et al., 2005), an experimental (not randomized) trial of inpatients with an active control group (Combs et al., 2007a) that included a 6-month follow-up of participants assigned to the intervention (Combs et al., 2009), an outpatient quasi-experimental study (Roberts & Penn, 2009), and a community-based, multisite, uncontrolled feasibility and transportability study (Roberts, Penn, Labate, Margolis, & Sterne, 2010).

In a trial of an adapted SCIT, Family-Assisted Social Cognition and Interaction Training (F-SCIT), the original SCIT intervention was adapted to include a family member or close friend to serve as a practice buddy for skills learned during the group sessions (Tas, Danaci, Cubukcuoglu, & Brune, 2012).

F-SCIT was associated with improvements in ToM, affect recognition, and empathy, a trend toward reduced paranoid attributional bias, and no significant improvement in social perception. Importantly, the intervention was associated with improvements in social functioning, quality of life, and psychiatric symptoms. SCIT is also being adapted for high-functioning autism (Turner-Brown, Perry, Dichter, Bodfish, & Penn, 2008), and additional randomized controlled trials of SCIT for schizophrenia are ongoing.

A related treatment called Social Cognitive Skill Training (SCST) was developed by Horan, Green, and colleagues at UCLA, and combines and expands on elements from other social cognitive treatments, including SCIT and Training in Affect Recognition. The intervention focuses on four social cognitive domains: emotion recognition, social perception, attributional bias, and ToM. Like SCIT, the attributional style and ToM training includes teaching participants how to avoid JTC by separating facts from guesses and by evaluating evidence in support of different attributions.

While SCIT and SCST have focused on improving performance on “traditional” social cognitive domains, such as affect recognition and ToM, an innovative, comprehensive group approach termed MCT has focused more specifically on social cognitive biases that are thought to underlie the formation and maintenance of psychotic symptoms. MCT represents a mixture of cognitive-behavioral therapy, cognitive remediation, and psychoeducation (Moritz et al., 2014). MCT treatment teaches participants about cognitive biases, how these cognitive biases relate to psychotic symptoms, and

how these cognitive biases may lead to negative consequences (Moritz & Woodward, 2007a, 2007b). MCT focuses on the “metacognitive infrastructure,” or general types of reasoning errors that are presumed to be related to the formation and maintenance of delusions. These reasoning errors include attributional bias, JTC bias, bias against disconfirmatory evidence, ToM impairments, overconfidence in memory errors, and depressive cognitive patterns. A recent evaluation of single-session MCT training suggests that it is associated with attenuation of the JTC bias (Ross, Freeman, Dunn, & Garety, 2011), while reports on the efficacy of a full eight-session course of MCT indicate that this more intensive treatment is associated with improvements in not only JTC but, in some cases, also positive symptoms (Aghotor, Pfueller, Moritz, Weisbrod, & Roesch-Ely, 2010; Kumar et al., 2010), as well as delusional distress, memory, and quality of social relationships (Moritz, Kerstan, et al., 2011; Moritz, Veckenstedt, Randjbar, Vitzthum, & Woodward, 2011).

SUMMARY

Metacognition is a recently invented concept that comprises skills that enable individuals to comprehend their own mental states. Metacognition is closely related to empathy, perspective taking, and ToM. Metacognitive deficits are associated with a number of neurodevelopmental disorders, such as schizophrenia and OCD. The chapter further examines the concept of empathy and in particular cognitive empathy and corresponding measures. The last section of the chapter reviews and defines cognitive and social cognitive biases in normative, as well as in neurodevelopmental disorders. Among the most important cognitive biases are hostile attributional bias, JTC, and attentional bias via schizophrenia and OCD. Finally, the role of targeted and comprehensive cognitive treatments in schizophrenia is investigated. Metacognition therapy is a recently developed type of therapy that focuses on social cognitive biases that are thought to underlie psychotic symptomatology.

REFERENCES

- Aakre, J. M., Seghers, J. P., St-Hilaire, A., & Docherty, N. (2009). Attributional style in delusional patients: a comparison of remitted paranoid, remitted nonparanoid, and current paranoid patients with nonpsychiatric controls. *Schizophrenia Bulletin*, 35(5), 994–1002.
- Abell, F., Happé, F., & Frith, U. (2000). Do triangles play tricks? Attribution of mental states to animated shapes in normal and abnormal development. *Cognitive Development*, 15(1), 1–16.
- Abramowitz, J. S., Whiteside, S., Kalsy, S. A., & Tolin, D. F. (2003). Thought control strategies in obsessive-compulsive disorder: a replication and extension. *Behaviour Research and Therapy*, 41(5), 529–540.
- Aghotor, J., Pfueller, U., Moritz, S., Weisbrod, M., & Roesch-Ely, D. (2010). Metacognitive training for patients with schizophrenia (MCT): feasibility and preliminary evidence for its efficacy. *Journal of Behavior Therapy and Experimental Psychiatry*, 41(3), 207–211.
- Albaity, M., Rahman, M., & Shahidul, I. (2014). Cognitive reflection test and behavioral biases in Malaysia. *Judgment and Decision Making*, 9(2), 148–151.
- Albiero, P., Matricardi, G., Speltri, D., & Toso, D. (2009). The assessment of empathy in adolescence: a contribution to the Italian validation of the “Basic Empathy Scale”. *Journal of Adolescence*, 32(2), 393–408.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.
- Amir, N., Najmi, S., & Morrison, A. S. (2009). Attenuation of attention bias in obsessive-compulsive disorder. *Behaviour Research and Therapy*, 47(2), 153–157.
- Andrade, B. F., Waschbusch, D. A., Doucet, A., King, S., MacKinnon, M., McGrath, P. J., & Corkum, P. (2011). Social information processing of positive and negative hypothetical events in children with ADHD and conduct problems and controls. *Journal of Attention Disorders*, 16(6), 491–504.
- Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, 35(1), 124–140.
- Arnott, D. (2006). Cognitive biases and decision support systems development: a design science approach. *Information Systems Journal*, 16(1), 55–78.
- Bacon, E., & Izaute, M. (2009). Metacognition in schizophrenia: processes underlying patients’ reflections on their own episodic memory. *Biological Psychiatry*, 66(11), 1031–1037.
- Bahnemann, M., Dziobek, I., Prehn, K., Wolf, I., & Heekeren, H. R. (2009). Sociotopy in the temporoparietal cortex: common versus distinct processes. *Social Cognitive and Affective Neuroscience*, 5(1), 48–58.
- Bailey, C. A., & Ostrov, J. M. (2008). Differentiating forms and functions of aggression in emerging adults: associations with hostile attribution biases and normative beliefs. *Journal of Youth and Adolescence*, 37(6), 713–722.
- Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2007). Threat-related attentional bias in anxious and nonanxious individuals: a meta-analytic study. *Psychological Bulletin*, 133(1), 1–24.
- Baron, J. (2008). *Thinking and deciding* (4th ed.). New York, NY: Cambridge University Press.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Boston, MA: MIT Press/Bradford Books.
- Baron-Cohen, S. (2009). Autism: the empathizing–systemizing (E-S) theory. *Annals of the New York Academy of Sciences*, 1156(1), 68–80.
- Baron-Cohen, S. (2011). *Zero degrees of empathy: A new theory of human cruelty*. London, England: Penguin.
- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, 21(1), 37–46.

- Baron-Cohen, S., Leslie, A. M., & Frith, U. (1986). Mechanical, behavioural and intentional understanding of picture stories in autistic children. *British Journal of Developmental Psychology*, *4*(2), 113–125.
- Baron-Cohen, S., & Wheelwright, S. (2004). The Empathy Quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, *34*(2), 163–175.
- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry*, *42*(2), 241–251.
- Bateman, A. W., & Fonagy, P. (2004). Mentalization-based treatment of BPD. *Journal of Personality Disorders*, *18*(1), 36–51.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York, NY: International Universities Press.
- Beck, A. T., Baruch, E., Balter, J. M., Steer, R. A., & Warman, D. M. (2004). A new instrument for measuring insight: the Beck Cognitive Insight Scale. *Schizophrenia Research*, *68*(2), 319–329.
- Beck, A. T., & Clark, D. A. (1997). An information processing model of anxiety: automatic and strategic processes. *Behaviour Research and Therapy*, *35*(1), 49–58.
- Bell, V., Halligan, P. W., & Ellis, H. D. (2006). A cognitive neuroscience of belief. In P. W. Halligan, & M. Aylward (Eds.), *The power of belief* (pp. 3–21). Oxford, UK: Oxford University Press.
- Bell, M., Tsang, H. W. H., Greig, T. C., & Bryson, G. J. (2009). Neurocognition, social cognition, perceived social discomfort, and vocational outcomes in schizophrenia. *Schizophrenia Bulletin*, *35*(4), 738–747.
- Belloch, A., Morillo, C., & Garcia-Soriano, G. (2009). Strategies to control unwanted intrusive thoughts: which are relevant and specific in obsessive-compulsive disorder? *Cognitive Therapy and Research*, *33*(1), 75–89.
- Bentall, R. P. (1994). Cognitive biases and abnormal beliefs: towards a model of persecutory delusions. In A. S. David, & J. Cutting (Eds.), *The neuropsychology of schizophrenia* (pp. 337–360). London, England: Erlbaum.
- Bentall, R. P., Corcoran, R., Howard, R., Blackwood, N., & Kinderman, P. (2001). Persecutory delusions: a review and theoretical integration. *Clinical Psychology Review*, *21*(8), 1143–1192.
- Bentall, R. P., Kinderman, P., & Kaney, S. (1994). The self, attributional processes and abnormal beliefs: towards a model of persecutory delusions. *Behaviour Research and Therapy*, *32*(3), 331–341.
- Bernhardt, B. C., & Singer, T. (2012). The neural basis of empathy. *Neuroscience*, *35*(1), 1–23.
- Blair, R. J. R. (2005). Responding to the emotions of others: dissociating forms of empathy through the study of typical and psychiatric populations. *Consciousness and Cognition*, *14*(4), 698–718.
- Bora, E., Yücel, M., & Pantelis, C. (2009). Theory of mind impairment: a distinct trait-marker for schizophrenia spectrum disorders and bipolar disorder? *Acta Psychiatrica Scandinavica*, *120*(4), 253–264.
- Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: the self-assessment manikin and the semantic differential. *Journal of Behavioral Therapy and Experimental Psychiatry*, *25*, 49–59.
- Brenner, L. A., Koehler, D. J., Liberman, V., & Tversky, A. (1996). Overconfidence in probability and frequency judgments: a critical examination. *Organizational Behavior and Human Decision Processes*, *65*(3), 212–219.
- Brown, H. D., Kosslyn, S. M., Breiter, H. C., Baer, L., & Jenike, M. A. (1994). Can patients with obsessive-compulsive disorder discriminate between percepts and mental images? A signal detection analysis. *Journal of Abnormal Psychology*, *103*(3), 445–454.
- Brüne, M. (2005). “Theory of mind” in schizophrenia: a review of the literature. *Schizophrenia Bulletin*, *31*(1), 21–42.
- Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. *Journal of Personality and Social Psychology*, *92*(5), 938–956.
- Buchy, L., Woodward, T. S., & Liotti, M. (2007). A cognitive bias against disconfirmatory evidence (BADE) is associated with schizotypy. *Schizophrenia Research*, *90*(1), 334–337.
- Carré, A., Stefaniak, N., D’Ambrosio, F., Bensalah, L., & Besche-Richard, C. (2013). The Basic Empathy Scale in Adults (BES-A): factor structure of a revised form. *Psychological Assessment*, *25*(3), 679–691.
- Carter, C. R., Kaufmann, L., & Michel, A. (2007). Behavioral supply management: a taxonomy of judgment and decision-making biases. *International Journal of Physical Distribution & Logistics Management*, *37*(8), 631–669.
- Chadwick, P. (2006). *Person-based cognitive therapy for distressing psychosis*. Chichester, England: Wiley.
- Chadwick, P. D., & Lowe, C. F. (1994). A cognitive approach to measuring and modifying delusions. *Behaviour Research and Therapy*, *32*(3), 355–367.
- Clark, D. (2004). *Cognitive-behavioral therapy for OCD*. New York, NY: Guilford Press.
- Clark, D. A., & Purdon, C. (1993). New perspectives for a cognitive theory of obsessions. *Australian Psychologist*, *28*(3), 161–167.
- Clark, D. A., Purdon, C., & Wang, A. (2003). The Meta-Cognitive Beliefs Questionnaire: development of a measure of obsessional beliefs. *Behaviour Research and Therapy*, *41*(6), 655–669.
- Clerkin, E. M., & Teachman, B. A. (2011). Training interpretation biases among individuals with symptoms of obsessive compulsive disorder. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*(3), 337–343.
- Combs, D. R., Adams, S. D., Penn, D. L., Roberts, D., Tiegreen, J., & Stem, P. (2007a). Social Cognition and Interaction Training (SCIT) for inpatients with schizophrenia spectrum disorders: preliminary findings. *Schizophrenia Research*, *91*(1–3), 112–116.
- Combs, D. R., Elerson, K., Penn, D. L., Tiegreen, J. A., Nelson, A., Ledet, S. N., et al. (2009). Stability and generalization of Social Cognition and Interaction Training (SCIT) for schizophrenia: six-month follow-up results. *Schizophrenia Research*, *112*(1–3), 196–197.
- Combs, D. R., Penn, D. L., Wicher, M., & Waldheter, E. (2007b). The Ambiguous Intentions Hostility Questionnaire (AIHQ): a new measure for evaluating hostile social-cognitive biases in paranoia. *Cognitive Neuropsychiatry*, *12*(2), 128–143.

- Corbera, S., Wexler, B. E., Ikezawa, S., & Bell, M. D. (2013). Factor structure of social cognition in schizophrenia: is empathy preserved? *Schizophrenia Research and Treatment*, 2013, 1–13.
- Couture, S. M., Granholm, E. L., & Fish, S. C. (2011). A path model investigation of neurocognition, theory of mind, social competence, negative symptoms and real-world functioning in schizophrenia. *Schizophrenia Research*, 125(2), 152–160.
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115(1), 74–101.
- Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.
- Davis, M. H. (1983). Measuring individual differences in empathy: evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113–126.
- de Silva, P., & Rachman, S. (1998). *Obsessive-compulsive disorder: The facts* (2nd ed.). New York, NY, USA: Oxford University Press.
- Decety, J., & Cowell, J. M. (2014). The complex relation between morality and empathy. *Trends in Cognitive Sciences*, 18(7), 337–339.
- Declerck, C. H., & Bogaert, S. (2008). Social value orientation: related to empathy and the ability to read the mind in the eyes. *Journal of Social Psychology*, 148(6), 711–726.
- DeWall, C. N., Twenge, J. M., Gitter, S. A., & Baumeister, R. F. (2009). It's the thought that counts: the role of hostile cognition in shaping aggressive responses to social exclusion. *Journal of Personality and Social Psychology*, 96(1), 45–59.
- Dimaggio, G., & Lysaker, P. H. (2010). *Metacognition and severe adult mental disorders: From research to treatment*. London, England: Routledge.
- Dimaggio, G., Semerari, A., Carcione, A., Nicolò, G., & Procacci, M. (2007). *Psychotherapy of personality disorders: Metacognition, states of mind, and interpersonal cycles*. London, England: Routledge.
- Dodge, K. A. (2006). Translational science in action: hostile attributional style and the development of aggressive behavior problems. *Development and Psychopathology*, 18(03), 791–814.
- Dodge, K. A., Price, J. M., Bachorowski, J. A., & Newman, J. P. (1990). Hostile attributional biases in severely aggressive adolescents. *Journal of Abnormal Psychology*, 99(4), 385–392.
- Dudley, R. E. J., & Over, D. E. (2003). People with delusions jump to conclusions: a theoretical account of research findings on the reasoning of people with delusions. *Clinical Psychology & Psychotherapy*, 10(5), 263–274.
- Dziobek, I., Preißler, S., Grozdanovic, Z., Heuser, I., Heekeren, H. R., & Roepke, S. (2011). Neuronal correlates of altered empathy and social cognition in borderline personality disorder. *Neuroimage*, 57(2), 539–548.
- Dziobek, I., Rogers, K., Fleck, S., Bahnemann, M., Heekeren, H. R., Wolf, O. T., & Convit, A. (2008). Dissociation of cognitive and emotional empathy in adults with Asperger syndrome using the Multifaceted Empathy Test (MET). *Journal of Autism and Developmental Disorders*, 38(3), 464–473.
- Epley, N., & Gilovich, T. (2001). Putting adjustment back in the anchoring and adjustment heuristic: differential processing of self-generated and experimenter-provided anchors. *Psychological Science*, 12(5), 391–396.
- Evans, J. S. B., Barston, J. L., & Pollard, P. (1983). On the conflict between logic and belief in syllogistic reasoning. *Memory & Cognition*, 11(3), 295–306.
- Fan, Y., Duncan, N. W., de Greck, M., & Northoff, G. (2011). Is there a core neural network in empathy? An fMRI based quantitative meta-analysis. *Neuroscience & Biobehavioral Reviews*, 35(3), 903–911.
- Feshbach, N. D. (1978). Studies of empathic behavior in children. In B. A. Maher (Ed.), *Progress in experimental personality research* (pp. 1–47). (Vol. 8). New York, NY: Academic Press.
- Fischhoff, B. (1975). Hindsight is not equal to foresight: the effect of outcome knowledge on judgment under uncertainty. *Journal of Experimental Psychology: Human Perception and Performance*, 1(3), 288–299.
- Fisher, P. L. (2009). Obsessive compulsive disorder: a comparison of CBT and the metacognitive approach. *International Journal of Cognitive Therapy*, 2(2), 107–122.
- Fiszdon, J. M., & Reddy, L. F. (2012). Review of social cognitive treatments for psychosis. *Clinical Psychology Review*, 32(8), 724–740.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: a new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906–911.
- Fonagy, P., Gergely, G., Jurist, E. L., & Target, M. (2002). *Affect regulation, mentalization, and the development of the self*. London, England: Karnac.
- Fowler, D. (2000). Psychological formulation of early episodes of psychosis: a cognitive model. In M. Birchwood, D. Fowler, & C. Jackson (Eds.), *Early intervention in psychosis: A guide to concepts, evidence and interventions* (pp. 101–127). Chichester, England: Wiley.
- Fox, E., Russo, R., Bowles, R., & Dutton, K. (2001). Do threatening stimuli draw or hold visual attention in subclinical anxiety? *Journal of Experimental Psychology: General*, 130(4), 681–700.
- Francis, J. L., & Penn, D. L. (2001). The relationship between insight and social skill in persons with severe mental illness. *Journal of Nervous and Mental Disease*, 189(12), 822–829.
- Frederick, S. (2005). Cognitive reflection and decision making. *The Journal of Economic Perspectives*, 19(4), 25–42.
- Freeman, D. (2007). Suspicious minds: the psychology of persecutory delusions. *Clinical Psychology Review*, 27(4), 425–457.
- Freeman, D., & Freeman, J. (2008). *Paranoia: The 21st century fear*. Oxford, England: Oxford University Press.
- Freeman, D., Garety, P. A., Fowler, D., Kuipers, E., Bebbington, P. E., & Dunn, G. (2004). Why do people with delusions fail to choose more realistic explanations for their experiences? An empirical investigation. *Journal of Consulting and Clinical Psychology*, 72(4), 671–680.
- Freeman, D., Garety, P., Fowler, D., Kuipers, E., Dunn, G., Bebbington, P., & Hadley, C. (1998). The London–East Anglia randomized controlled trial of cognitive-behaviour therapy for psychosis IV: self-esteem and persecutory delusions. *British Journal of Clinical Psychology*, 37(4), 415–430.
- Freeman, D., Garety, P., Kuipers, E., Colbert, S., Jolley, S., Fowler, D., & Bebbington, P. (2006). Delusions and decision-making style: use of the Need for Closure Scale. *Behaviour Research and Therapy*, 44(8), 1147–1158.
- Frommann, N., Streit, M., & Wolwer, W. (2003). Remediation of facial affect recognition impairments in patients with schizophrenia: a new training program. *Psychiatry Research*, 117(3), 281–284.

- Frost, R. O., & Steketee, G. (2002). *Cognitive approaches to obsessions and compulsions: Theory, assessment, and treatment*. Amsterdam, Netherlands: Pergamon/Elsevier Science Inc.
- García-Blanco, A. C., Perea, M., & Salmerón, L. (2013). Attention orienting and inhibitory control across the different mood states in bipolar disorder: an emotional antisaccade task. *Biological Psychology, 94*(3), 556–561.
- Garety, P. A., & Freeman, D. (1999). Cognitive approaches to delusions: a critical review of theories and evidence. *British Journal of Clinical Psychology, 38*(2), 113–154.
- Garety, P. A., Hemsley, D. R., & Wessely, S. M. R. C. (1991). Reasoning in deluded schizophrenic and paranoid patients: biases in performance on a probabilistic inference task. *The Journal of Nervous and Mental Disease, 179*(4), 194–201.
- Ghiassi, V., Dimaggio, G., & Brüne, M. (2010). Dysfunctions in understanding other minds in borderline personality disorder: a study using cartoon picture stories. *Psychotherapy Research, 20*(6), 657–667.
- Gigerenzer, G. (1996). On narrow norms and vague heuristics: a reply to Kahneman and Tversky. *Psychological Review, 103*(3), 592–596.
- Gigerenzer, G. (2004). Fast and frugal heuristics: the tools of bounded rationality. In D. J. Koehler, & N. Harvey (Eds.), *Blackwell handbook of judgment and decision making* (pp. 62–88). Oxford, England: Blackwell.
- Gilovich, T., Griffin, D., & Kahneman, D. (2002). *Heuristics and biases: The psychology of intuitive judgment*. New York, NY: Cambridge University Press.
- Grove, R., Baillie, A., Allison, C., Baron-Cohen, S., & Hoekstra, R. A. (2015). Exploring the quantitative nature of empathy, systemising and autistic traits using factor mixture modelling. *The British Journal of Psychiatry, 207*(5), 400–406.
- Harkness, K., Sabbagh, M., Jacobson, J., Chowdrey, N., & Chen, T. (2005). Enhanced accuracy of mental state decoding in dysphoric college students. *Cognition & Emotion, 19*(7), 999–1025.
- Haselton, M. G., Nettle, D., & Andrews, P. W. (2005). The evolution of cognitive bias. In D. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 724–746). Hoboken, NJ: Wiley.
- Hodel, B., Kern, R. S., & Brenner, H. D. (2004). Emotion Management Training (EMT) in persons with treatment-resistant schizophrenia: first results. *Schizophrenia Research, 68*(1), 107–108.
- Hoppe, E. I., & Kusterer, D. J. (2011). Behavioral biases and cognitive reflection. *Economics Letters, 110*(2), 97–100.
- Horan, W. P., Kern, R. S., Green, M. F., & Penn, D. L. (2008). Social cognition training for individuals with schizophrenia: emerging evidence. *American Journal of Psychiatric Rehabilitation, 11*(3), 205–252.
- Huddy, V. C., Reeder, C., & Wykes, T. (2010). What factors predict awareness of cognitive problems in people with schizophrenia? *Schizophrenia Research, 117*(2–3), 214.
- Jacoby, R. J., Leonard, R. C., Riemann, B. C., & Abramowitz, J. S. (2016). Self-punishment as a maladaptive thought control strategy mediates the relationship between beliefs about thoughts and repugnant obsessions. *Cognitive Therapy and Research, 40*(2), 179–187.
- Jin, H. C., Jin, H. K., Lee, J., & Green, M. F. (2009). Social cognition training for individuals with schizophrenia: a review of targeted interventions. *Clinical Psychopharmacology and Neuroscience, 7*(2), 29–38.
- Johnson, M. K., & Raye, C. L. (1981). Reality monitoring. *Psychological Review, 88*(1), 67–85.
- Jolliffe, D., & Farrington, D. P. (2006). Development and validation of the Basic Empathy Scale. *Journal of Adolescence, 29*(4), 589–611.
- Jones, A. P., Happé, F. G., Gilbert, F., Burnett, S., & Viding, E. (2010). Feeling, caring, knowing: different types of empathy deficit in boys with psychopathic tendencies and autism spectrum disorder. *Journal of Child Psychology and Psychiatry, 51*(11), 1188–1197.
- Jorgensen, C. R. (2010). Invited essay: identity and borderline personality disorder. *Journal of Personality Disorders, 24*(3), 344–364.
- Kahneman, D., & Frederick, S. (2005). A model of heuristic judgment. In K. J. Holyoak, & R. G. Morrison (Eds.), *The Cambridge handbook of thinking and reasoning* (pp. 267–293). New York, NY: Cambridge University Press.
- Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological Review, 80*(4), 237–251.
- Keays, C., Kaas, J. H., & Gazzola, V. (2010). Somatosensation in social perception. *Nature Reviews Neuroscience, 11*(6), 417–428.
- Kinderman, P., & Bentall, R. P. (1996). A new measure of causal locus: the internal, personal, and situational attributions questionnaire. *Personality and Individual Differences, 20*(2), 261–264.
- Kinderman, P., & Bentall, R. P. (1997). Causal attributions in paranoia and depression: internal, personal, and situational attributions for negative events. *Journal of Abnormal Psychology, 106*, 341–345.
- Kinderman, P., & Bentall, R. P. (2000). Self-discrepancies and causal attributions: studies of hypothesized relationships. *British Journal of Clinical Psychology, 39*(3), 255–273.
- Knafo, A., Zahn-Waxler, C., Van Hulle, C., Robinson, J. L., & Rhee, S. H. (2008). The developmental origins of a disposition toward empathy: genetic and environmental contributions. *Emotion, 8*(6), 737–752.
- Koster, E. H., Fox, E., & MacLeod, C. (2009). Introduction to the special section on cognitive bias modification in emotional disorders. *Journal of Abnormal Psychology, 118*(1), 1–4.
- Krackow, E., & Rabenhorst, M. (2010). Does the body know best? Psychophysiological reactivity to perceived versus imagined childhood events. *Imagination, Cognition and Personality, 30*(2), 133–145.
- Kukla, M., Lysaker, P. H., & Salyers, M. P. (2013). Do persons with schizophrenia who have better metacognitive capacity also have a stronger subjective experience of recovery? *Psychiatry Research, 209*(3), 381–385.
- Kumar, D., Zia, U. I., Haq, M., Dubey, I., Dotiwala, K., Siddiqui, S. V., & Abhishek, P. (2010). Effects of meta-cognitive training in the reduction of positive symptoms in schizophrenia. *European Journal of Psychotherapy and Counseling, 12*(2), 149–158.
- Kurtz, M. M., & Richardson, C. L. (2012). Social cognitive training for schizophrenia: a meta-analytic investigation of controlled research. *Schizophrenia Bulletin, 38*(5), 1092–1104.

- Lamm, C., & Singer, T. (2010). The role of anterior insular cortex in social emotions. *Brain Structure and Function*, *214*(5–6), 579–591.
- Lawrence, E. J., Shaw, P., Baker, D., Baron-Cohen, S., & David, A. S. (2004). Measuring empathy: reliability and validity of the Empathy Quotient. *Psychological Medicine*, *34*(05), 911–920.
- Lim, C., Chong, S. A., & Keefe, R. S. (2009). Psychosocial factors in the neurobiology of schizophrenia: a selective review. *Annals Academy of Medicine Singapore*, *38*(5), 402–406.
- Lincoln, T. M., Lange, J., Buro, J., Exner, C., & Moritz, S. (2010a). The effect of state anxiety on paranoid ideation and jumping to conclusions: an experimental investigation. *Schizophrenia Bulletin*, *36*(6), 1140–1148.
- Lincoln, T. M., Mehl, S., Exner, C., Lindenmeyer, J., & Rief, W. (2010b). Attributional style and persecutory delusions: evidence for an event independent and state specific external-personal attribution bias for social situations. *Cognitive Therapy and Research*, *34*(3), 297–302.
- Lincoln, T. M., Wilhelm, K., & Nestoriuc, Y. (2007). Effectiveness of psychoeducation for relapse, symptoms, knowledge, adherence and functioning in psychotic disorders: a meta-analysis. *Schizophrenia Research*, *96*(1), 232–245.
- Lincoln, T. M., Ziegler, M., Mehl, S., & Rief, W. (2010c). The jumping to conclusions bias in delusions: specificity and changeability. *Journal of Abnormal Psychology*, *119*(1), 40–49.
- Livesley, W. J. (2011). An empirically-based classification of personality disorder. *Journal of Personality Disorders*, *25*(3), 397–420.
- Lockwood, P. L., Bird, G., Bridge, M., & Viding, E. (2013). Dissecting empathy: high levels of psychopathic and autistic traits are characterized by difficulties in different social information processing domains. *Frontiers in Human Neuroscience*, *7*, 760.
- Lysaker, P. H., Bob, P., Pec, O., Hamm, J., Kukula, M., Vohs, J., & Dimaggio, G. (2013). Synthetic metacognition as a link between brain and behavior in schizophrenia. *Translational Neuroscience*, *4*(3), 368–377.
- Lysaker, P. H., Buck, K. D., Carcione, A., Procacci, M., Salvatore, G., Nicolò, G., & Dimaggio, G. (2011a). Addressing metacognitive capacity for self reflection in the psychotherapy for schizophrenia: a conceptual model of the key tasks and processes. *Psychology and Psychotherapy: Theory, Research and Practice*, *84*(1), 58–69.
- Lysaker, P. H., Carcione, A., Dimaggio, G., Johannesen, J. K., Nicolò, G., Procacci, M., & Semerari, A. (2005). Metacognition amidst narratives of self and illness in schizophrenia: associations with neurocognition, symptoms, insight and quality of life. *Acta Psychiatrica Scandinavica*, *112*(1), 64–71.
- Lysaker, P. H., & Dimaggio, G. (2014). Metacognitive capacities for reflection in schizophrenia: implications for developing treatments. *Schizophrenia Bulletin*, *40*(3), 487–491.
- Lysaker, P. H., Erickson, M. A., Buck, B., Buck, K. D., Olesek, K., Grant, M. L., & Dimaggio, G. (2011b). Metacognition and social function in schizophrenia: associations over a period of five months. *Cognitive Neuropsychiatry*, *16*(3), 241–255.
- Lysaker, P. H., Leonhardt, B. L., Brüne, M., Buck, K. D., James, A., Vohs, J., & Dimaggio, G. (2014). Capacities for theory of mind, metacognition, and neurocognitive function are independently related to emotional recognition in schizophrenia. *Psychiatry Research*, *219*(1), 79–85.
- Lysaker, P. H., Ringer, J. M., Buck, K. D., Grant, M., Olesek, K., Leudtke, B. L., & Dimaggio, G. (2012). Metacognitive and social cognition deficits in patients with significant psychiatric and medical adversity: a comparison between participants with schizophrenia and a sample of participants who are HIV-positive. *Journal of Nervous and Mental Disease*, *200*(2), 130–134.
- Lysaker, P. H., Yanos, P. T., & Roe, D. (2009). The role of insight in the process of recovery from schizophrenia: a review of three views. *Psychosis*, *1*(2), 113–121.
- MacBrayer, E. K., Milich, R., & Hundley, M. (2003). Attributional biases in aggressive children and their mothers. *Journal of Abnormal Psychology*, *112*(4), 698–708.
- MacLeod, C. (2012). Cognitive bias modification procedures in the management of mental disorders. *Current Opinion in Psychiatry*, *25*(2), 114–120.
- MacLeod, C., Campbell, L., Rutherford, E., & Wilson, E. (2004). The causal status of anxiety-linked attentional and interpretive bias. In J. Yiend (Ed.), *Cognition, emotion and psychopathology: Theoretical, empirical and clinical directions* (pp. 172–189). Cambridge, England: Cambridge University Press.
- Mancuso, F., Horan, W. P., Kern, R. S., & Green, M. F. (2011). Social cognition in psychosis: multidimensional structure, clinical correlates, and relationship with functional outcome. *Schizophrenia Research*, *125*(2–3), 143–151.
- Mathews, A., & MacLeod, C. (2005). Cognitive vulnerability to emotional disorders. *Annual Review of Clinical Psychology*, *1*, 167–195.
- Mathieson, L. C., Murray-Close, D., Crick, N. R., Woods, K. E., Zimmer-Gembeck, M., Geiger, T. C., & Morales, J. R. (2011). Hostile intent attributions and relational aggression: the moderating roles of emotional sensitivity, gender, and victimization. *Journal of Abnormal Child Psychology*, *39*(7), 977–987.
- Mayer, J. D., Salovey, P., Caruso, D. R., & Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT V2.0. *Emotion*, *3*(1), 97–105.
- Mazza, M., Lucci, G., Pacitti, F., Pino, M. C., Mariano, M., Casacchia, M., & Roncone, R. (2010). Could schizophrenic subjects improve their social cognition abilities only with observation and imitation of social situations? *Neuropsychological Rehabilitation*, *20*(5), 675–703.
- Medalia, A., Thysen, J., & Freilich, B. (2008). Do people with schizophrenia who have objective cognitive impairment identify cognitive deficits on a self report measure? *Schizophrenia Research*, *105*(1), 156–164.
- Mehta, U. M., Thirthalli, J., Subbakrishna, D. K., Gangadhar, B. N., Eack, S. M., & Keshavan, M. S. (2013). Social and neuro-cognition as distinct cognitive factors in schizophrenia: a systematic review. *Schizophrenia Research*, *148*(1–3), 3–11.
- Mesholam-Gately, R. I., Giuliano, A. J., Goff, K. P., Faraone, S. V., & Seidman, L. J. (2009). Neurocognition in first-episode schizophrenia: a meta-analytic review. *Neuropsychology*, *23*(3), 315–336.
- Moore, E. L., & Abramowitz, J. S. (2007). The cognitive mediation of thought-control strategies. *Behaviour Research and Therapy*, *45*(8), 1949–1955.
- Moritz, S., Andreou, C., Schneider, B. C., Wittekind, C. E., Menon, M., Balzan, R. P., & Woodward, T. S. (2014). Sowing the seeds of doubt: a narrative review on metacognitive training in schizophrenia. *Clinical Psychology Review*, *34*(4), 358–366.
- Moritz, S., Kerstan, A., Veckenstedt, R., Randjbar, S., Vitzthum, F., Schmidt, C., Heise, M., & Woodward, T. S. (2011a). Further evidence for the efficacy of a metacognitive group training in schizophrenia. *Behaviour Research and Therapy*, *49*(3), 151–157.

- Moritz, S., Veckenstedt, R., Randjbar, S., Hottenrott, B., Woodward, T. S., Eckstaedt, F. V., & Lincoln, T. M. (2009). Decision making under uncertainty and mood induction: further evidence for liberal acceptance in schizophrenia. *Psychological Medicine, 39*(11), 1821–1829.
- Moritz, S., Veckenstedt, R., Randjbar, F., Vitzthum, F., & Woodward, T. S. (2011b). Antipsychotic treatment beyond antipsychotics: metacognitive intervention for schizophrenia patients improves delusional symptoms. *Psychological Medicine, 41*(9), 1823–1832.
- Moritz, S., Werner, R., & von Collani, G. (2006). The inferiority complex in paranoia readdressed: a study with the Implicit Association Test. *Cognitive Neuropsychiatry, 11*(4), 402–415.
- Moritz, S., & Woodward, T. S. (2006). A generalized bias against disconfirmatory evidence in schizophrenia. *Psychiatry Research, 142*(2), 157–165.
- Moritz, S., & Woodward, T. S. (2007a). Metacognitive training for schizophrenia patients (MCT): a pilot study on feasibility, treatment adherence, and subjective efficacy. *German Journal of Psychiatry, 10*(3), 69–78.
- Moritz, S., & Woodward, T. S. (2007b). Metacognitive training in schizophrenia: from basic research to knowledge translation and intervention. *Current Opinion in Psychiatry, 20*(6), 619–625.
- Moritz, S., & Woodward, T. S. Metacognition Study Group. (2010). *Metacognitive training for schizophrenia (MCT) manual* (4th ed.). Hamburg, Germany: VanHam Campus.
- Muller, J., & Roberts, J. E. (2005). Memory and attention in obsessive-compulsive disorder: a review. *Journal of Anxiety Disorders, 19*(1), 1–28.
- Murphy, F. C., Sahakian, B. J., Rubinsztein, J. S., Michael, A., Rogers, R. D., Robbins, T. W., & Paykel, E. S. (1999). Emotional bias and inhibitory control processes in mania and depression. *Psychological Medicine, 29*(06), 1307–1321.
- Obsessive Compulsive Cognitions Working Group (OCCWG). (1997). Cognitive assessment of obsessive-compulsive disorder. *Behaviour Research and Therapy, 35*(7), 667–681.
- Obsessive Compulsive Cognitions Working Group (OCCWG). (2001). Development and initial validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory. *Behaviour Research and Therapy, 39*, 987–1006.
- Obsessive Compulsive Cognitions Working Group (OCCWG). (2003). Psychometric validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory: Part I. *Behaviour Research and Therapy, 41*(8), 863–878.
- Obsessive Compulsive Cognitions Working Group (OCCWG). (2005). Psychometric validation of the Obsessive Beliefs Questionnaire and Interpretation of Intrusions Inventory—Part 2. Factor analyses and testing of a brief version. *Behaviour Research and Therapy, 43*(11), 1527–1542.
- O'Connor, K., & Aardema, F. (2003). Fusion or confusion in obsessive-compulsive disorder. *Psychological Reports, 93*(1), 227–232.
- Oechssler, J., Roider, A., & Schmitz, P. W. (2009). Cognitive abilities and behavioral biases. *Journal of Economic Behavior & Organization, 72*(1), 147–152.
- Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: detecting the snake in the grass. *Journal of Experimental Psychology: General, 130*(3), 466–478.
- Osatuke, K., Stiles, W. B., Barkham, M., Hardy, G. E., & Shapiro, D. A. (2011). Relationship between mental states in depression: the assimilation model perspective. *Psychiatry Research, 190*(1), 52–59.
- Parker, A. M., & Fischhoff, B. (2005). Decision-making competence: external validation through an individual-differences approach. *Journal of Behavioral Decision Making, 18*(1), 1–27.
- Paus, T. (2005). Mapping brain maturation and cognitive development during adolescence. *Trends in Cognitive Sciences, 9*(2), 60–68.
- Peckham, A. D., Johnson, S. L., & Gotlib, I. H. (2016). Attentional bias in euthymic bipolar I disorder. *Cognition and Emotion, 30*(3), 472–487.
- Penn, D. L., Roberts, D. L., Combs, D., & Sterne, A. (2007). Best practices: the development of the Social Cognition and Interaction Training program for schizophrenia spectrum disorders. *Psychiatric Services, 58*(4), 449–451.
- Penn, D. L., Roberts, D. L., Munt, E. D., Silverstein, E., Jones, N., & Sheitman, B. (2005). A pilot study of Social Cognition and Interaction Training (SCIT) for schizophrenia. *Schizophrenia Research, 80*(2–3), 357–359.
- Penn, D. L., Sanna, L. J., & Roberts, D. L. (2008). Social cognition in schizophrenia: an overview. *Schizophrenia Bulletin, 34*(3), 408–411.
- Perivoliotis, D., Grant, P. M., Peters, E. R., Ison, R., Kuipers, E., & Beck, A. T. (2010). Cognitive insight predicts favorable outcome in cognitive behavioral therapy for psychosis. *Psychosis, 2*(1), 23–33.
- Peters, E., Day, S., & Garety, P. (1997). From preconscious to conscious processing—where does the abnormality lie in delusions? *Schizophrenia Research, 24*(1), 120.
- Pino, M. C., De Berardis, D., Mariano, M., Vellante, F., Serroni, N., Valchera, A., & Mazza, M. (2016). Two systems for empathy in obsessive-compulsive disorder: mentalizing and experience sharing. *Revista Brasileira de Psiquiatria, 38*(4), 307–313.
- Pohl, R. (2004). *Cognitive illusions: A handbook on fallacies and biases in thinking, judgment and memory*. Hove, England: Psychology Press.
- Preti, A., Vellante, M., Baron-Cohen, S., Zucca, G., Petretto, D. R., & Masala, C. (2011). The Empathy Quotient: a cross-cultural comparison of the Italian version. *Cognitive Neuropsychiatry, 16*(1), 50–70.
- Rabin, S. J., Hasson-Ohayon, I., Avidan, M., Rozenzweig, S., Shalev, H., & Kravetz, S. (2014). Metacognition in schizophrenia and schizotypy: relation to symptoms of schizophrenia, traits of schizotypy and social quality of life. *Israel Journal of Psychiatry and Related Sciences, 51*(1), 44–53.
- Rachman, S. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy, 35*(9), 793–802.
- Rachman, S. (1998). A cognitive theory of obsessions: elaborations. *Behaviour Research and Therapy, 36*(4), 385–401.
- Randjbar, S., Veckenstedt, R., Vitzthum, F., Hottenrott, B., & Moritz, S. (2011). Attributional biases in paranoid schizophrenia: further evidence for a decreased sense of self-causation in paranoia. *Psychosis, 3*(1), 74–85.
- Rees, C., & Anderson, R. (2013). New approaches to the psychological treatment of obsessive-compulsive disorder in adults. In F. Durbano (Ed.), *New insights into anxiety disorders* (pp. 427–444). New York, NY: InTech.
- Reniers, R. L., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. A. (2011). The QCAE: a questionnaire of cognitive and affective empathy. *Journal of Personality Assessment, 93*(1), 84–95.

- Rizzolatti, G., & Sinigaglia, C. (2010). The functional role of the parieto-frontal mirror circuit: interpretations and misinterpretations. *Nature Reviews Neuroscience*, *11*(4), 264–274.
- Roberts, D. L., & Penn, D. L. (2009). Social Cognition and Interaction Training (SCIT) for outpatients with schizophrenia: a preliminary study. *Psychiatry Research*, *166*(2–3), 141–147.
- Roberts, D. L., Penn, D. L., Labate, D., Margolis, S. A., & Sterne, A. (2010). Transportability and feasibility of Social Cognition and Interaction Training (SCIT) in community settings. *Behavioural and Cognitive Psychotherapy*, *38*(1), 35–47.
- Roder, V., & Medalia, A. (2010). *Neurocognition and social cognition in schizophrenia patients: Basic concepts and treatments*. Basel, Switzerland: Karger.
- Roncone, R., Mazza, M., Frangou, I., De Risio, A., Ussorio, D., Tozzini, C., & Casacchia, M. (2004). Rehabilitation of theory of mind deficit in schizophrenia: a pilot study of metacognitive strategies in group treatment. *Neuropsychological Rehabilitation*, *14*(4), 421–435.
- Ross, K., Freeman, D., Dunn, G., & Garety, P. (2011). A randomized experimental investigation of reasoning training for people with delusions. *Schizophrenia Bulletin*, *37*(2), 324–333.
- Rueda, P., Fernández-Berrocal, P., & Baron-Cohen, S. (2015). Dissociation between cognitive and affective empathy in youth with Asperger syndrome. *European Journal of Developmental Psychology*, *12*(1), 85–98.
- Russell, T. A., Chu, E., & Phillips, M. L. (2006). A pilot study to investigate the effectiveness of emotion recognition remediation in schizophrenia using the micro-expression training tool. *The British Journal of Clinical Psychology*, *45*(4), 579–583.
- Salkovskis, P. M. (1985). Obsessional-compulsive problems: a cognitive-behavioural analysis. *Behaviour Research and Therapy*, *23*(5), 571–583.
- Salkovskis, P. M. (1996). *Frontiers of cognitive therapy*. New York, NY: Guilford Press.
- Savla, G. N., Vella, L., Armstrong, C. C., Penn, D. L., & Twamley, E. W. (2013). Deficits in domains of social cognition in schizophrenia: a meta-analysis of the empirical evidence. *Schizophrenia Bulletin*, *39*(5), 979–992.
- Schmidt, S. J., Mueller, D. R., & Roder, V. (2011). Social cognition as a mediator variable between neurocognition and functional outcome in schizophrenia: empirical review and new results by structural equation modeling. *Schizophrenia Bulletin*, *37*(2), 41–54.
- Schwenck, C., Mergenthaler, J., Keller, K., Zech, J., Salehi, S., Taurines, R., & Freitag, C. M. (2012). Empathy in children with autism and conduct disorder: group-specific profiles and developmental aspects. *Journal of Child Psychology and Psychiatry*, *53*(6), 651–659.
- Semerari, A., Carcione, A., Dimaggio, G., Falcone, M., Nicolo, G., Procacci, M., & Alleva, G. (2003). How to evaluate metacognitive functioning in psychotherapy? The metacognition assessment scale and its applications. *Clinical Psychology & Psychotherapy*, *10*(4), 238–261.
- Semerari, A., Carcione, A., Dimaggio, G., Nicolò, G., & Procacci, M. (2007). Understanding minds: different functions and different disorders? The contribution of psychotherapy research. *Psychotherapy Research*, *17*(1), 106–119.
- Shafran, R., Thordarson, D. S., & Rachman, S. (1996). Thought–action fusion in obsessive compulsive disorder. *Journal of Anxiety Disorders*, *10*(5), 379–391.
- Shamay-Tsoory, S. G., Aharon-Peretz, J., & Perry, D. (2009). Two systems for empathy: a double dissociation between emotional and cognitive empathy in inferior frontal gyrus versus ventromedial prefrontal lesions. *Brain*, *132*(3), 617–627.
- Sica, C., Coradeschi, D., Sanavio, E., Dorz, S., Manchisi, D., & Novara, C. (2004). A study of the psychometric properties of the Obsessive Beliefs Inventory and Interpretations of Intrusions Inventory on clinical Italian individuals. *Journal of Anxiety Disorders*, *18*(3), 291–307.
- Stanovich, K. (2003). The fundamental computational biases of human cognition: heuristics that (sometimes) impair decision making and problem solving. In J. Davidson, & R. Sternberg (Eds.), *The psychology of problem solving* (pp. 291–342). New York, NY: Cambridge University Press.
- Stanovich, K. E. (2009). Distinguishing the reflective, algorithmic, and autonomous minds: is it time for a tri-process theory? In J. St. B. T. Evans, & K. Frankish (Eds.), *In two minds: Dual processes and beyond* (pp. 55–88). Oxford, England: Oxford University Press.
- Stanovich, K. E., & West, R. F. (1998). Individual differences in rational thought. *Journal of Experimental Psychology: General*, *127*(2), 161.
- Stanovich, K. E., & West, R. F. (2008). On the relative independence of thinking biases and cognitive ability. *Journal of Personality and Social Psychology*, *94*, 672–695.
- Steketee, G., Frost, R., Bhar, S., Bouvard, M., Calamari, J., Carmin, C., & Freeston, M. (2003). Psychometric validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory: Part I. *Behaviour Research and Therapy*, *41*(8), 863–878.
- Steketee, G., Frost, R., Bhar, S., Bouvard, M., Calamari, J., Carmin, C., & Freeston, M. (2005). Psychometric validation of the Obsessive Beliefs Questionnaire and the Interpretation of Intrusions Inventory: Part 2. *Behaviour Research and Therapy*, *43*(11), 1527–1542.
- Strack, F., & Mussweiler, T. (1997). Explaining the enigmatic anchoring effect: mechanisms of selective accessibility. *Journal of Personality and Social Psychology*, *73*(3), 437–446.
- Tai, S., & Turkington, D. (2009). The evolution of cognitive behavior therapy for schizophrenia: current practice and recent developments. *Schizophrenia Bulletin*, *35*(5), 865–873.
- Tas, C., Brown, E. C., Esen-Danaci, A., Lysaker, P. H., & Brüne, M. (2012a). Intrinsic motivation and metacognition as predictors of learning potential in patients with remitted schizophrenia. *Journal of Psychiatric Research*, *46*(8), 1086–1092.
- Tas, C., Danaci, A. E., Cubukcuoglu, Z., & Brüne, M. (2012b). Impact of family involvement on social cognition training in clinically stable outpatients with schizophrenia—a randomized pilot study. *Psychiatry Research*, *195*(1), 32–38.
- Tata, P. R., Leibowitz, J. A., Prunty, M. J., Cameron, M., & Pickering, A. D. (1996). Attentional bias in obsessional compulsive disorder. *Behaviour Research and Therapy*, *34*(1), 53–60.
- Taylor, S., Kyrios, M., Thordarson, D., Steketee, G., & Frost, R. (2002). Development and validation of instruments for measuring intrusions and beliefs in obsessive compulsive disorder. In R. O. Frost, & G. Steketee (Eds.), *Cognitive approaches to obsessions and compulsions: Theory, assessment, and treatment* (pp. 118–138). Amsterdam, Netherlands: Pergamon/Elsevier Science Inc.
- Teovanović, P., Knežević, G., & Stankov, L. (2015). Individual differences in cognitive biases: evidence against one-factor theory of rationality. *Intelligence*, *50*, 75–86.

- Tolin, D. F., Woods, C. M., & Abramowitz, J. S. (2003). Relationship between obsessive beliefs and obsessive-compulsive symptoms. *Cognitive Therapy and Research*, 27(6), 657–669.
- Tolin, D. F., Worhunsky, P., & Maltby, N. (2006). Are “obsessive” beliefs specific to OCD?: a comparison across anxiety disorders. *Behaviour Research and Therapy*, 44(4), 469–480.
- Toplak, M. E., West, R. F., & Stanovich, K. E. (2011). The Cognitive Reflection Test as a predictor of performance on heuristics-and-biases tasks. *Memory and Cognition*, 39(7), 1275–1289.
- Toplak, M. E., West, R. F., & Stanovich, K. E. (2014). Assessing miserly information processing: an expansion of the Cognitive Reflection Test. *Thinking and Reasoning*, 20(2), 147–168.
- Trower, P., & Chadwick, P. (1995). Pathways to defense of the self: a theory of two types of paranoia. *Clinical Psychology: Science and Practice*, 2(3), 263–278.
- Turner-Brown, L. M., Perry, T. D., Dichter, G. S., Bodfish, J. W., & Penn, D. L. (2008). Brief report: feasibility of Social Cognition and Interaction Training for adults with high functioning autism. *Journal of Autism and Developmental Disorders*, 38(9), 1777–1784.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: heuristics and biases. *Science*, 185, 1124–1131.
- van der Gaag, M. (2006). A neuropsychiatric model of biological and psychological processes in the remission of delusions and auditory hallucinations. *Schizophrenia Bulletin*, 32(1), 113–122.
- Wells, A. (1995). Meta-cognition and worry: a cognitive model of generalized anxiety disorder. *Behavioural and Cognitive Psychotherapy*, 23(3), 301–320.
- Wells, A. (2000). *Emotional disorders and metacognition: Innovative cognitive therapy*. Chichester, England: Wiley.
- Wells, A. (2011). *Metacognitive therapy for anxiety and depression*. New York, NY: Guilford Press.
- Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hove, England: Erlbaum.
- White, L. O., & Mansell, W. (2009). Failing to ponder? delusion-prone individuals rush to conclusions. *Clinical Psychology & Psychotherapy*, 16(2), 111–124.
- Williams, C. C. (2008). Insight, stigma, and post-diagnosis identities in schizophrenia. *Psychiatry*, 71(3), 246–256.
- Williams, A. D., & Grisham, J. R. (2013). Cognitive Bias Modification (CBM) of obsessive compulsive beliefs. *BMC Psychiatry*, 13, 256.
- Williams, J. M., Watts, F. N., MacLeod, C., & Mathews, A. (1997). *Cognitive psychology and emotional disorder*. Chichester, England: Wiley.
- Won, H. T., & Lee, H. J. (1997). The self-concept and attributional style in a paranoid group. *Korean Journal of Clinical Psychology*, 16, 173–182.
- Woodward, T. S., Moritz, S., Cuttler, C., & Whitman, J. C. (2006). The contribution of a cognitive bias against disconfirmatory evidence (BADE) to delusions in schizophrenia. *Journal of Clinical and Experimental Neuropsychology*, 28(4), 605–617.
- Wykes, T., Steel, C., Everitt, B., & Tarrrier, N. (2008). Cognitive behavior therapy for schizophrenia: effect sizes, clinical models, and methodological rigor. *Schizophrenia Bulletin*, 34(3), 523–537.
- Yeung, R. S., & Leadbeater, B. J. (2007). Does hostile attributional bias for relational provocations mediate the short-term association between relational victimization and aggression in preadolescence? *Journal of Youth and Adolescence*, 36(8), 973–983.
- Young, H. F., & Bentall, R. P. (1997). Probabilistic reasoning in deluded, depressed and normal subjects: effects of task difficulty and meaningful versus non-meaningful material. *Psychological Medicine*, 27(2), 455–465.
- Zaki, J., & Ochsner, K. N. (2012). The neuroscience of empathy: progress, pitfalls and promise. *Nature Neuroscience*, 15(5), 675–680.

Chapter 7

The Role of Temperament in Development and Psychopathology

Chapter Outline

| | | | |
|---|------------|--|------------|
| Temperament and personality in childhood | 157 | Akiskal affective temperaments model | 167 |
| Basic temperament traits and types | 158 | Functional Ensemble of Temperament model | 168 |
| The relationship between temperament and the Big Five factors | 159 | Temperament and culture | 169 |
| Models and measures of temperament | 160 | Temperament and psychopathology | 170 |
| Traditional models of temperament | 161 | Attachment, temperament, and personality disorders | 171 |
| The behavioral styles approach | 161 | Depression, temperament, and cognition | 171 |
| The criterial approach | 161 | Temperament/character traits of ODD and ADHD | 173 |
| The emotion regulation model | 161 | Temperament and parenting practices and ADHD | 173 |
| The tridimensional temperament model | 163 | Temperament and autism spectrum disorders | 174 |
| The neurobiological developmental approach | 163 | Temperament and its relation to schizophrenia | 174 |
| Kagan's behavioral inhibition model | 166 | Temperament, coping, and resilience | 175 |
| Contemporary models of temperament | 167 | Summary | 176 |
| Regulative theory of temperament | 167 | References | 176 |

TEMPERAMENT AND PERSONALITY IN CHILDHOOD

Developmental psychologists have historically focused on differentiating temperament from personality, but in recent years they have come to the general consensus that temperament and personality converge in many ways (Saklofske et al., 2013a). Personality has traditionally been conceptualized as having two components: temperament, which refers to biologically based, early-emerging, stable individual differences in emotion, and its regulation and characteristics, referring to individual differences due to socialization (Saklofske, Reynolds, & Schwann, 2013).

According to Rothbart (2011), temperament in infancy affects the child's reactions and adjustments to the environment. In infancy, children display a more narrow range of traits, including differences in positive and negative emotions and early self-regulation. Children's expanding repertoire of abilities enables them to manifest new traits, such as differences in task persistence, empathy, aggression, imagination, or affiliation.

A comprehensive definition of temperament is the one proposed by Goldsmith et al. (1987):

Temperament consists of relatively consistent, basic dispositions inherent in the person that underlie and modulate the expression of activity, reactivity, emotionality and sociability. Major elements of temperament are present early in life and those elements are likely to be strongly influenced by biological factors. As development proceeds, the expression of temperament increasingly becomes more influenced by experience and context (p. 524).

Shiner et al. (2012) and Shiner and Caspi (2012) proposed that temperament traits are early-emerging basic dispositions in the domains of activity, affectivity, attention, and self-regulation. These dispositions are the outcome of complex interactions among genetic, biological, and environmental factors across time. Recent research has enhanced the understanding of the nature of temperament. First, it was found that not all temperament traits are stable early in life (Rothbart, 2011). Some

temperament traits become more consistent and more stable with age (Roberts & DelVecchio, 2000). Second, in addition to the fundamental traits of activity level and positive and negative emotionality, newer dimensions have been added, such as attention planfulness. All of these dimensions form part of the broader temperament trait labeled effortful control and self-regulation (Rothbart, Sheese, & Posner, 2007; Rueda, 2012). Recent studies have demonstrated that affective and cognitive processing are highly integrated systems (e.g., Forgas, 2008), and thus traits like attention and executive control have a more cognitive substrate. Third, the dichotomy between biological and environmental influences is not consistent with current findings on brain and behavioral development. Both genetic and environmental factors affect temperament later in life (Saudino & Wang, 2012).

Basic temperament traits and types

Most current temperament researchers have underscored the significance and key role of a number of temperamental components (e.g., Caspi & Shiner, 2006; Rothbart & Bates, 2006):

Behavioral inhibition. It is important to distinguish behavioral inhibition from inhibitory control. The former is reactive and results from relatively automatic fear or distress responses in novel situations. The latter, in contrast, involves the regulatory use of executive attention (see the upcoming paragraph on attention/persistence) and expresses itself in behaviors, such as resisting temptation or delaying gratification.

Irritability/frustration. Individual differences in neonatal irritability have been found to relate to significant outcomes, such as later temperamental difficulty and social anxieties (e.g., Riese, 1987; Zentner, 2004). Irritability is perhaps one of the key elements of the construct of difficult temperament measured by the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979), which was defined by a factor that included frequent and intense negative affect and the degree of difficulty evaluated by caregivers. Part of what is experienced by caregivers as difficult may be, in addition to the infants' sensitivity to aversive stimuli, the "demanding" way in which this sensitivity is expressed. Another, qualitatively different kind of irritability is seen in individual differences in frustration. Frustration may be defined as negative affect in reaction to interruption of ongoing tasks or blocking of behaviors related to approach and goal attainment.

Positive emotionality. One of the most important behavior systems involves the processing of information about potential rewards, such as food and the many other things we find interesting and useful for our survival. Individual differences in these systems are, in one way or another, linked to frequencies and intensity of positive emotions, such as interest, eagerness, and associated behaviors, such as approach and investigation. The variations in positive emotionality are captured by subcomponents, such as positive anticipation, sensation or novelty seeking, smiling and laughter, and possibly activity level. Findings suggest that components of positive emotionality tend to be quite stable across the early childhood period, regardless of whether they are measured by laboratory observation (Putnam & Stifter, 2005; Rothbart, Derryberry, & Hershey, 2000) or via parental reports (Putnam, Gartstein, & Rothbart, 2006).

Activity level is traditionally considered an important component of child temperament (e.g., Buss & Plomin, 1975; Henderson & Wachs, 2007).

Attention/persistence. Persistence is viewed as a temperamental characteristic by most temperament researchers. Rothbart, in particular, has introduced an overarching construct called *effortful control*, which is the "ability to inhibit a dominant response and/or activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). This ability can be differentiated into two major subcomponents: *attentional control* (the capacity to maintain attention on tasks, as well as to shift attention when desired) and *inhibitory control* (the capacity to plan and to suppress inappropriate action). Infants and children differ greatly along these dimensions.

Sensory sensitivity. Sensory sensitivity includes two separate, though possibly related, facets, namely: (1) sensitivity to aversive stimuli, such as loud noises or scratchy clothes, which are captured in the sensory discomfort construct (Kochanska, Coy, Tjebkes, & Husarek, 1998; Rothbart, Ahadi, Hershey, & Fisher, 2001), and (2) the ability to react to sensory stimuli of low stimulative value, captured by the notion of perceptual sensitivity (Goldsmith, 1996; Rothbart et al., 2001). Related constructs, such as threshold (Martin, Wisenbaker, & Huttunen, 1994), sensory defensiveness (Goldsmith, Van Hulle, Arneson, Schreiber, & Gernsbacher, 2006) or high sensitivity (Aron, 2002), probably represent mixtures of both aspects of sensitivity.

Thomas and Chess's threefold temperament typology distinguished among *difficult*, *slow-to-warm-up*, and *easy* children. More recently, a related triadic classification scheme has been proposed (e.g., Asendorpf & van Aken, 1999; Caspi & Silva, 1995):

- Undercontrolled child (willful, restless, inattentive, and impulsive)
- Overcontrolled child (shy, obedient, self-critical, and liked by others)
- Resilient child (self-confident, able to concentrate, self-reliant, and open)

Given the fact that personality is a developmentally dynamic construct (Roberts, Walton, & Viechtbauer, 2006), the characteristic developmental changes during puberty are often reflected in personality change. Mervielde and Asendorpf (2000) argue that there are two major approaches to the study of personality: the *person-centered* and *variable-centered* approaches. A key goal of the *person-centered approach* is to identify individuals who share similar configurations of personality characteristics and the same basic personality structure (i.e., “personality types”; Block, 1971) based on Block and Block’s (1980) theory of ego control and ego resilience. Combining ego control and ego resilience results in three personality types: *resilients*, who manage to control and adjust to environmental demands (high ego resilience, moderate ego control); *undercontrollers*, characterized by a low level of impulse control (low ego resiliency, low ego control); and *overcontrollers*, who have high impulse control but low ability to adjust their impulse control to environmental demands (low ego resilience, high ego control).

In the *variable-centered approach*, the focus is on relations among variables in a population while personality dimensions are generalized across individuals (Asendorpf & Denissen, 2006). The most well-known and widespread variable-centered model is the five-factor model (FFM) (e.g., Caspi & Shiner, 2006).

Moreover, the three personality types of *resilients*, *undercontrollers*, and *overcontrollers* have been found to characterize specific constellations of the personality dimensions (Denissen, Asendorpf, & van Aken, 2008; Germeijs & Verschueren, 2011; Robins, John, Caspi, Moffitt, & Stouthamer-Loeber, 1996). Typically, resilients have the best adjusted personality profiles (highest scores on extraversion, conscientiousness, emotional stability, and openness to experience); overcontrollers score lowest on extraversion and emotional stability; and undercontrollers score lowest on agreeableness and conscientiousness. Personality dimensions and personality types have been found to account for much of the same variance in life outcomes (e.g., Chapman & Goldberg, 2011), and should thus be considered complementary. The current study examines whether configurations of Big Five personality dimensions in childhood and adolescence can be meaningfully characterized by personality types. It examined whether changes in children’s self-reported Big Five dimensions are represented by (developmental) personality types, using a cohort-sequential design with three measurement occasions across 5 years (four cohorts, 9–12 years at T1; $N = 523$). Correlates of, and gender differences in, type membership were examined. Latent class growth modeling yielded three personality types: resilients (highest initial levels on all Big Five), overcontrollers (lowest extraversion, emotional stability, imagination), and undercontrollers (lowest benevolence, conscientiousness). Gender differences in type membership were small. Warm parenting, but not overreactive discipline, in childhood was associated with type membership. The types differed in adjustment problems by the end of middle adolescence. Personality change more likely occurs at the level of dimensions within types than in type membership. The results showed that relations between personality and adjustment problems are not only concurrent, but also longitudinal. Moreover, differences between children (i.e., variances around growth parameters) can be meaningfully translated into developmental personality types that can be used as descriptive and possibly predictive tools for the explanation of externalizing and internalizing problems across the transitional period between childhood and adolescence. Thus, the development of personality throughout childhood and adolescence appears to be more strongly affected by an overall supportive family context than by (ineffective) discipline strategies. Moreover, personality is substantially influenced by genetics, and behavioral-genetic studies have suggested evidence for the heritability of support (warmth) but not ineffective (overreactive) behavioral control (Kendler & Baker, 2007).

The relationship between temperament and the Big Five factors

The studies on trait structure provide a broad taxonomy of children’s traits from preschool to adolescence. Extraversion surging or positive emotionality refers to children’s tendency to experience high positive affect, such as joy and enthusiasm, and to face the world with an assertive attitude. In preschoolers, this trait seems to implicate the components of sociability (an eagerness to interact with others) and approach or activity level (an eagerness to approach new situations and a high level of physical activity) (De Pauw, Mervielde, & Van Leeuwen, 2009; Dyson, Olino, Durbin, Goldsmith, & Klein, 2012).

Neuroticism or negative emotionality reflects children’s differences in susceptibility to negative emotions and general distress. In preschool years, this trait reflects children’s tendencies toward fear, irritability, and frustration, and difficulty with being quieted after high arousal (Rothbart, 2011). Children high on this trait are described as fearful, tense, low in frustration tolerance, and interpersonally insecure. Neuroticism includes components, such as insecurity, jealousy, fear of failing, and concern of being rejected. Such feelings become more obvious from middle childhood through adolescence.

Conscientiousness or effortful control reflects children’s ability to self-control, particularly when self-control is used in constraining impulses and striving to meet standards. In infancy children vary in their abilities to focus attention and manifest contention during low-intensity activities. In childhood, this ability, referred to as effortful control, expands to include the capacities to sustain attention, inhibit impulses, and engage in planning (Rothbart, 2011). Conscientiousness captures

similar abilities but also includes traits, such as orderliness, dependability, and achievement motivation. Empirical studies have revealed that these two traits are highly related (e.g., De Pauw et al., 2009). Effortful control and conscientiousness are both important predictors of academic success and better social-emotional functioning from childhood through adulthood (Duckworth & Allred, 2012; Eisenberg et al., 2010; Liew, 2012).

Agreeableness and openness to experience or intellect is children's tendency to be cooperative, compliant, helpful, and considerate. Researchers have proposed that agreeableness may arise in part from early differences in effortful control (Ahadi & Rothbart, 1994). Like negative emotion, low agreeableness includes tendencies toward externalizing emotions (anger, irritability), and these two traits are correlated in childhood (Shiner & DeYoung, 2013). However, low agreeableness typically focuses on the hostile expression of these traits in interactions with others, rather than on just the experience of such negative emotions.

Openness to experience refers to the tendency to explore, seek, and attend to external and internal sensory stimulation and abstract information. Children high on openness tend to be perceptive, curious, creative, and eager to learn (e.g., Mervielde & De Fruyt, 2002; Shiner & Masten, 2008). In adults, openness reflects perceptual, aesthetic, and intellectual interests (DeYoung, Quilty, & Peterson, 2007). Although openness is not included in childhood temperament models, it may be related to sensory sensitivity, a dimension measured in Rothbart's temperament model (Rothbart, 2011).

MODELS AND MEASURES OF TEMPERAMENT

The most popular models of temperament are the behavioral styles approach of Thomas and Chess, the criterial approach of Buss and Plomin, the psychobiological approach of Rothbart, the emotion regulation model of Goldsmith and Campos, and the behavioral inhibition model of Kagan. With the exception of the Kagan model, these models were developed to capture multiple dimensions of infant temperament but were later expanded by adding and adapting items to describe temperament in older children and adolescents. The trait dimensions postulated by these models are primarily operationalized by questionnaires (e.g., Majdandžić & van den Boom, 2007).

All of these models and their development rest on extensive studies of infants and children. There are also well-known theories focusing on adult temperament, whose possible connections to child temperament are being explored. For example, Gray's (1991) well-known neural theory of the Behavioral Inhibition System (BIS) and Behavioral Approach System (BAS) has been influential over theory building in the child temperament area. It has been adapted, for example, by Martin (1999) in the revised Temperament Assessment Battery for Children (TABCR), which measures negative emotionality, activity, and persistence [based on New York Longitudinal Study (NYLS) concepts], as well as inhibition and impulsivity, which derive from the BIS and BAS.

Because young children are typically unable to provide self-reports of their own characteristics, the assessment of temperament commonly includes other report measures, use of behavioral tasks, observational techniques, and peer nominations. In behavioral task measures of temperament, children are presented with situations designed to evoke particular behavioral tendencies; children's responses then are coded for specific behavioral indicators (Goldsmith & Gagne, 2012). Laboratory tasks have been created to assess a broad range of traits (e.g., Goldsmith & Rothbart, 1991), along with specific traits, such as effortful control (Kochanska & Knaack, 2003), behavioral inhibition (Kagan & Fox, 2006), and exuberance (Degnan et al., 2011). Two studies used behavioral task measures to establish trait structure in samples of preschoolers. First, a lab-based study probed the factor structure of children's coded responses to a set of tasks and obtained evidence for five traits: sociability, positive affect or interest, dysphoria (including anger and sadness), fear or inhibition, and constraint versus impulsivity (Dyson et al., 2012). Second, a home-based behavioral task measure determined a number of distinct temperament traits: anger, sadness, fear, shyness, positive expression, approach, active engagement, persistence, and inhibitory control (Gagne, Van Hulle, Aksan, Essex, & Goldsmith, 2011). These two studies thus obtained evidence for the temperament dimensions of positive affect or approach, negative emotions, and self-control, but the second one demonstrated that these observed traits could be broken into further dimensions (e.g., constraint vs. impulsivity could be split into persistence and inhibitory control). Although used less often than behavioral task measures, naturalistic observation likewise may be used to assess a broad range of traits (Buckley, Klein, Durbin, Hayden, & Moerk, 2002). Finally, peer nominations may be used to assess traits that peers may be especially sensitive to, such as shyness or sociability (e.g., Rubin, Coplan, & Bowker, 2009).

Parent reports are the most commonly used measures of temperament across all kinds of studies. Temperament questionnaires generally are developed based on the developer's particular model of temperament (Mervielde & De Pauw, 2012). At present, Rothbart and coworkers age-graded temperament questionnaires have been the most influential in establishing the structure of children's temperament traits, in part because they explored a broad range of temperament facets assessed across multiple situations (Rothbart, 2011). These measures have been adjusted to assess behaviors during different periods

of life (e.g., early childhood, preschool and early elementary school age, middle childhood, early adolescence). These questionnaires reflect three overarching temperament trait dimensions. *Surgency* assesses children's tendencies toward sociability, positive emotions, and eagerness to engage in potentially pleasurable activities. *Negative emotionality* measures children's general tendencies toward a wide range of negative emotions, including fear, withdrawal, sadness, anger, and frustration. *Effortful control* reflects children's emerging behavioral constraint and regulation, including the ability to sustain attention and persist at tasks.

There is a clear conceptual overlap between the traits identified in temperament research and the traits assessed in personality research in children. A recent study of preschoolers examined the empirical relationships among prominent temperament and personality measures to determine whether the conceptually similar traits do, in fact, relate to one another (De Pauw et al., 2009). In this study, the researchers investigated the factor structure of scales from three temperament measures and one Big Five measure and obtained evidence for six factors: sociability (low shyness and high expressiveness and sociability), activity level (high energy, activity level, and impulsivity), conscientiousness (high attention, achievement motivation, persistence, creativity, and curiosity), disagreeableness (high irritability, egocentrism, and anger, and low compliance, altruism, and adaptability), negative emotionality (high sadness, fear, anxiety, and negative intensity), and sensitivity (high pleasure in a wide variety of tactile, auditory, and visual experiences). The results suggest that temperament and personality traits relate in meaningful ways to each other and that the Big Five model may provide an overarching structure for children's individual differences, with some developmental modifications.

We present the various models or approaches to temperament in chronological order, classified into traditional and contemporary models.

TRADITIONAL MODELS OF TEMPERAMENT

The behavioral styles approach

The NYLS is considered as a landmark in the study of individual differences in developmental psychology and pediatrics (Chess & Thomas, 1966; Thomas & Chess, 1977). The two authors assessed on a regular basis the development of 141 infants through parent interviews. Employing content analyses, they identified nine categories of behaviors: activity level, regularity or rhythmicity, approach/withdrawal, adaptability, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, and attention span/task persistence. Thomas and Chess (1977) postulated the "goodness-of-fit" concept, suggesting that healthy psychological development and parenting should be tailored to a child's unique temperament. They also introduced three types of children based on temperamental characteristics: the *difficult*, the *slow-to-warm-up*, and the *easy* child. This typology has been instrumental in linking temperament to behavioral problems (Carey, 1998).

There are three widely used questionnaires that assess the nine Thomas and Chess dimensions in three age groups: in early childhood (ages 1–3) the Toddler Temperament Scale (TTS; Fullard, McDevitt, & Carey, 1984), in middle childhood (3–7 years) the Behavioral Style Questionnaire (BSQ; McDevitt & Carey, 1978), and in middle-late childhood (7–12 years) the Middle Childhood Temperament Questionnaire (MCTQ; Hegvik, McDevitt, & Carey, 1982).

The criterial approach

Buss and Plomin (1975) initially distinguished four temperamental dimensions within their Emotionality, Activity, Sociability, and Impulsivity (EASI) model. According to the authors, a temperament trait should be inherited, relatively stable during childhood, retained into adulthood, evolutionary adaptive, and present in phylogenetic relatives. Buss and Plomin (1984) developed the Emotionality, Activity, and Sociability (EAS) Temperament Survey, a concise instrument that contains 20 statements describing 3 dimensions of temperament: emotionality, activity, and sociability. The EAS Temperament Survey Shyness subscale is best viewed as a mixture of shyness and sociability. Moreover, Buss and Plomin (1984) designed the Colorado Child Temperament Inventory (CCTI), a parent report scale consisting of 30 items. Parents are required to rate their child within a 5-point Likert scale ranging from 1 (Not at all/Strongly disagree) to 5 (A lot/Strongly agree) on 6 factors pertaining to different dimensions of child temperament: emotionality, activity, sociability, shyness, attention, and persistence.

The emotion regulation model

Goldsmith and Campos (1982) define temperament as emotional in nature, pertaining to individual differences referring to behavioral tendencies and indexed by expressive acts of emotion. According to the Goldsmith–Campos model, the basic components of temperament can be assessed not only by parents and/or caregivers, but also through observations

of preschoolers in a lab setting performing tasks that form part of the Preschool Assessment Battery (PR Lab-TAB; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1993).

Goldsmith and Campos (1982; Goldsmith, 1993) refer to temperament primarily as individual differences in the emotional domain. Whereas the term *emotionality* in the temperament area often refers to individual differences in negative emotions, Goldsmith and Campos look at temperament as individual differences in the primary emotions, including both positive and negative emotions (i.e., joy, interest, sadness, anger, fear). Individual differences in these emotional predispositions are expressed in intensive and temporal aspects of behavior, including vocal, facial, and motor expressions. Together with Rothbart, Goldsmith developed an extensive laboratory assessment battery, the Lab-TAB (Goldsmith & Rothbart, 1996), and a multidimensional inventory to gather caretaker ratings of infant and child temperament, the Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996). These instruments were originally devised to measure five emotional temperamental components (motor activity, anger, fearfulness, pleasure/joy, interest/persistence), but newer versions of these tools can be used to assess a larger number of temperament dimensions (TBAQ-R; Goldsmith, 2000). Although the seminal article by Goldsmith and Campos did not emphasize heritability in defining temperament, Goldsmith and his coworkers have extensively studied heritability of temperament (Goldsmith et al., 1993; Ruf, Schmidt, Lemery, & Goldsmith, 2008). The TBAQ (Goldsmith, 1996) is a caregiver report based on the emotion regulation model that consists of five fairly independent scales: activity level, pleasure/positive affect, social fearfulness, anger proneness, and interest/persistence.

The current approach conceptualizes both emotion and emotion regulation as components of temperament. “Emotion regulation,” which is similar to effortful control, is one of the most complex temperamental constructs. It has been defined as consisting of “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (Thompson, 1994, pp. 27–28). Subsequent research on this model has been mainly confined to behavioral genetic analyses (Goldsmith, Buss, & Lemery, 1997; Lemery, Essex, & Smider, 2002).

The Laboratory-Temperament Assessment Battery (Lab-TAB)

The goal in developing the Laboratory-Temperament Assessment Battery (Lab-TAB; Goldsmith et al., 1993) was to make available a standardized instrument for laboratory assessment of early temperament. Lab-TAB comprises a set of 3–5-min episodes that simulate everyday situations in which one can reliably observe individual differences in the expression of emotion, in approach/avoidance and other instrumental behaviors, in activity level, and in regulatory aspects of behavior (or temperament).

An important issue in temperament research is whether temperament dimensions are best viewed as types or as dimensions. The underlying conceptualization of the Lab-TAB is dimension-oriented, but it is conceivable that typological characterizations will prove superior. The current coding systems, which can be examined in detail in the manuals, are designed with a dimensional conceptualization of individual difference variability. For example, facial, vocal, and motoric indicators of target discrete emotions are rated using a combination of both event- and interval-based coding. Specific dimensions of children’s behavior are characterized with a combination of binary (presence/absence), ordinal (peak intensity), or ratio (latency) scales. Because the episodes are modeled after everyday situations, they tend to elicit a variety of emotions in addition to specifically targeted emotions. For example, although Stranger Approach episodes target fearfulness in social situations, these episodes also reliably elicit sadness reactions.

Currently, there are three versions of the Lab-TAB: one for infants who have not started to crawl (prelocomotor), one for infants who have started to crawl (locomotor), and a version for preschoolers.

The Toddler Behavior Assessment Questionnaire (TBAQ-R)

The Toddler Behavior Assessment Questionnaire (TBAQ), a measure of temperament, was initially designed for use with children aged 18–36 months, although Goldsmith (1996). The TBAQ measures temperamental dimensions of activity level, tendency to express pleasure, social fearfulness, anger proneness, and interest/persistence. The TBAQ has been revised several times since its development. In its current iteration, developed in 2003, the TBAQ-R comprises 110 items measuring activity level, inhibitory control, anger, interest, attention, object fear, pleasure, social fear, sadness, soothability, and sensory defensiveness.

The scales include activity level, anger, fear, pleasure, and interest. Activity level is defined as limb, trunk, or locomotor movement during a variety of daily situations, including free play, confinement, or quiet activities. Anger is defined as crying, protesting, hitting, pouting, or other signs of anger in situations involving conflict with the caregiver or another child. The fear scale examines inhibition, distress, withdrawal (rather than approach), or signs of shyness in novel or uncertainty-provoking situations. The pleasure scale examines smiling, laughter, and other hedonically positive vocalizations or playful activity in a variety of nonthreatening or mildly novel situations. The interest scale refers to the duration of task engagement in ongoing solitary play.

The tridimensional temperament model

In the late 1980s, Cloninger proposed the tridimensional temperament model, which later evolved to the psychobiological model of temperament and character (Cloninger, Svrakic, & Przybeck, 1993). Cloninger first developed a model of temperament based on heritable differences in the way behavior is conditioned by patterns of reward and punishment that elicit basic emotional responses like fear or anger. The temperament model was based on studies of the effects of genetics and neuropsychological data on behavioral learning (Cloninger, 1986), which led to the identification of four dimensions of temperament related to inhibition of behavior by signals of punishment or nonreward (i.e., harm avoidance), activation of approach behavior by novelty (i.e., novelty seeking), activation of social attachment (i.e., reward dependence), and maintenance of behavior despite frustration (i.e., persistence). The temperament dimensions measure the associatively conditioned aspects of personality that are not rational or self-aware but are moderately stable throughout life (Josefsson et al., 2013). Cloninger next developed a model of mental self-government of these temperament traits by higher cognitive processes he called self-directedness (the executive aspect of self-government), cooperativeness (the legislative aspect of self-government), and self-transcendence (the judicial aspect of self-government) (Cloninger et al., 1993). These traits integrate much earlier work in humanistic and transpersonal psychology (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). These character traits can be measured in preschoolers (Constantino, Cloninger, Clarke, Hashemi, & Przybeck, 2002) but mature with age in the direction of culturally sanctioned norms (Josefsson et al., 2013).

In the psychobiological theory, maturity refers to the character configuration typical of healthy middle-aged individuals, which is characterized by high self-directedness and high cooperativeness (Cloninger et al., 1993; Cloninger, Svrakic, & Svrakic, 1997; Cloninger & Zohar, 2011; Josefsson et al., 2011). Extreme immaturity, in contrast, is often related to diagnosable personality disorders (Cloninger, 2010; Svrakic, Whitehead, Przybeck, & Cloninger, 1993), and extreme temperament variants may differentiate between various subtypes of personality disorders (Cloninger, 1987).

Character is assumed to develop in adulthood as a result of conceptual learning of the meaning and consequences of one's actions (Cloninger et al., 1993; Svrakic et al., 1993). However, individual differences in the character traits are as heritable as the temperament traits (Gillespie, Cloninger, Heath, & Martin, 2003), suggesting that the division between temperament and character cannot be made simply on the basis of more and less heritable components of personality. Cloninger's model has been shown to be a useful model or discriminating different psychiatric disorders in adults (Lochner et al., 2006; Celikel et al., 2009), as well as in adolescents (Olvera et al., 2009; Kim et al., 2010) and school-age children (Althoff et al., 2012; Zappitelli et al., 2013). To diagnose the different disorders in preschool children, Melegari et al. (2015) administered a reliable structured interview, the Preschool Age Psychiatric Assessment (PAPA) (Egger, Ascher, & Angold, 1999), which provides a comprehensive assessment of *DSM-IV-TR* diagnoses.

The Temperament and Character Inventory–Revised (TCI-R)

Cloninger's model has been investigated through the Temperament and Character Inventory (TCI; Cloninger et al., 1994) and its most recent version, the TCI-R (Cloninger, 1999), and a short version (TCI-140). The TCI was developed by Cloninger based on the Tridimensional Personality Questionnaire (TPQ), with the goal of assessing the seven factors of the psychobiological model of personality (Cloninger et al., 1993, 1994; Cloninger, 1987, 2004). The TCI is a 240-item true/false questionnaire measuring 4 dimensions of temperament—novelty seeking (NS), harm avoidance (HA), reward dependence (RD), and persistence (P)—and 3 dimensions of character—self-directedness (SD), cooperativeness (C), and self-transcendence (ST); 25 facets are also measured as subscales of the 7 main TCI dimensions.

The TCI assesses in a reliable way the seven dimensions and subdimensions of Cloninger's model of personality, with a stable internal structure and numerous indexes of external validity. The most frequent psychometric limitations emerging in validation studies of the TCI are the weak reliability parameters (test–retest reliability, internal structure, and consistency) obtained for persistence and reward dependence, the unequal numbers of subscales for all dimensions, and the true/false response mode, which is known to be less reliable than Likert modalities. These observations and the psychometric analyses emerging from more than 10 years of TCI utilization recently led to the development of a revised edition, the TCI-R.

The neurobiological developmental approach

The theoretical model developed by Rothbart (Rothbart, 1981; Rothbart & Ahadi, 1994) conceptualizes temperament as constitutionally based individual differences in reactivity and self-regulation emotion motivation and attention-related process. The fundamental assumption of the psychobiological approach is that temperamental differences are largely dependent on the responsiveness of underlying psychobiological processes. Behaviorally, temperament can be observed across all ages as differences in patterns of emotional activity and attention. Motivational and attentional systems are considered to provide the link between neural systems and major personality dimensions.

The Rothbart model originally described temperament during the first year of life but was later on expanded to include older age groups. The Children's Behavior Questionnaire (CBQ; Putnam et al., 2006) assesses 15 scales, combined into 3 factors: surgency, negative affect, and effortful control. The CBQ is completed by parents and covers the ages 4–7 years. There is also the Early Adolescent Temperament Questionnaire–Revised (EATQ-R; Ellis & Rothbart, 2001) for children aged 8–14 years. The EATQ-R is a parent-report measure that consists of 62 items and includes 2 behavioral scales (depression and aggression) and 7 temperament traits representing negative affect (combining the subscales fear and frustration), surgency (high-intensity pleasure and shyness), and effortful control (activation control, attention, and inhibitory control).

The Infant Behavior Questionnaire (IBQ and IBQ-R)

Since its introduction in 1981, the Infant Behavior Questionnaire (IBQ; Rothbart, 1981) has been one of the most widely used parent-report measures for infants aged 3–12 months. The original IBQ was developed by Dr. Rothbart in the early 1980s and first reported in the 1981 *Child Development* article, "Measurement of Temperament in Infancy" (Rothbart, 1981). This early form of the instrument assessed six domains of infant temperament (activity level, soothability, fear, distress to limitations, smiling and laughter, and duration of orienting). The items on the IBQ ask parents to rate the frequency of specific temperament-related behaviors observed over the prior week (or sometimes 2 weeks).

In 1998, Rothbart and her colleague revised the IBQ by refining the original scales and adding several new scales. The new instrument is referred to as the IBQ–Revised (IBQ-R; Derryberry & Rothbart, 1988). Short (91 items; 14 scales) and very short (36 items; 3 broad scales) forms of the IBQ-R were developed by Putnam, Rothbart, and Gartstein (2008). The IBQ-R was developed to provide a more differentiated measure of infant temperament, consistent with Rothbart's psychobiologically oriented approach to temperament emphasizing both reactive and regulatory capacities (Rothbart, 1981, 1989; Rothbart & Derryberry, 1981a, 1981b; Rothbart & Posner, 1985). The IBQ-R is a representative psychobiologically oriented approach to the measurement of temperament, allowing researchers to investigate interactions between different domains of temperament, as well as their relationships with environmental influences (e.g., parenting).

The response format of the IBQ presents sets of items based on the context or situation eliciting the infant's reactions (e.g., bathing and dressing), which may serve to enhance specific recall and limit social desirability. The IBQ-R assesses the following dimensions of temperament: activity level, distress to limitations, approach, fear, duration of orienting, smiling and laughter, vocal reactivity, sadness, perceptual sensitivity, high-intensity pleasure, low-intensity pleasure, cuddliness, soothability, and falling reactivity/rate of recovery from distress.

The IBQ has been used to achieve at least three major goals. The first has been to measure individual differences in reactivity and regulation, often in the context of structured laboratory tasks and/or physiological measures (Kochanska et al., 1998; Rothbart et al., 2000). Second, the IBQ has been employed to identify the structure of infant temperament. Factor analytic work with the IBQ has generally yielded dimensions related to positive and negative affectivity (Kochanska et al., 1998). A third has been to evaluate relations among temperament, socialization, and parental and family functioning (Clark, Hyde, Essex, & Klein, 1997; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996).

The Early Childhood Behavior Questionnaire (ECBQ)

The Early Childhood Behavior Questionnaire (ECBQ; Putnam et al., 2006) was originally designed to supplement the TBAQ (Goldsmith, 1996), a widely used parent-report temperament questionnaire for young children aged 18–36 months. The TBAQ includes 108 items that address 5 aspects of temperament: activity level, pleasure, social fearfulness, anger proneness, and interest/persistence. Goldsmith (1996) documented internal consistency and interrater reliability of the instrument, as well as convergence with other temperament measures. Subsequent studies (e.g., Eiden, Edwards, & Leonard, 2004; Kochanska & Knaack, 2003; Lemery, Goldsmith, Klinnert, & Mrazek, 1999) have provided support for the construct validity of the instrument. The value of this measure is further indicated by successful translations to Japanese (Kusanagi, Chen, & Hoshi, 2000), Spanish (Salinas, Montesinos, & Carnicero, 1999), and Dutch (Van Bakel & Riksen-Walraven, 2004).

The ECBQ assesses the following dimensions of temperament: activity level/energy, attentional focusing, attentional shifting, cuddliness, discomfort, fear, frustration, high-intensity pleasure, impulsivity, inhibitory control, low-intensity pleasure, motor activation, perceptual sensitivity, positive anticipation, sadness, shyness, sociability, and soothability. The scales that make up the ECBQ are internally consistent, demonstrate satisfactory cross-rater agreement, and are stable across time.

The Children's Behavior Questionnaire (CBQ)

The CBQ (Rothbart et al., 2001) was developed to provide a highly differentiated caregiver report assessment of temperament in children 3–8 years of age. Domains included in the instrument are positive and negative emotion, motivation,

activity level, and attention. Specific dimensions chosen for the CBQ were based on constructs of temperament in infancy as measured by the IBQ (Rothbart, 1981), and in adulthood as measured by the Physiological Reactions Questionnaire (PRQ) (Derryberry & Rothbart, 1988), and items were rationally generated based on conceptual definitions for each scale.

In the CBQ, parents are asked to rate their child on a 7-point scale ranging from 1 (extremely untrue of the child) to 7 (extremely true of the child). Parents are also provided with a Not Applicable response option when the child has not been observed in the situation described. The standard form of the CBQ consists of 195 items assessing the following 15 scales of 12–14 items each: activity level, anger/frustration, approach/positive anticipation, attentional control, discomfort, falling reactivity/soothability, fear, high-intensity pleasure, impulsivity, inhibitory control, low-intensity pleasure, perceptual sensitivity, sadness, shyness, and smiling and laughter. Scale scores are created by averaging applicable item scores.

The standard form has been used to study genetic and environmental influences on temperament (Goldsmith et al., 1997) and longitudinal change and consistency in temperament (e.g., Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999), as well as cross-cultural similarities and differences in the structure of temperament (Ahadi et al., 1993). In addition, both the overall instrument and select scales have been employed in studies of temperament in relation to a variety of topics, including perceived competence (Schaughency & Fagot, 1993), temperamental types or clusters in preschoolers (Aksan et al., 1999), ability estimation and injury proneness (Schwebel & Plumert, 1999), problem behaviors (Eisenberg et al., 1996a; Lengua, West, & Sandler, 1998), mental development and the ability to delay gratification (Silverman & Ippolito, 1995), prosocial behavior (Eisenberg et al., 1996b), mothers' perceptions of power and patterns of control (Mills, 1998), social competence in peer interactions (Fabes et al., 1999), and parents' reactions to children's negative emotions (Eisenberg et al., 1999).

The very short form was constructed in reference to the factor pattern characteristic of the standard form. Factor analysis of the CBQ has consistently led to the formation of three broad factors (Goldsmith et al., 1997; Rothbart et al., 2001) that resemble three of the Big Five (Digman, 1990; Goldberg, 1990) personality dimensions: surgency/extraversion, negative affectivity, and effortful control, which has been compared to conscientiousness/constraint.

The Temperament in Middle Childhood Questionnaire (TMCQ)

Computerized self-report and paper-and-pencil parent-report versions of the Temperament in Middle Childhood Questionnaire (7–10 years) (TMCQ; Simonds & Rothbart, 2004) have been used to measure surgency and other temperament constructs. The TMCQ was largely based on the CBQ (Rothbart et al., 2001). Four scales not included on the CBQ were added to the TMCQ (activation control, assertiveness/dominance, fantasy/openness, and affiliation). Items not adapted from the CBQ were written specifically for the TMCQ or adapted from the Child Temperament and Personality Questionnaire (CTPQ; Victor, Rothbart, & Baker, 2003) and the Berkeley Puppet Interview self-report version of the CBQ (CBQ-BPI; Ablow & Measelle, 1993; Hwang, 2003).

The measure contains 16 scales consisting of 157 items. The 20- to 25-min self-report version of the TMCQ uses a computer to present questions to children with a cartoon voice of “Ducky.” A nonanimated graphic of a cartoon duck, wearing glasses and a lab coat and holding a briefcase, appears on the screen. The cartoon voice reads instructions to guide children through practice items and then reads each item as it appears simultaneously in text on the screen. Response choices appear in a 5-point scale from “not at all” to “a lot.” The TMCQ assesses the following dimensions of temperament: activity level, affiliation, anger/frustration, assertiveness/dominance, attentional focusing, discomfort, fantasy/openness, fear, high-intensity pleasure, impulsivity, inhibitory control, low-intensity pleasure, perceptual sensitivity, sadness, shyness, soothability/falling reactivity, activation control (experimental scale).

The Early Adolescent Temperament Questionnaire–Revised (EATQ-R)

The Early Adolescent Temperament Questionnaire–Revised (EATQ-R) is a revision of a 1992 instrument developed by Capaldi and Rothbart (1992). The current questionnaire has been designed specifically to tap experiences common to adolescents (9–15 years), and is available in self- and parent-report formats. It assesses temperament and self-regulation via adaptation of scales used in studies of children and adults. The revised questionnaire also contains two behavioral scales to allow examination of the relationship of temperament to social-emotional functioning. The EATQ-R assesses the following scales: activation control, activity level, affiliation, attention, fear, frustration, high-intensity pleasure, inhibitory control, perceptual sensitivity, pleasure sensitivity, and shyness, as well as behavioral scales of aggression and depressive mood. Ellis and Rothbart (2001) have shown the EATQ-R to be a reliable tool for the measurement of temperament in adolescents. Further, it appears that temperamental characteristics may be related to socialization-relevant behaviors, even when controlling for differences in gender.

The Adult Temperament Questionnaire (ATQ)

The Adult Temperament Questionnaire (ATQ; Evans & Rothbart, 2007) was adapted from the Physiological Reactions Questionnaire (PRQ) developed by Derryberry and Rothbart (1988) and includes general constructs of negative affect,

extraversion/surgency, effortful control, and orienting sensitivity. The ATQ (Evans & Rothbart, 2007) is a measurement tool consisting of 77 questions in the short form. It can be related to Cloninger's TCI and the FFM and Multi-Language Seven (ML7) model of personality traits. It is deduced from several studies' results (Derryberry & Rothbart, 1988; Evans & Rothbart, 2007; Rothbart et al., 2000).

The ATQ assesses the following factor scales, in a hierarchical listing of scales:

- *Negative affect* includes fear, sadness, discomfort, and frustration.
- *Extraversion/surgency* includes sociability, positive affect, and high-intensity pleasure.
- *Effortful control* includes attentional control, inhibitory control, and activation control.
- *Orienting sensitivity* includes neutral perceptual sensitivity, affective perceptual sensitivity, and associative sensitivity.

Kagan's behavioral inhibition model

Kagan (1999) places "behavioral inhibition" at the center in his biotypological approach to temperament. In contrast to other temperament theories, Kagan refers to high-reactive versus low-reactive and inhibited versus uninhibited children as belonging to distinctive and discrete categories produced by different biological factors. Kagan (2008) maintains that different phenotypes are often the outcome of distinct genotypes. During the 1990s, researchers embarked on a large and methodical endeavor to develop an empirically based taxonomy for child personality. Kohnstamm, Halverson, Mervielde, and Havill (1998) interviewed parents of 2400 youths from various countries, and their free descriptions of their children were coded and extensively analyzed. Two separate instruments were developed as an outcome of these combined efforts: the Hierarchical Personality Inventory for Children (HiPIC; Mervielde & De Fruyt, 1999) and the Inventory for Child Individual Differences (ICID; Halverson et al., 2003).

The HiPIC and ICID are nonoverlapping unique associations between temperament/psychopathology constructs, and HiPIC or ICID traits also provide important information regarding the psychological nature of nonoverlapping variances in each instrument. In other words, the extent to which one higher-order trait domain (e.g., extraversion) may predict externalizing problems via one child personality measure but not another suggests differential coverage of the externalizing domain in the two measures (e.g., perhaps the predictive measure offers greater coverage of content related to sensation-seeking behaviors, which in turn predict externalizing problems).

The Hierarchical Personality Inventory for Children (HiPIC)

The Hierarchical Personality Inventory for Children (HiPIC; Mervielde & De Fruyt, 1999) is a 144-item parent report questionnaire measuring child personality dimensions, and was originally developed with 5- to 13-year-old Belgian youths (Mervielde & De Fruyt, 1999). Items are rated 1–5, ranging from barely characteristic to highly characteristic. HiPIC items are scored to generate scales for five higher-order personality dimensions and 18 lower-order facets (shyness, expressiveness, optimism, energy, egocentrism, irritability, compliance, dominance, altruism, achievement, orderliness, concentration, persistence, anxiety, self-confidence, creativity, curiosity, and intellect), which are aggregated into five higher-order traits of child personality: neuroticism, extraversion, imagination, benevolence, and conscientiousness (Mervielde & De Fruyt, 1999). The HiPIC items were selected using brief, sentence-format parental descriptions of a Flemish sample of children. Studies conducted with the original Dutch language version of the HiPIC have shown strong support for structural validity, interrater agreement, internal consistency, and temporal stability (De Fruyt, Mervielde, & van Leeuwen, 2002; Mervielde & De Fruyt, 2002).

The Inventory for Child Individual Differences (ICID)

The Inventory of Children's Individual Differences–Short Form (ICID-S; Deal, Halverson, Martin, Victor, & Baker, 2007) is a 50-item parent-report questionnaire measuring childhood personality dimensions. Items are rated 1–7, ranging from much less than the average youth to much more than the average youth. ICID-S items are scored to generate scales for higher-order traits that are analogous, but not identical, to the FFM in adults (Costa & McCrae, 1992; Goldberg, 2001; Tackett et al., 2012) and for 15 lower-order facet scales (sociability, shyness, activity level, positive emotions, antagonism, strong-willed, negative affect, considerate, compliant, organized, achievement orientation, distractible, fearful/insecure, intellect, and openness), which are compiled into five higher-order traits of child personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness (Halverson et al., 2003). Facet allocation to higher-order traits corresponded to the structure outlined by Deal et al. (2007).

The ICID items were collected using parental descriptions of American, Chinese, Dutch, and Greek samples of children. Studies conducted with the ICID have shown strong support for structural validity, interrater agreement, internal

consistency, and temporal stability (Deal et al., 2007; Halverson et al., 2003; Knyazev, Zupančič, & Slobodskaya, 2008; Tackett, 2011; Tackett et al., 2012). Thus, the ICID and HiPIC share a common origin.

CONTEMPORARY MODELS OF TEMPERAMENT

Regulative theory of temperament

The regulative theory of temperament (RTT) posits that temperament manifests itself not only in emotions, but also in any behaviors and all kinds of mental activity (Strelau, 2001). The RTT framework proposes that four dimensions belong to energetic characteristics of behavior, such as emotional reactivity (ER), endurance (EN), sensory sensitivity (SS), and activity (A); there are also two temporal aspects of behavior described by perseveration (PE) and briskness (BR) (Strelau & Zawadzki, 1997).

- Emotional reactivity (tendency to intensive reactions to emotion-generating stimuli)
- Endurance (ability to cope with long-lasting or intensive stimulation)
- Sensory sensitivity (ability to react to low-threshold sensory stimuli)
- Activity (tendency to undertake strong stimulating behavior)
- Perseveration (tendency to repeat and continue behavior after the stimulus or situation has stopped)
- Briskness (tendency to quick reactions, high tempo, and to change behavior easily)

The RTT postulates the interaction between biological and psychosocial factors in predicting a behavioral response to environmental requirements. Thus, the RTT fits well with a sociodevelopmental cognitive model of psychosis (Howes & Murray, 2014). Strelau and Zawadzki (1996) argue that the terms *personality* and *temperament* are discrepant. In the RTT, it is hypothesized that temperament is inherent in the early development and marks relatively stable and constitutionally based determinants of behavior (e.g., intensity, energy, strength, speed, tempo, fluctuation, mobility). By contrast, personality traits occur in later developmental stages and are conceptualized as products of temperament and culture, as well as social factors, resulting in specific interests, habits, and attitudes. Thus, the RTT differentiates between regulative and integrative aspects of behavioral tendencies and relates temperament to regulatory characteristics of behavior (e.g., active vs. inactive, stable vs. instable), whereas personality goes beyond formal characteristics and encompasses integral (including regulatory) behavioral tendencies (e.g., to be or not to be open to experiences).

In some aspects, the distinction between “temperament” and “personality” in the RTT resembles the distinction between “basic tendencies” and “characteristic adaptations” in the five-factor theory. According to the RTT, however, basic personality traits contain both regulative and integrative functions of behavior, whereas temperamental traits only play a regulatory role (Strelau & Zawadzki, 2008). This differentiation between regulatory and integral functions indicates that the Big Five personality traits extraversion (with its energetic facets activity, excitement seeking, and positive emotions) and neuroticism (with its energetic facets anxiety and impulsivity) should show stronger genetic links to the regulatory temperamental traits, whereas conscientiousness, agreeableness, and openness as basic dimensions underlying more integrative personality facets (e.g., fantasy, trust, or dutifulness) should rather be genetically distinct from the genetic effects on temperament in terms of the RTT. In contrast, the five-factor theory indicates that the Big Five personality traits as universal genetically based tendencies should account for the vast majority of the genetic variance in several specific temperament variables and measures.

The Formal Characteristics of Behavior–Temperament Inventory (FCB-TI)

The Formal Characteristics of Behavior–Temperament Inventory (FCB-TI; Zawadzki & Strelau, 1997) is an internationally used self-report scale, developed originally in Polish, comprising 120 items eliciting yes or no responses. Behaviors are assessed on six subscales (described in the preceding RTT section): briskness, perseveration, sensory sensitivity, emotional reactivity, endurance, and activity. Raw scores of 0–20 points for each subscale are obtained from the total number of diagnostic responses. Higher scores indicate greater magnitude of a given characteristic. The reliabilities of the FCB-TI scale temperament traits in 1997 and 2001 were in the range of .7–.8 (Cronbach’s α).

Akiskal affective temperaments model

Temperaments refer to temporarily stable behavior with strong affective reactivity, and have been associated with biological aspects of personality, such as activity level, rhythm, mood, and their variations (Rihmer, Akiskal, Rihmer, & Akiskal, 2010). Akiskal et al. (2005) have extensively worked on the development and field research on affective

temperaments. Akiskal conceptualized affective temperaments as a combination of ancient ideas (especially Hippocrates' humoral theories) with contemporary empirical research in order to encompass the broad spectrum of affective disorders from "healthy" emotional reactivity to affective disorders.

The affective spectrum describes a continuum between cyclothymia, bipolar disorder, as well as subsyndromal depression, minor depression, dysthymia, and unipolar major depression (e.g., Rihmer et al., 2010). Affective temperaments in a marked form are present in up to 20% of the healthy population, while in their dominant form [a score of at least 2 Standard Deviations above the average on the Temperament Evaluation of Memphis, Pisa, Paris and San Diego–Autoquestionnaire Version (TEMPS-A) scale] they are generally present in 3%–5% of the healthy population (Gonda, Vazquez, Akiskal, & Akiskal, 2011). According to studies on clinical samples, depressive temperament is prevalent in major depressive disorders (e.g., Rihmer et al., 2010), while hyperthymic temperament and also cyclothymic temperament are general characteristics for bipolar I illness (e.g., Rihmer et al., 2010). According to a study by Akiskal et al. (1977), 35% of subjects with marked cyclothymic temperament developed hypomanic, manic, or depressive episodes in 3 years, and one-third of offspring and siblings of bipolar patients manifest dysthymic, cyclothymic, or hyperthymic temperamental characteristics. Even in the case of unipolar major depression, the presence of other affective temperaments besides the depressive temperament has a crucial role in determining the clinical picture, and the presence of other affective temperaments in patients with a major depressive episode may be valuable in predicting illness course and bipolar conversion.

The Temperament Evaluation of Memphis, Pisa, Paris and San Diego–Autoquestionnaire Version (TEMPS-A)

The TEMPS-A (Akiskal, Akiskal, Haykal, Manning, & Connor, 2005) is a widely used measure of affective temperaments that was translated and validated in many countries over the five continents (e.g., Vazquez et al., 2012) and the list in Preti et al. (2010). The TEMPS-A is thought to measure five affective temperaments that define the bipolar spectrum. Evidence supporting the factor structure and measurement invariance of the TEMPS-A was provided for the short version of the TEMPS-A (Preti et al., 2013). The short TEMPS-A is a 39-item yes-or-no self-report questionnaire designed to quantify affective temperaments in psychiatric patients and healthy subjects. It derives from a longer, 110-item version developed around the concept of the bipolar spectrum, and includes five subscales: cyclothymic (C), dysthymic (D), irritable (I), hyperthymic (H), and anxious (A) (Akiskal & Akiskal, 2005b).

The first psychometrically valid instrument measuring the classical affective temperaments by interview methodology, the Temperament Evaluation of Memphis, Pisa, Paris and San Diego–Interview (TEMPS-I), was applied in a large community sample in Pisa, Italy (Akiskal et al., 1998). However, the most extensive research on affective temperaments was performed based on the scale in its autoquestionnaire form (TEMPS-A). The factorial structure of TEMPS-A demonstrated both good reliability and internal consistency, and external validation was found with Cloninger's TCI, the Costa and McCrae Revised NEO Personality Inventory, and von Zerssen's Munich Personality Test (Rihmer et al., 2010). This 110-item autoquestionnaire version (Akiskal & Akiskal, 2005a), which includes the subscale for assessing anxious temperament, has been translated into more than 25 languages, and validated in several of them. In the relatively short time since the development of the final form of this instrument, there have been several national studies published on large study populations (e.g., Erfurth et al., 2005; Figueira et al., 2008; Vazquez et al., 2007).

Functional Ensemble of Temperament model

The functional perspective was implemented in the neurochemical "Functional Ensemble of Temperament (FET)" model that was developed utilizing the Structure of Temperament Questionnaire (Rusalov & Trofimova, 2007; Trofimova, 2010a, 2010b, 2015; Trofimova & Robbins, 2016). Temperament (i.e., biologically based individual differences in healthy people) and mental illnesses are considered as varying degrees along the same continuum of neurotransmitter imbalance in neurophysiological systems of behavioral regulation (Clark, Watson, & Mineka, 1994; Heath, Cloninger, & Martin, 1994; Mehrabian, 1995; Ball, Tennen, Poling, Kranzler, & Rounsaville, 1999; Weinstock & Whisman, 2006; Brown, 2007; Rusalov & Trofimova, 2007; Weiss et al., 2009; Karam et al., 2010; Trofimova, 2015).

Many temperament traits (such as impulsivity, sensation seeking, neuroticism, endurance, plasticity, sociability, extraversion) have been linked to brain neurotransmitters and hormonal systems (i.e., the very same systems implicated in mental disorders) (Gray, 1982; Cloninger, 1986; Heath et al., 1994; Kagan, Snidman, Arcus, & Reznick, 1994; Depue & Morone-Strupinsky, 2005; Trofimova & Sulis, 2010; Zentner & Shiner, 2012; Trofimova, 2015; Trofimova & Robbins, 2016). In contrast, the FET model considers 12 temperament traits in a 3 × 4 matrix: 9 activity-related traits (energetic, dynamic, and orientational), each assessed in 3 domains (physical, social, and intellectual) together with three systems related to emotionality (neuroticism, impulsivity, and self-confidence). For example, energetic systems emerge in temperament as

traits of endurance (i.e., the ability of an individual to sustain prolonged and/or intense activities). The FET model considers three types of endurance—physical, social, and intellectual.

The nine FET nonemotionality traits are posited to be regulated by monoamine and neuropeptide systems, whereas the three emotionality-related traits emerge from a dysregulation of opioid receptors systems that have direct control over monoamine systems. The FET model suggests that there is no one-to-one correspondence between the neurotransmitter systems underlying temperament traits (or mental disorders), but instead specific ensemble associations between these systems emerge as temperament traits.

The Compact Russian Structure of Temperament Questionnaire (STQ-77)

Rusalov developed the Structure of Temperament Questionnaire (STQ). The Extended version of the STQ has 12 items for each of 12 scales, assessing 4 traits—ergonicity (energetic component), plasticity, tempo of activity, and emotionality—in three types of activities: verbal-social, physical objects related, and intellectual (mental) (Rusalov, 1989, 1997, 2004).

The Compact version, STQ-77 (Rusalov & Trofimova, 2007), consists of 6 out of 12 items on each scale of the Extended STQ that had the highest item–total correlation. The STQ-77 upgraded Rusalov’s original model of temperament according to Luria’s neuropsychological description of regulational blocks. In addition to an “energetic” block attributed to general ascending reticular activating system (ARAS) and limbic system activity (reflected in the ergonicity and emotionality traits in Rusalov’s model) and a “programming,” integration-mobility block (reflected in the plasticity and tempo traits), two plasticity scales (physical and social) were unified into one, three emotionality scales were also unified into one, and the scale of intellectual tempo was renamed sensitivity to probabilities. As a result of this upgrade, five scales in the Extended STQ were relabeled and restructured within STQ-77, and three new scales of empathy, sensitivity to sensations, and impulsivity were added to the list of scales (Rusalov & Trofimova, 2007).

The Compact Russian Structure of Temperament Questionnaire (STQ-77R; Trofimova & Sulis, 2010), used to evaluate the features of temperament, includes the following scales: motor ergonicity (ERM), social ergonicity (ERS), and intellectual ergonicity (ERI), which measure the abilities of an individual to sustain prolonged physical, social, and mental activity, respectively; scales of motor and social tempo, which measure the preferred speeds of manipulating physical objects (TMM) and speaking, reading, and other verbal activities (TMS); sensitivity to sensations (SS, a measure of the sensitivity to basic physical sensations and pleasures and a measure of the tendency toward sensation seeking and risk-taking behavior); empathy (EMP, a measure of the sensitivity to other people’s states and expectations); plasticity (PL, a measure of the ability to adapt quickly to changes in the situation and to shift between different tasks); self-confidence (SLF, a measure of the tendency to be optimistic and confident about one’s performance and to ignore other people’s criticism); sensitivity to probabilities (PRO, a measure of the ability to develop adequate understandings and expectations of probable events and the efficient extraction and processing of new knowledge, classification, and learning abilities); impulsivity (IMP, a measure of the lability of emotional reactions); neuroticism (NEU, a measure of the expectations of negative outcome and low tolerances for uncertainty).

Validity studies were conducted for English and Russian versions of the STQ-77. The factor analysis of the STQ-77 showed the same four factors as those found for the Extended STQ, namely factors of motor activity, social activity, intellectual activity, and emotionality (Rusalov & Trofimova, 2007; Trofimova, 2010a). Studies of the concurrent and discriminant validity of the English STQ-77 scales used Strelau’s Pavlovian Temperament Survey and an experiment with a task requiring intense verbal and intellectual activity; the validity of the Russian STQ-77 was studied with Zuckerman’s Sensation Seeking Scales (SSS-V), NEO Five Factor Inventory (NEO-FFI), Achieving Tendency scale (Trofimova, 2010a), and clinical symptoms of anxiety (Trofimova & Sulis, 2010).

TEMPERAMENT AND CULTURE

Although cross-cultural temperament research has not been widespread, especially during the infancy period, a number of studies have reported differences, as well as similarities primarily on the basis of parent-report methodologies, with limited use of laboratory observations. For example, significant differences between American and Taiwanese infants were noted, with parents reporting lower levels of regularity, activity, approach, adaptability, distractibility, and threshold of responsiveness, as well as higher levels of negative mood and intensity for Taiwanese infants (Hsu, Soong, Stigler, Hong, & Liang, 1981). Kagan et al. (1994a) compared Chinese, Irish, and American 4-month-olds in an observation study, finding that American infants displayed more motor activity and more distress than Irish infants, who in turn were more active and more fearful than Chinese infants. Japanese preschoolers were rated as more active in sleep, more withdrawal-oriented, less flexible, expressing less positive affect, and less regular than US children (Windle, Iwawaki, & Lerner, 1987). Notably, school-age Japanese children also rated themselves as significantly lower on approach, mood quality, and flexibility, and

higher on the rhythmicity factor (Windle et al., 1987) relative to their US counterparts. A recent investigation of cross-cultural differences between Russian and US infants demonstrated a number of significant mean differences, consistent in the direction of the effect: the US parents reported more frequent manifestations of positive emotions in their infants, whereas reports of the Russian participants indicated a greater frequency of negative affect manifestations (Gartstein, Slobodskaya, & Kinsht, 2003).

Research conducted with predominantly Western cultures has demonstrated differences in “parental ethnotheories,” or culturally derived belief systems regarding children, family, and parenthood (Harkness & Super, 1995), which in turn are likely to be reflected in different approaches to parenting and in variability in child characteristics. The influence of such cultural differences in parental ethnotheories can also translate into variability in parental perceptions of child behavior. For example, behavioral and emotional tendencies considered challenging to manage in one country may not be perceived as equally difficult in another (Harkness & Super, 1996). Zawadzki, Strelau, Oniszcenko, Riemann, and Angleitner (2001) evaluated as equivalent the contribution of genetic and environmental factors to temperament across various countries.

The theoretical framework for cross-cultural research addressing differences in social-emotional development was provided by Super and Harkness (1986), who conceptualized the interface between a child and his or her culture as a “developmental niche” that was described as a function of (1) customs (especially those related to child rearing), (2) settings available to the child, and (3) caregiver psychosocial characteristics, all factors influenced by culture. According to these authors, each of the three factors that shape the developmental niche interact differently with other features of the larger ecology, yet operate in a coordinated manner. In addition, the organism (i.e., the child) and the niche are mutually adaptive. This theoretical conceptualization has been successfully applied in understanding relationships among customs, settings, parents’ attitudes, child-rearing practices, and perceptions of child temperament. Although most applications of the developmental niche theory have involved vastly different societies (e.g., rural East African communities and Western/industrialized countries), there are some notable exceptions of its generalization to more similar cultures (Super et al., 2008).

The study of cultural influences on temperament has also focused on comparisons among largely different cultures, such as those with Eastern/collectivistic and Western/individualistic values (Ho, 1986; Ho & Kang, 1984; Hsu et al., 1981; Markus & Kitayama, 1994). There has been little systematic study of Russian children’s temperament from the cross-cultural perspective (Digman & Shmelyov, 1996; Slobodskaya, 1995), especially in infancy (Kolpakov, Makarov, Khryachkova, Chuguy, & Chepkasov, 1984; Kolpakov et al., 1987), despite the fact that research in cultures with mixed values, such as Russia, can provide important information regarding cultural influences.

Surprisingly, systematic differences in parenting between individualistic and collectivistic societies have been demonstrated. Socialization contexts in infancy occurring in collectivistic cultures have been described as focusing on emotional warmth and proximity that foster acceptance of the group’s norms and values (Keller, 2002; Keller et al., 2004). Caregivers in collectivistic societies often respond to their infants’ needs in an anticipatory manner, blurring the self–other distinction. In contrast, caregivers in individualistic cultures tend to use eye contact, object play, and contingency, encouraging the expression of positive emotions. The initiation of an individualistic developmental pathway also leads caregivers to focus on early self-regulation during infancy (Greenfield, Keller, Fuligni, & Maynard, 2003; Keller, 2002; Keller et al., 2004). A study by Gartstein et al. (2010) investigated early development of temperament across four cultures, Japan, the United States, Poland, and Russia, through a cross-sectional design. Selection of these countries presented an opportunity to conduct comparisons between cultures that vary on the individualistic/collectivistic value systems. Parents responded to the IBQ-R, with US and Polish infants receiving the highest ratings for a number of positive affectivity/surgency dimensions: smiling and laughter, high-intensity pleasure, perceptual sensitivity, approach, and vocal reactivity. Japanese and Russian infants were characterized as demonstrating the highest and the second highest levels of fearfulness, respectively, with US and Polish infants receiving relatively lower ratings from their caregivers. Age and gender differences were observed across all four cultures. Significant gender differences emerged for high-intensity pleasure and approach, with males receiving higher scores than females. Older infants were perceived by their caregivers as exhibiting higher levels of distress to limitations and fear compared to the younger age group.

TEMPERAMENT AND PSYCHOPATHOLOGY

Bates, Schermerhorn, and Petersen (2014) conceptualize temperament as a caption covering of positive and negative reactivity, as well as higher-order self-regulation. Temperament traits are based on individual differences in biological structures and processes. In the domain of temperament, key trait dimensions are: (1) positive emotionality (i.e., variability in approach motivation, activity, and joy); (2) negative emotionality (which includes the dimensions of fearfulness and frustration/anger); and (3) self-regulation (centered on effortful attention). In the domain of developmental psychopathology, the key trait dimensions are: (1) externalizing behavioral problems that consist of overassertive, aggressive, oppositional, and

attention-demanding behaviors, as well as rule-breaking behaviors, and (2) internalizing behavioral problems that consist of fearful, stressful, anxious, and depressed behaviors.

Bates et al. (2014) propose a *social process model* of temperament in psychopathology. In employing the model in psychopathology, they attempt to identify parallel correspondences between temperament and parenting, temperament and adjustment, and parenting and adjustment dimensions. The model would suggest that temperamental dispositions toward high levels of approach, reward seeking, excessive efforts to control others, and frustrated emotion would be associated with externalizing problems; that temperamental dispositions toward fearful emotion, safety seeking, and behavioral inhibition would be associated with internalizing problems; and that temperamental dispositions toward low levels of effortful self-regulation would be associated with both externalizing and internalizing problems. Low effortful control—perhaps expressed as low ability to direct attention away from a positive goal or a minor threat—would lead to conflicts between the child and environment, perhaps developmentally earlier in the case of failure to self-regulate impulsive action (an aggressive child would likely cause early difficulties for the family) and perhaps later in the case of failure to regulate fearfulness (parents can avoid conflict in the short term by overprotecting an overly fearful child but put the child at risk in later developmental tasks).

There are two major ways in which temperament is related to adjustment: direct, linear connections and indirect, nonlinear ones. Based on the evidence of temperament-adjustment links emerging through several longitudinal studies in the 1980s, the authors proposed the *differential linkage model* in which the various temperament traits predict conceptually related dimensions of psychopathology (Bates, 1989). In particular, fearful dimensions of temperament are assumed to predict later internalizing problems better than they predict externalizing problems. With regard to the self-regulation dimensions of temperament, it is assumed that they inversely predict future externalizing problems better than they predict internalizing problems.

The differential linkage of temperament and adjustment is paralleled by the general findings of differential linkages between adjustment variables across time (i.e., early internalizing predicting later internalizing better than externalizing and vice versa) (Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003). Early temperaments could also influence the development of adjustment via impact on environmental factors. For example, Buss (2011) demonstrated that toddlers' fearful temperament predicted social withdrawal at age 5 years via mothers' protective behavior in toddlerhood.

Attachment, temperament, and personality disorders

Personality disorders are closely related to interpersonal functions. Thus, most *DSM-IV* personality disorders can be encompassed into an attachment-oriented model describing mental models of self and other, patterns of affect regulation, and behavior in close relationships (e.g., Shorey & Snyder, 2006). Attachment theory has generated what is now a diverse cross-disciplinary and translational research enterprise incorporating ethology, evolutionary biology, genetics/epigenetics functional brain imaging, psychiatric diagnosis, psychotherapy, and psychopharmacology (e.g., Bartz et al., 2011; Shorey & Snyder, 2006; Van Ijzendoorn, Caspers, Bakermans-Kranenburg, Beach, & Philibert, 2010). The relationships between temperament, personality, and attachment have been studied in a variety of normal (Chotai, Jonasson, Hagglof, & Adolfs-son, 2005; Martinotti et al., 2008) and psychiatric samples (e.g., Marazziti et al., 2007; Riggs et al., 2007).

In a study, MacDonald, Berlow, and Thomas (2013) investigated the ways two attachment dimensions (attach anxiety and attach avoidance) correlated with measures of temperament and personality in 357 psychiatric outpatients. The authors conducted a retrospective review of four questionnaires: the Experiences in Close Relationship scale (ECR-R), TCI, TEMPS-A, and Personality Self Portrait Questionnaire. The results demonstrated significant correlations between attachment anxiety and (1) several negative affective temperaments (dysthymic and cyclothymic), (2) several indexes of personality pathology [low self-directedness (TCI), *DSM-IV* paranoid, borderline, histrionic, avoidant, and dependent personality traits]. In an exploratory model, the negative predictive value of attachment security for a personality disorder was 86% (MacDonald et al., 2013).

Depression, temperament, and cognition

Integrated affective-cognitive models of depression have suggested that the effects of temperament on depression may be mediated by using maladaptive cognitive strategies in response to life events. Research indicates that temperament is a vulnerability factor for psychopathology in general and for depression in particular (Compas, Connor-Smith, & Jaser, 2004; Muris & Ollendick, 2005). Trait negative affectivity has been found to be significantly involved in the development of depressive symptoms. Negative affectivity is described as a trait tendency to experience more frequent, intense, and prolonged negative emotions and to demonstrate sensitivity to novel or aversive cues (e.g., Rothbart & Bates, 2006). For example,

a study of young adults found that high negative affectivity predicted greater depressive symptoms over 3 months (Loh, Schutte, & Thornsteinsson, 2014). Recently, research has begun to examine the relationship between trait positive affectivity and depression. Positive affectivity is uniquely associated with depression above and beyond the effects of high trait negative affectivity (Feldman, Joormann, & Johnson, 2008).

Affective-cognitive theories of depression suggest that the effects of temperament on depression may be mediated through the application of maladaptive cognitive strategies (Gotlib & Joormann, 2010). A common type of cognitive strategy is *rumination*. *Brooding*, the more maladaptive component of rumination, is the passive focus on negative emotions, thoughts, and events (Treyner, Gonzalez, & Nolen-Hoeksema, 2003). Research has revealed that brooding mediates the relationship between negative affectivity and depression (Arger, Sanchez, Simonson, & Mezulis, 2012; Hudson, Harding, & Mezulis, 2015). Another maladaptive cognitive strategy that may mediate the relationship between positive affectivity and depression is *dampening*. Dampening is the tendency to distract or redirect attention away from positive emotion in order to reduce it (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Individuals may dampen positive emotions for a variety of reasons, such as remaining consistent with their self-image or attribution style or if they believe they do not deserve to experience the positive emotion (e.g., Hayden, Klein, Durbin, & Olino, 2006). Dampening has been found to reduce state positive affectivity and predict greater depressive symptoms (e.g., Raes, Daems, Feldman, Johnson, & Van Gucht, 2009; Werner-Seidler, Banks, Dunn, & Moulds, 2013). Dampening has also been found to correlate with brooding (Hudson et al., 2015; Johnson, McKenzie, & McMurrich, 2008), suggesting that dampening may also be related to negative affectivity. Future research should consider temperament traits and cognitive strategy jointly to gain a better understanding the development and maintenance of depression (Hudson et al., 2015).

Temperament and Mood Disorders

Zaninotto et al. (2015) conducted a systematic review of literature and a random effects metaanalysis of studies comparing at least two of the following groups: (1) adults with a primary mood diagnosis, such as bipolar disorder (BPD) or major depressive disorder (MDD), (2) their unaffected siblings (SIBs), or (3) “healthy” subjects (HS). Most studies employed the Tridimensional Personality Questionnaire (TPQ) and the TCI. The results confirmed that high harm avoidance (HA) and low self-directedness (SD) are personality markers that are consistently associated with mood disorders (e.g., Harley, Wells, Frampton, & Joyce, 2011; Zaninotto et al., 2015).

According to two metaanalyses (e.g., Kampman & Poutanen, 2011; Sasayama et al., 2011), it was confirmed that both HA and SD dimensions manifested mood-state dependence. The metaanalytic results revealed that SIBs were characterized by higher HA and lower SD than HS, suggesting that personality traits are key vulnerability factors for mood disorders (e.g., Kampman & Poutanen, 2011). Increased HA and low SD might also contribute to the vulnerability to some other HS. According to Cloninger, Zohar, and Cloninger (2010), different mood disorders are associated with distinct multidimensional profiles of personality traits. For example, the profile associated with mood appears to overlap with the personality profile of individuals with an obsessional personality disorder: mood patients are characterized by a methodological temperament [i.e., high HA, low novelty seeking (NS), low reward dependence (RD)] and by a character profile considered standard of PD in general [i.e., low SD, low cooperativeness (CO)] (American Psychiatric Association, 2013; Cloninger, Zohar, Hirschmann, & Dahan, 2012).

BPD individuals were characterized by higher levels in NS, being more extravagant, impulsive, and disorderly than HS, SIB, and MDD subjects (e.g., Serretti, Calati, Mandelli, & De Ronchi, 2006). Increased self-transcendence (ST) was found in BPD and SIB, while MDD subjects were characterized by lower ST levels. ST is a complex transpersonal construct (Garcia-Romeu, 2010) that has been defined as “the extent to which a person identifies the self as an integral part of the universe as a whole” (Cloninger et al., 1993, p. 975). According to Cloninger’s theory (Cloninger, 1994), high ST in the presence of high SD and CO may be an adaptive personality trait, leading to a mature creativity and spirituality (Cloninger, 2013; Cloninger & Zohar, 2011). Furthermore, high ST is considered psychologically adaptive in old age as issues of mortality and loss arise (Cloninger et al., 1993; Tornstam, 1996). Some studies have found an inverse relationship between ST and depressive symptoms (e.g., Ellerman & Reed, 2001), which may explain the results of the different profile of BPD and MDD subjects. For the same reason, increased ST in BPD may also depend on the presence of subthreshold manic symptoms. When high ST is not present together with high SD and CO, the unusual, imaginative, and idiosyncratic interpretations to events may be associated with magical ideation and psychotic thought processes (Cloninger et al., 1993). Thus, high ST in the presence of low SD may also suggest either a proneness to psychosis (Bayon, Hill, Svrakic, Przybeck, & Cloninger, 1996) or the presence of residual psychotic symptoms.

Thus, the personality profile associated with BPD, especially BPD with psychotic features, appears to be characterized by approach–avoidance conflicts (high HA and high NS) and vulnerability to moodiness and psychosis (high ST, low CO, and low SD), a personality pattern that has been considered as an indication of schizotypal traits (Smith, Cloninger, Harms,

& Csernansky, 2008). In other words, magical thinking and perceptual aberrations may result from personality traits of low SD and high ST, which are associated with affective disorders, as well as with schizophrenia, suggesting a basis for a partial overlap in vulnerability to these two types of psychosis (Hill et al., 2013; Jabben, Arts, van Os, & Krabbendam, 2010).

No difference was found in temperament and character dimensions between BP-I and BP-II. Previous studies inspired by the FFM of personality also reported no difference between BP-I and BP-II in terms of neuroticism and extraversion (Hecht, van Calker, Berger, & von Zerssen, 1998; Jylhä et al., 2010). Conversely, according to Akiskal's model of temperaments, the hyperthymic temperament may be more common in BP-I than in BP-II subjects (Iasevoli et al., 2013). High NS and HA traits seems to correlate positively with hyperthymic and depressive temperaments, respectively (Maremmanni et al., 2005). High NS and high HA were observed in BPD in general. However, the TCI and the TEMPS-A arise from different perspectives on personality dimensions, and temperament types according to Akiskal are supposed to be multidimensional configurations consisting of elements of both temperament and character (Cloninger et al., 1998; Maremmanni et al., 2005).

Temperament/character traits of ODD and ADHD

Regarding attention-deficit/hyperactivity disorder (ADHD), studies of adults suggest a genetic, neuropsychological, and neuroanatomical parallel between ADHD and specific temperamental and personality traits, such as low conscientiousness, low agreeableness, and high neuroticism (Nigg, 2000, 2001; Nigg & Goldsmith, 1998; Plomin & Caspi, 1999). Recently, the integration of dimensional model with a categorical approach in developmental research and early-onset psychopathology has gained ground (Stringaris, Maughan, & Goodman, 2010; Witkiewitz et al., 2013). In particular, South Korean studies of school-age children with ADHD, based on Cloninger's psychosocial model, indicate a personality profile that is characterized by high novelty seeking (Yoo et al., 2006) and low self-directedness in both the parents' and the children's self-ratings.

Research on the temperament of preschool children with early-onset psychopathology remain controversial (Egger & Angold, 2006). In a recent study, Melegari et al. (2015) attempted to identify dimensional temperament and character profiles that can differentiate the three most frequent psychiatric disorders in preschoolers: anxiety disorders, ADHD, and oppositional defiant disorder (ODD). In contrast, with previous studies that examined multiple bivariate associations, the study adopted a multivariate approach that utilized multiple personality traits to discriminate different psychiatric disorders in preschoolers. In particular, it examined the ability of the temperamental and character dimensions measured by Cloninger's biopsychosocial model (Cloninger et al., 1994) to distinguish preschoolers diagnosed as anxious, ODD, or ADHD.

The discriminant analysis showed that three temperamental dimensions (harm avoidance, novelty seeking, and persistence) enabled the correct classification of 75% of cases within their own group. The ADHD children showed a temperamental profile that was characterized by high novelty seeking, low reward dependence, and low persistence, while the anxious children obtained high scores in harm avoidance. The profiles of the ODD children shared some common features (e.g., high novelty seeking) with the ADHD children, but the ODD children were characterized by higher persistence and harm avoidance compared with ADHD children (Melegari et al., 2015).

Empirical evidence reveals that several disorders (e.g., ODD, ADHD, and anxiety disorders) are often characterized by affective temperamental traits, such as negative emotionality, that moderate the relationship between emotional self-regulation and both positive and negative outcomes (Eisenberg, Fabes, Guthrie, & Reiser, 2000). Regarding ADHD, studies of adults suggest a genetic neuropsychological and neuroanatomical parallel between ADHD and specific temperamental and personality traits, such as low conscientiousness, low agreeableness, and high neuroticism (e.g., Nigg, 2001).

Karalunas et al. (2014) selected temperament measures that are closely to Research Domain Criteria (RDoC) domains. They also demonstrated superior clinical prediction versus existing clinical categories related to ADHD or ADHD with comorbidity. The authors identified three distinct types of ADHD based on temperament profiles: (1) a mild type characterized only by deficits in major ADHD symptom domains; (2) a surgent type characterized by high levels of positive-approach-motivated behaviors and activity level, shorter prejection period (PEP), parasympathetic withdrawal in response to positive emotions, and atypical amygdala connectivity to medial frontal areas; and (3) an irritable type characterized by high levels of negative emotionality, weak parasympathetic response to negative emotionality stimuli, reduced amygdala-insula connectivity, and a doubling of risk for onset of new behavioral or emotional disorders. A promising finding of this study was that the new temperament types of ADHD predicted clinical outcomes.

Temperament and parenting practices and ADHD

Ullsperger, Nigg, and Nikolas (2016) examined the presence of the indirect effects of parenting on child ADHD symptoms via child temperament characteristics. They also examined the indirect role of temperament traits as statistical mediators of

these associations within cross-sectional data. The sample consisted of 498 children 6–17 years of age. The assessment procedure was multistage and multiple-informant that included parent, child, and teacher report measures of parenting practices, child temperament, and ADHD symptoms. The key measures included the *DSM-IV* ADHD Rating Scale (DuPaul, Power, Anastopoulos, & Reid, 1998), which asks informants to rate children on the key features of ADHD (i.e., inattention, hyperactivity, impulsivity); parents also completed the common language version of the California Child Q-Sort (CCQ) (Caspi et al., 1992) to assess youth temperament traits; the Alabama Parenting Question (APQ) was completed by adolescents to assess different dimensions of parenting behaviors (e.g., parental involvement, monitoring, supervision, and consistency of discipline). Results indicated differential patterns of effect for negative and positive parenting dimensions.

First, inconsistent discipline exerted indirect effects on both ADHD symptom dimensions via child conscientiousness, such that higher levels of inconsistency predicted lower levels of conscientiousness, which in turn predicted greater ADHD symptomatology. Similarly, poor supervision also exerted indirect effects on inattention via child conscientiousness, as well as significant indirect effects on hyperactivity and impulsivity via its impact on both child reactive control and conscientiousness. In contrast, primarily direct effects of positive parenting (i.e., involvement) on ADHD emerged.

Temperament and autism spectrum disorders

Adopting an individual differences approach can contribute the understanding of heterogeneity observed within autism spectrum disorders (ASDs), and thus the construct of temperament is often found in the relevant literature. Mundy, Henderon, Inge, and Coman (2007) proposed a “modifier model” of autism. According to this model, modifier processes influence symptom expression, contributing to behavioral variability. Temperament is proposed as one such modifier along with other factors, such as socialization and cognitive style. Temperament traits as studied by age-appropriate instruments, such as the IBQ-R (Gartstein & Rothbart, 2003), Middle Childhood Temperament Questionnaire the ECBQ (Putnam et al., 2006), and the CBQ (Rothbart et al., 2001), appear to cluster around three broad factors: surgency, negative affectivity, and effortful control.

Existing research on infant temperament comes mostly from retrospective studies. Such studies using home video point to very early differences in the attention and affect of infants developing ASD (e.g., Clifford & Dissanayake, 2008), while retrospective parent reports have suggested that these infants demonstrate a lack of positive affect and increased negative affect (e.g., Clifford & Dissanayake, 2008) compared to controls. Additionally, they exhibited greater detachment, hypersensitivity, impulsivity, and self-regulatory impairments (Gomez & Baird, 2005).

Existing findings provide evidence of the potential benefits to be gained by adopting an individual differences approach to ASD research. A study by Clifford et al. (2013) investigated early temperament in 54 infants at familiar high risk for ASD and 50 controls. Parental report of temperament was examined at around 7, 14, and 24 months of age, and diagnostic assessment was conducted at 3 years. High-risk infants diagnosed with ASD were distinguished from controls by a temperament profile marked by increased perceptual sensitivity from the first year of life, and increased negative affect and reduced cuddliness in the second year of life.

Temperament and its relation to schizophrenia

One of the most prominent problems in schizophrenia is severe impairment in social functioning (Pallanti, Quercioli, & Hollander, 2004). Some researchers have suggested that premorbid and/or morbid features of personality may interact with the clinical symptomatology of schizophrenia in ways that either increase risk or provide a protective buffer for social functioning impairment (e.g., Jetha, Schmidt, & Goldberg, 2007). Several studies have investigated differences between patients with schizophrenia and controls. On the whole, these studies have documented higher levels of avoidance styles of responding (e.g., introversion, harm avoidance, and shyness) and reduced levels of approach-related styles of responding (e.g., extraversion, novelty seeking, and sociability) in patients than in controls (e.g., Berenbaum & Fujita, 1994; Guillem, Bicu, Semkovska, & Debruille, 2002). Research that has examined within-group relations proposes that patients high on extroversion or low on neuroticism may be at reduced risk for symptom severity and emotional discomfort (Lysaker, Bell, Kaplan, Greig, & Bryson, 1999).

Several studies have assessed differences on temperament dimensions between individuals with schizophrenia and controls (Guillem et al., 2002; Kurs, Farkas, & Ritsner, 2005; Margetić, Jakovljević, Ivanec, & Margetić, 2011; Smith et al., 2008) and have consistently reported patients to be higher on harm avoidance, a broad dimension measuring a tendency toward avoidant behavior (e.g., cautious, shy, fearful, and passive) than controls. A few of these studies have also reported patients to be lower on reward dependence, a broad dimension measuring a tendency to be warm, sensitive, dedicated, and socially attached (Kurs et al., 2005; van Ammers, Sellman, & Mulder, 1997) and lower on novelty seeking, a

temperament dimension measuring a tendency toward exploratory, impulsive, extravagant, and enthusiastic behavior, than controls (Margetić et al., 2011). Studies that have included the character dimensions of the TCI have generally reported patients with schizophrenia to be lower on self-directedness (characterized by the concept of self as autonomous) and cooperativeness (characterized by the concept of self in society) and higher on self-transcendence (characterized by the concept of self in the universe) than controls (Margetić et al., 2011; Smith et al., 2008). Research examining within-group relations has reported that greater harm avoidance, lower self-directedness, and/or greater self-transcendence are associated with reduced subjective and objective reports of quality of life (Eklund, Hansson, & Bengtsson-Tops, 2004; Margetić et al., 2011). The robustness of harm avoidance in differentiating patients and controls and in accounting for variance in social functioning has led to the consideration of harm avoidance as a schizophrenia-related endophenotype (Smith et al., 2008). In addition to the broad dimensional personality measures described earlier, specific personality traits may also be assessed. For example, shyness is a trait construct of personality that has received increased attention over the past 3 decades. Shyness is characterized by active avoidance of social interactions, preoccupation with real or imagined social evaluation, and a variety of psychophysiological correlates, such as increased levels of the basal stress hormone cortisol, increased heart rate and startle responses, and greater relative resting right frontal electroencephalogram (EEG) activity (Schmidt, Polak, & Spooner, 2005). Extensive longitudinal and cross-sectional studies examining the behavioral, cognitive, and biological correlates of shyness have been conducted with healthy children and adults (Kagan, 1999; Schmidt & Fox, 1999).

TEMPERAMENT, COPING, AND RESILIENCE

Although researchers have consistently examined ways in which temperament and personality contribute to the development of problem behaviors and psychopathology (e.g., Carver & Connor-Smith, 2010; Nigg, 2006; Rothbart, 2011), research has revealed that children who have an easy temperament are less prone to develop both internalizing and externalizing problems (e.g., Jaffee, Caspi, Moffitt, Polo-Tomás, & Taylor, 2007). One should speculate as to whether temperamental traits may also serve as protective factors from mental illness. From the first days of life, easy temperament assists infants to participate in effective interpersonal coping: distress signals are moderate and meaningful and thus more transformed into directed distress communications, and infants are more easily comforted and satisfied by caregivers' coping efforts on their behalf (Rothbart, 2011).

From a coping perspective, significant temperamental classifications are those that focus on reactivity and regulation (e.g., Rothbart, 2011; Rueda & Rothbart, 2009; Shannon, Beauchaine, Brenner, Neuhaus, & Gatzke-Kopp, 2007). In this context "reactivity" is closely linked to stress reactivity—that is, how easily the appetitive/approach and the defensive/inhibitory systems can be generated from external and internal stimuli. "Regulation" is closely linked to action regulation—that is, the effectiveness of the executive attention system in facilitating the control of emotional, motor, and attentional reactivity (Rueda & Rothbart, 2009).

Derryberry, Reed, and Pilkenton-Taylor (2003) indicate that:

the appetitive and defensive systems can be viewed as relatively primitive 'coping' systems. The defensive system is designed to help the person cope with dangerous situations where it is crucial to recognize the threat, inhibit inappropriate responses and find a source of safety. In contrast, the appetitive system is designed to help the person attain positive outcomes in appetitive contexts, where it is crucial to avoid or overcome obstacles in order to obtain the reward (p. 1052).

A growing body of research has focused on the associations between coping and temperament or personality during childhood and adolescence. Notably, the researchers have investigated whether specific coping strategies are associated with particular temperamental or personality traits, such as negative emotionality, neuroticism, effortful control, or introversion (Markovic, Rose-Krasnor, & Coplan, 2013). For example, most of these studies demonstrate that an easy temperament is associated with constructive ways of coping like problem solving and support seeking (Zimmer-Gembeck, Lees, & Skinner, 2011) and with resilience (e.g., Luthar, 2006). In contrast, more "difficult" temperaments that involve high reactivity and poor regulation can inhibit effective coping strategies (Rothbart, 2011).

Two well-known coping strategies are *engagement* and *disengagement*. Engagement strategies include approach-oriented, active strategies for handling stressors, such as problem solving, support seeking, and distraction, and disengagement strategies include avoidance-oriented attempts at distancing oneself from the stressors, such as withdrawal, denial, or substance abuse (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

Children's temperament traits are associated with their capacities for coping with daily stress. As articulated by Derryberry et al. (2003), temperament itself may be viewed as an early version of coping: the positive reactivity associated with positive emotionality and the negative reactivity associated with negative emotionality are both adaptive means of responding to and coping with rewarding and potentially threatening situations, respectively, and effortful control offers a

more direct means of self-regulation in response to stress. A metaanalysis (Connor-Smith & Flachsbart, 2007) explored the relations between temperament and personality traits, and, in particular, coping styles in youths and adults; temperament and personality traits were categorized together into the Big Five traits. In general, the associations between traits and coping were modest in magnitude. Extraversion was associated with numerous markers of engagement coping, neuroticism with numerous markers of disengagement coping and high expression of negative emotions, and conscientiousness with problem solving and cognitive restructuring.

Traits related to self-regulation seem to be especially important for children's developing coping skills (Buckner, Mez-zacappa, & Beardslee, 2009). There is some evidence, for example, that effortful control may lead to diminished behavior problems, mediated in part by effortful control's positive impact on engagement coping and dampening of involuntary responses to stress (Valiente, Lemery-Chalfant, & Swanson, 2009). There are some interesting studies that focus on whether coping serves as a moderator or mediator in the connections between temperament and psychopathology. For example, in one longitudinal study of preadolescents, avoidant coping mediated the impact of impulsivity on severe internalizing problems (Thompson, Zalewski, & Lengua, 2014).

SUMMARY

This chapter opened with the presentation of major temperament traits and types. Traditional models include the behavioral styles approach, the emotion regulation model, the tridimensional temperament model, the neurobiological developmental approach, and Kagan's behavioral inhibition model. Contemporary theories include the RTT, Akiskal affective temperaments model, and the Functional Ensemble of Temperament model. Special emphasis is given on the relation between temperament and culture, as well as temperament and psychopathology. Finally, the potential role of temperament traits as protective factors and the role of the coping strategies of engagement and disengagement, as well as self-regulation are discussed.

REFERENCES

- Ablow, J. C., & Measelle, J. R. (1993). *The Berkeley Puppet Interview: Administration and scoring manuals*. Berkeley, CA: University of California.
- Ahadi, S. A., & Rothbart, M. K. (1994). Temperament, development and the Big Five. In C. F. Halverson, G. A. Kohnstamm, & R. P. Martin (Eds.), *The developing structure of temperament and personality from infancy to adulthood* (pp. 189–207). Hillsdale, NJ: Lawrence Erlbaum.
- Ahadi, S. A., Rothbart, M. K., & Ye, R. (1993). Children's temperament in the U.S. and China: similarities and differences. *European Journal of Personality*, 7(5), 359–378.
- Akiskal, K. K., & Akiskal, H. S. (2005a). The theoretical underpinnings of affective temperaments: implications for evolutionary foundations of bipolar disorder and human nature. *Journal of Affective Disorders*, 85(1–2), 231–239.
- Akiskal, K. K., & Akiskal, H. S. (2005b). TEMPS: Temperament Evaluation of Memphis, Pisa, Paris and San Diego. *Journal of Affective Disorders*, 85(1–2), 1–2.
- Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005a). TEMPS-A: progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego autoquestionnaire. *Journal of Affective Disorders*, 85, 3–16.
- Akiskal, H. S., Djenderedjian, A. M., Rosenthal, R. H., & Khani, M. K. (1977). Cyclothymic disorder: validating criteria for inclusion in the bipolar affective group. *American Journal of Psychiatry*, 134(11), 1227–1233.
- Akiskal, H. S., Mendlowicz, M. V., Jean-Louis, G., Rapaport, M. H., Keloje, J. R., Gillin, J. C., & Smith, T. L. (2005b). TEMPS-A: validation of a short version of a self-rated instrument designed to measure variations in temperament. *Journal of Affective Disorders*, 85(1–2), 45–52.
- Akiskal, H. S., Placidi, G. F., Signoretta, S., Liguori, A., Gervasi, R., Maremmiani, I., & Puzantian, V. R. (1998). TEMPS-I: delineating the most discriminant traits of cyclothymic, depressive, irritable and hyperthymic temperaments in a nonpatient population. *Journal of Affective Disorders*, 51(1), 7–19.
- Aksan, N., Goldsmith, H. H., Smider, N. A., Essex, M. J., Clark, R., Hyde, J. S., Klein, M. H., & Vandell, D. L. (1999). Derivation and prediction of temperamental types among preschoolers. *Developmental Psychology*, 35(4), 958–971.
- Althoff, R. R., Ayer, L. A., Crehan, E. T., Rettew, D. C., Baer, J. R., & Hudziak, J. J. (2012). Temperamental profiles of dysregulated children. *Child Psychiatry & Human Development*, 43(4), 511–522.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)*. Washington, DC: American Psychiatric Publishing.
- Arger, C., Sanchez, O., Simonson, J., & Mezulis, A. (2012). Section 1: mental & physical health—pathways to depressive symptoms in young adults: examining affective, self-regulatory, and cognitive vulnerability factors. *Psychological Reports*, 111(2), 335–348.
- Aron, E. N. (2002). *The highly sensitive child*. New York, NY: Broadway Books.
- Asendorpf, J. B., & Denissen, J. J. A. (2006). Predictive validity of personality types versus personality dimensions from early childhood to adulthood: implications for the distinction between core and surface traits. *Merrill-Palmer Quarterly*, 52(3), 486–513.
- Asendorpf, J. B., & van Aken, M. A. (1999). Resilient, overcontrolled, and undercontrolled personality prototypes in childhood: replicability, predictive power, and the trait-type issue. *Journal of Personality and Social Psychology*, 77(4), 815–832.
- Ball, S. A., Tennen, H., Poling, J. C., Kranzler, H. R., & Rounsaville, B. J. (1999). Personality, temperament, and character dimensions and the DSM-IV personality disorders in substance abusers. *Journal of Abnormal Psychology*, 106(4), 545–553.
- Bartz, J., Simeon, D., Hamilton, H., Kim, S., Crystal, S., Braun, A., & Hollander, E. (2011). Oxytocin can hinder trust and cooperation in borderline personality disorder. *Social Cognitive and Affective Neuroscience*, 6(5), 556–563.

- Bates, J. E. (1989). Applications of temperament concepts. In G. A. Kohnstamm, J. E. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 321–355). Chichester, UK: Wiley.
- Bates, J. E., Freeland, C. A. B., & Lounsbury, M. L. (1979). Measurement of infant difficultness. *Child Development*, *50*(3), 794–803.
- Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2014). Temperament concepts in developmental psychopathology. In M. Lewis, & K. Rudolph (Eds.), *Handbook of developmental psychopathology* (3rd ed., pp. 311–329). New York, NY: Guilford Press.
- Bayon, C., Hill, K., Svrakic, D. M., Przybeck, T. R., & Cloninger, C. R. (1996). Dimensional assessment of personality in an out-patient sample: relations of the systems of Millon and Cloninger. *Journal of Psychiatric Research*, *30*(5), 341–352.
- Berenbaum, H., & Fujita, F. (1994). Schizophrenia and personality: exploring the boundaries and connections between vulnerability and outcome. *Journal of Abnormal Psychology*, *103*(1), 148–158.
- Block, J. (1971). *Lives through time*. Berkeley, CA: Bancroft.
- Block, J. H., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behaviour. In W. A. Collins (Ed.), *Minnesota symposium on child psychology* (pp. 39–101). (Vol. 13). Hillsdale, NJ: Lawrence Erlbaum.
- Brown, T. A. (2007). Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *Journal of Abnormal Psychology*, *116*(2), 313–328.
- Buckley, M. E., Klein, D. N., Durbin, C. E., Hayden, E. R., & Moerk, K. C. (2002). Development and validation of a q-sort procedure to assess temperament and behaviour in preschool-age children. *Journal of Clinical Child and Adolescent Psychology*, *31*(4), 525–539.
- Buckner, J. C., Mezzacappa, E., & Beardslee, W. R. (2009). Self-regulation and its relations to adaptive functioning in low income youths. *American Journal of Orthopsychiatry*, *79*(1), 19–30.
- Buss, D. M. (2011). *Evolutionary psychology: The new science of the mind* (4th ed.). Needham Heights, MA: Allyn & Bacon.
- Buss, A., & Plomin, R. (1975). *A temperament theory of personality development*. New York, NY: Wiley.
- Buss, A., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Lawrence Erlbaum.
- Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an early adolescent temperament measure. *Journal of Early Adolescence*, *12*(2), 153–173.
- Carey, W. B. (1998). Temperament and behaviour problems in the classroom. *School Psychology Review*, *27*(4), 522–533.
- Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, *61*(1), 679–704.
- Caspi, A., Block, J., Block, J. H., Klopp, B., Lynam, D., Moffitt, T. E., & Stouthamer-Loeber, M. (1992). A “common-language” version of the California Child Q-set for personality assessment. *Psychological Assessment*, *4*(4), 512–523.
- Caspi, A., & Shiner, R. L. (2006). Personality development. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (pp. 300–365). (Vol. 3). New York, NY: Wiley.
- Caspi, A., & Silva, P. A. (1995). Temperamental qualities at age three predict personality traits in young adulthood: longitudinal evidence from a birth cohort. *Child Development*, *66*(2), 486–498.
- Celikel, F. C., Koseb, S., Cumurcu, B. E., Erkokmaz, U., Sayard, K., Borckardt, J. J., & Cloninger, C. R. (2009). Cloninger’s temperament and character dimensions of personality in patients with major depressive disorder. *Comprehensive Psychiatry*, *50*(6), 556–561.
- Chapman, B. P., & Goldberg, L. R. (2011). Replicability and 40-year predictive power of childhood ARC types. *Journal of Personality and Social Psychology*, *101*(3), 593–606.
- Chess, S., & Thomas, A. (1966). *Temperament: Theory and practice*. New York, NY: Psychology Press.
- Chotai, J., Jonasson, M., Hagglof, B., & Adolfsson, R. (2005). Adolescent attachment styles and their relation to the temperament and character traits of personality in a general population. *European Psychiatry*, *20*(3), 251–259.
- Clark, R., Hyde, J. S., Essex, M. J., & Klein, M. H. (1997). Length of maternity leave and quality of mother-infant interactions. *Child Development*, *68*(2), 364–383.
- Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*(1), 103–116.
- Clifford, S. M., & Dissanayake, C. (2008). The early development of joint attention in infants with autistic disorder using home video observations and parental interview. *Journal of Autism and Developmental Disorders*, *38*(5), 791–805.
- Clifford, S. M., Hudry, K., Elsabbagh, M., Charman, T., & Johnson, M. H. BASIS Team. (2013). Temperament in the first 2 years of life in infants at high-risk for autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *43*(3), 673–686.
- Cloninger, C. R. (1986). A unified biosocial theory of personality and its role in the development of anxiety states. *Psychiatric Developments*, *4*(3), 167–226.
- Cloninger, C. R. (1987). A systematic method for clinical description and classification of personality variants: a proposal. *Archives of General Psychiatry*, *44*(6), 573–588.
- Cloninger, C. R. (1994). Temperament and personality. *Current Opinion in Neurobiology*, *4*(2), 266–273.
- Cloninger, C. R. (1999). *The temperament and character inventory—revised*. St. Louis, MO: Center for Psychobiology of Personality, Washington University.
- Cloninger, C. R. (2004). *Feeling good: The science of well-being*. New York, NY: Oxford University Press.
- Cloninger, C. R. (2010). From the guest editor. *Focus* *3*, *8*(2), 161–163.
- Cloninger, C. R. (2013). What makes people healthy, happy, and fulfilled in the face of current world challenges? *Mens Sana Monographs*, *11*(1), 16–24.
- Cloninger, C. R., Przybeck, T. R., Svrakic, D. M., & Wetzel, R. D. (1994). *The Temperament and Character Inventory (TCI): A guide to its development and use*. St. Louis, MO: Centre for Psychobiology of Personality.
- Cloninger, C. R., Svrakic, D. M., & Przybeck, T. R. (1993). A psychobiological model of temperament and character. *Archives of General Psychiatry*, *50*(12), 975–990.
- Cloninger, C. R., Svrakic, N. M., & Svrakic, D. M. (1997). Role of personality self organization in development of mental order and disorder. *Development and Psychopathology*, *9*(4), 881–906.

- Cloninger, C. R., Van Eerdewegh, P., Goate, A., Edenberg, H. J., Blangero, J., Hesselbrock, V., & Crowe, R. (1998). Anxiety proneness linked to epistatic loci in genome scan of human personality traits. *American Journal of Medical Genetics*, *81*(4), 313–317.
- Cloninger, C. R., & Zohar, A. H. (2011). Personality and the perception of health and happiness. *Journal of Affective Disorders*, *128*(1–2), 24–32.
- Cloninger, C. R., Zohar, A. H., & Cloninger, K. M. (2010). Promotion of well-being in person-centred mental health care. *Focus*, *8*(2), 165–179.
- Cloninger, C. R., Zohar, A. H., Hirschmann, S., & Dahan, D. (2012). The psychological costs and benefits of being highly persistent: personality profiles distinguish mood disorders from anxiety disorders. *Journal of Affective Disorders*, *136*(3), 758–766.
- Compas, B. E., Connor-Smith, J., & Jaser, S. S. (2004). Temperament, stress reactivity, and coping: implications for depression in childhood and adolescence. *Journal of Clinical Child & Adolescent Psychology*, *33*(1), 21–33.
- Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: problems, progress, and potential in theory and research. *Psychological Bulletin*, *127*(1), 87–127.
- Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: a meta-analysis. *Journal of Personality and Social Psychology*, *93*(6), 1080–1107.
- Constantino, J. N., Cloninger, C. R., Clarke, A. R., Hashemi, B., & Przybeck, T. (2002). Application of the seven-factor model of personality to early childhood. *Psychiatry Research*, *109*(3), 229–243.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PIR) and NEO Five Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- De Fruyt, F., Mervielde, I., & van Leeuwen, K. G. (2002). The consistency of personality type classification across samples and five-factor measures. *European Journal of Personality*, *16*(Suppl. 1), S57–S72.
- De Pauw, S. S. W., Mervielde, I., & Van Leeuwen, K. G. (2009). How are traits related to problem behaviour in preschool children? Similarities and contrasts between temperament and personality. *Journal of Abnormal Child Psychology*, *37*(3), 309–325.
- Deal, J. E., Halverson, C. F., Martin, R., Victor, J., & Baker, S. (2007). The Inventory of Children's Individual Differences: development and validation of a short version. *Journal of Personality Assessment*, *89*(2), 162–166.
- Degnan, K. A., Hane, A. A., Henderson, H. A., Moas, O. L., Reeb-Sutherland, B. C., & Fox, N. A. (2011). Longitudinal stability of temperamental exuberance and social-emotional outcomes in early childhood. *Developmental Psychology*, *47*(3), 765–780.
- Dennissen, J. J., Asendorpf, J. B., & van Aken, M. A. (2008). Childhood personality predicts long-term trajectories of shyness and aggressiveness in the context of demographic transitions in emerging adulthood. *Journal of Personality*, *76*(1), 67–99.
- Depue, R. A., & Morrone-Strupinsky, J. V. (2005). A neurobehavioural model of affiliate bonding: implications for conceptualizing a human trait of affiliation. *Journal of Behavioural and Brain Sciences*, *28*(3), 313–350.
- Derryberry, D., Reed, M. A., & Pilkenton-Taylor, C. (2003). Temperament and coping: advantages of an individual differences perspective. *Development and Psychopathology*, *15*(4), 1049–1066.
- Derryberry, D., & Rothbart, M. K. (1988). Arousal, affect, and attention as components of temperament. *Journal of Personality and Social Psychology*, *55*(6), 958–966.
- DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology*, *93*(5), 880–896.
- Digman, J. M. (1990). Personality structure: emergence of the five-factor model. *Annual Review of Psychology*, *41*(1), 417–440.
- Digman, J. M., & Shmelyov, A. G. (1996). The structure of temperament and personality in Russian children. *Journal of Personality and Social Psychology*, *71*(2), 341–351.
- Duckworth, A. L., & Allred, K. M. (2012). Temperament in the classroom. In R. L. Shiner, & M. Zentner (Eds.), *Handbook of temperament* (pp. 627–644). New York, NY: Guilford Press.
- DuPaul, G. J., Power, T. J., Anastopoulos, A. D., & Reid, R. (1998). *ADHD rating scale-IV: Checklists, norms, and clinical interpretation*. New York, NY: Guilford Press.
- Dyson, M. W., Olino, T. M., Durbin, C. E., Goldsmith, H. H., & Klein, D. N. (2012). The structure of temperament in preschoolers: a two-stage factor analytic approach. *Emotion*, *12*(1), 44–57.
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioural disorders in preschool children: presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry*, *47*(3–4), 313–337.
- Egger, H. L., Ascher, B. H., & Angold, A. (1999). *The preschool age psychiatric assessment: Version 1.1. Unpublished interview schedule*. Durham, NC: Centre of Developmental Epidemiology, Department of Psychiatry and Behavioural Science, Duke University Medical Centre.
- Eiden, R. D., Edwards, E. P., & Leonard, K. E. (2004). Predictors of effortful control among children of alcoholic and nonalcoholic fathers. *Journal of Studies on Alcohol*, *65*(3), 309–319.
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: their role in predicting quality of social functioning. *Journal of Personality and Social Psychology*, *78*(1), 136.
- Eisenberg, N., Fabes, R. A., Murphy, B., Karbon, M., Smith, M., & Maszk, P. (1996a). The relations of children's dispositional empathy-related responding to their emotionality, regulation, and social functioning. *Developmental Psychology*, *32*(2), 195–209.
- Eisenberg, N., Fabes, R. A., Murphy, B. C., Karbon, M., Wosinski, M., Polazzi, L., & Juhnke, C. (1996b). The relations of children's dispositional prosocial behavior to emotionality, regulation, and social functioning. *Child Development*, *67*(3), 974–992.
- Eisenberg, N., Fabes, R. A., Shepard, S. A., Guthrie, I. K., Murphy, B. C., & Reiser, M. (1999). Parental reactions to children's negative emotions: longitudinal relations to quality of children's social functioning. *Child Development*, *70*(2), 513–534.
- Eisenberg, N., Spinrad, T. L., Eggum, N. D., Silva, K. M., Reiser, M., Hofer, C., & Michalik, N. (2010). Relations among maternal socialization, effortful control, and maladjustment in early childhood. *Development and Psychopathology*, *22*(3), 507–525.

- Eklund, M., Hansson, L., & Bengtsson-Tops, A. (2004). The influence of temperament and character on functioning and aspects of psychological health among people with schizophrenia. *European Psychiatry, 19*(1), 34–41.
- Ellerman, C. R., & Reed, P. G. (2001). Self-transcendence and depression in middle age adults. *Western Journal of Nursing Research, 23*(7), 698–713.
- Ellis, L. K., & Rothbart, M. K. (2001). Revision of the Early Adolescent Temperament Questionnaire. In *Poster presented at the biennial meeting of the Society for Research in Child Development, Minneapolis, MN*.
- Erfurth, A., Gerlach, A. L., Hellweg, I., Boenigk, I., Michael, N., & Akiskal, H. S. (2005). Studies on a German (Munster) version of the temperament auto-questionnaire TEMPS-A: construction and validation of the brief TEMPS-M. *Journal of Affective Disorders, 85*(1–2), 53–69.
- Evans, D. E., & Rothbart, M. K. (2007). Development of a model for adult temperament. *Journal of Research in Personality, 41*(4), 868–888.
- Fabes, R., Eisenberg, N., Jones, S., Smith, M., Guthrie, I., Poulin, R., Shepard, S., & Friedman, J. (1999). Regulation, emotionality, and preschoolers' socially competent peer interactions. *Child Development, 70*(2), 432–442.
- Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to positive affect: a self-report measure of rumination and dampening. *Cognitive Therapy and Research, 32*(4), 507–525.
- Figureira, M. L., Caeiro, L., Ferro, A., Severino, L., Duarte, P. M., Abreu, M., & Akiskal, K. K. (2008). Validation of the Temperament Evaluation of Memphis, Pisa, Paris and San Diego (TEMPS-A): Portuguese-Lisbon version. *Journal of Affective Disorders, 111*(2–3), 193–203.
- Forgas, J. P. (2008). Affect and cognition. *Perspectives on Psychological Science, 3*(2), 94–101.
- Fullard, W., McDevitt, S. C., & Carey, W. B. (1984). Assessing temperament in one-to-three-year-old children. *Journal of Pediatric Psychology, 9*(2), 205–216.
- Gagne, J. R., Van Hulle, C. A., Aksan, N., Essex, M. J., & Goldsmith, H. H. (2011). Deriving childhood temperament measures from emotion-eliciting behavioural episodes: scale construction and initial validation. *Psychological Assessment, 23*(2), 337–353.
- Garcia-Romeu, A. (2010). Self-transcendence as a measurable transpersonal construct. *Journal of Transpersonal Psychology, 42*(1), 26–47.
- Gartstein, M. A., Bridgett, D. J., Rothbart, M. K., Robertson, C., Iddins, E., Ramsay, K., & Schlect, S. (2010). A latent growth examination of fear development in infancy: contributions of maternal depression and the risk for toddler anxiety. *Developmental Psychology, 46*(3), 651–668.
- Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised Infant Behaviour Questionnaire. *Infant Behaviour and Development, 26*(1), 64–86.
- Gartstein, M. A., Slobodskaya, H. R., & Kinsht, I. A. (2003). Cross-cultural differences in the first year of life: United States of America (U.S.) and Russia. *International Journal of Behavioural Development, 27*(4), 316–328.
- Germeijs, V., & Verschuere, K. (2011). Indecisiveness: specificity and predictive validity. *European Journal of Personality, 25*(5), 295–305.
- Gillespie, N. A., Cloninger, C. R., Heath, A. C., & Martin, N. G. (2003). The genetic and environmental relationship between Cloninger's dimensions of temperament and character. *Personality and Individual Differences, 35*(8), 1931–1946.
- Goldberg, L. R. (1990). An alternative "description of personality": the Big-Five factor structure. *Journal of Personality and Social Psychology, 59*(6), 1216–1229.
- Goldberg, L. R. (2001). Analyses of Digman's child-personality data: derivation of Big-Five factor scores from each of six samples. *Journal of Personality, 69*(5), 709–743.
- Goldsmith, H. H. (1993). Temperament: variability in developing emotion systems. In M. Lewis, & J. M. Haviland (Eds.), *Handbook of emotion* (pp. 353–364). New York, NY: Guilford Press.
- Goldsmith, H. H. (1996). Studying temperament via construction of the Toddler Behaviour Assessment Questionnaire. *Child Development, 67*(1), 218–235.
- Goldsmith, H. H. (2000). *The Toddler Behaviour Assessment Questionnaire Revised*. Madison, WI: Department of Psychology, University of Wisconsin.
- Goldsmith, H. H., Buss, K. A., & Lemery, K. S. (1997). Toddler and childhood temperament: expanded content, stronger genetic evidence, new evidence for the importance of environment. *Developmental Psychology, 33*(6), 891–905.
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., & Chess, S. (1987). What is temperament? Four approaches. *Child Development, 58*(2), 505–529.
- Goldsmith, H. H., & Campos, J. (1982). Toward a theory of infant temperament. In R. Emde, & R. Harmon (Eds.), *Attachment and affiliative systems* (pp. 161–193). New York, NY: Plenum Press.
- Goldsmith, H. H., & Gagne, J. R. (2012). Behavioural assessment of temperament. In M. Zentner, & R. Shiner (Eds.), *The handbook of temperament* (pp. 209–228). New York, NY: Guilford Press.
- Goldsmith, H. H., Reilly, J., Lemery, K. S., Longley, S., & Prescott, A. (1993). *Preliminary manual for the Preschool Laboratory Temperament Assessment Battery. Technical Report*. Madison, WI: Department of Psychology, University of Wisconsin.
- Goldsmith, H. H., & Rothbart, M. K. (1991). Contemporary instruments for assessing early temperament by questionnaire and in the laboratory. In J. Strelau, & A. Angleitner (Eds.), *Explorations in temperament* (pp. 249–272). New York, NY: Plenum Press.
- Goldsmith, H. H., & Rothbart, M. K. (1996). *Prelocomotor and locomotor Laboratory Temperament Assessment Battery (Lab-TAB; version 3.0, Technical Manual)*. Madison, WI: Department of Psychology, University of Wisconsin.
- Goldsmith, H. H., Van Hulle, C. A., Arneson, C. L., Schreiber, J. E., & Gernsbacher, M. A. (2006). A population-based twin study of parentally reported tactile and auditory defensiveness in young children. *Journal of Abnormal Child Psychology, 34*(3), 378–392.
- Gomez, C. R., & Baird, S. (2005). Identifying early indicators for autism in self-regulation difficulties. *Focus on Autism and Other Developmental Disabilities, 20*(2), 106–116.
- Gonda, X., Vazquez, G. H., Akiskal, K. K., & Akiskal, H. S. (2011). From putative genes to temperament and culture: cultural characteristics of the distribution of dominant affective temperaments in national studies. *Journal of Affective Disorders, 131*(1–3), 45–51.
- Gotlib, I. H., & Joormann, J. (2010). Cognition and depression: current status and future directions. *Annual Review of Clinical Psychology, 6*(1), 285–312.

- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford, England: Oxford University Press.
- Gray, J. A. (1991). Neural systems, emotion, and personality. In J. Madden, IV (Ed.), *Neurobiology of learning, emotion, and affect* (pp. 273–306). New York, NY: Raven Press.
- Greenfield, P. M., Keller, H., Fuligni, A., & Maynard, A. (2003). Cultural pathways through universal development. *Annual Review of Psychology*, *54*, 461–491.
- Guillem, F., Bicu, M., Semkovska, M., & Debruille, J. B. (2002). The dimensional symptom structure of schizophrenia and its association with temperament and character. *Schizophrenia Research*, *56*(2), 137–147.
- Halverson, C. F., Havill, V. L., Deal, J., Baker, S. R., Victor, J. B., Pavlopoulos, V., & Wen, L. (2003). Personality structure as derived from parental ratings of free descriptions of children: the Inventory of Child Individual Differences. *Journal of Personality*, *71*(6), 995–1026.
- Harkness, S., & Super, C. M. (1995). Culture and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting, Vol. 2: Biology and ecology of parenting* (pp. 211–234). Hillsdale, NJ: Lawrence Erlbaum.
- Harkness, S., & Super, C. M. (1996). Introduction. In S. Harkness, & C. M. Super (Eds.), *Parents' cultural belief systems: Their origins, expressions, and consequences* (pp. 1–24). New York, NY: Guilford Press.
- Harley, J. A., Wells, J. E., Frampton, C., & Joyce, P. R. (2011). Bipolar disorder and the TCI: higher self-transcendence in bipolar disorder compared to major depression. *Depression Research and Treatment*, *2011*.
- Hayden, E. P., Klein, D. N., Durbin, C. E., & Olino, T. M. (2006). Positive emotionality at age 3 predicts cognitive styles in 7-year-old children. *Development and Psychopathology*, *18*(2), 409–423.
- Heath, A. C., Cloninger, C. R., & Martin, N. G. (1994). Testing a model for the genetic structure of personality: a comparison of the personality systems of Cloninger and Eysenck. *Journal of Personality and Social Psychology*, *66*(4), 762–775.
- Hecht, H., van Calker, D., Berger, M., & von Zerssen, D. (1998). Personality in patients with affective disorders and their relatives. *Journal of Affective Disorders*, *51*(1), 33–43.
- Hegvik, R. L., McDevitt, S. C., & Carey, W. B. (1982). The middle childhood temperament questionnaire. *Development and Behavioural Pediatrics*, *3*(4), 197–200.
- Henderson, H. H., & Wachs, T. D. (2007). Temperament theory and the study of cognition-emotion interactions across development. *Developmental Review*, *27*(3), 396–427.
- Hill, S. K., Reilly, J. L., Keefe, R. S., Gold, J. M., Bishop, J. R., Gershon, E. S., & Sweeney, J. A. (2013). Neuropsychological impairments in schizophrenia and psychotic bipolar disorder: findings from the Bipolar-Schizophrenia Network on Intermediate Phenotypes (B-SNIP) study. *American Journal of Psychiatry*, *170*(11), 1275–1284.
- Ho, D. Y. E. (1986). Chinese patterns of socialization: a critical review. In M. H. Bond (Ed.), *The psychology of Chinese people*. New York, NY: Oxford University Press.
- Ho, D. Y. E., & Kang, T. K. (1984). Intergenerational comparisons of child-rearing attitudes and practices in Hong Kong. *Developmental Psychology*, *20*(6), 1004–1016.
- Howes, O. D., & Murray, R. M. (2014). Schizophrenia: an integrated socio-developmental-cognitive model. *Lancet*, *383*(9929), 1677–1687.
- Hsu, C., Soong, W., Stigler, J. W., Hong, C., & Liang, C. (1981). The temperamental characteristics of Chinese babies. *Child Development*, *52*(4), 1337–1340.
- Hudson, M. R., Harding, K. A., & Mezulis, A. (2015). Dampening and brooding jointly link temperament with depressive symptoms: a prospective study. *Personality and Individual Differences*, *83*, 249–254.
- Hwang, J. Y. (2003). Development of a temperament self-report measure for young children. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *63*(11-B), 5550.
- Iasevoli, F., Valchera, A., Di Giovambattista, E., Marconi, M., Rapagnani, M. P., De Berardis, D., & De Bartolemeis, A. (2013). Affective temperaments are associated with specific clusters of symptoms and psychopathology: a cross-sectional study on bipolar disorder inpatients in acute manic, mixed, or depressive relapse. *Journal of Affective Disorders*, *151*(2), 540–550.
- Jabben, N., Arts, B., van Os, J., & Krabbendam, L. (2010). Neurocognitive functioning as intermediary phenotype and predictor of psychosocial functioning across the psychosis continuum: studies in schizophrenia and bipolar disorder. *Journal of Clinical Psychiatry*, *71*(6), 764–774.
- Jaffee, S. R., Caspi, A., Moffitt, T. E., Polo-Tomás, M., & Taylor, A. (2007). Individual, family, and neighborhood factors distinguish resilient from non-resilient maltreated children: a cumulative stressors model. *Child Abuse & Neglect*, *31*(3), 231–253.
- Jetha, M. K., Schmidt, L. A., & Goldberg, J. O. (2007). Stability of shyness, sociability, and social dysfunction in schizophrenia: a preliminary investigation of the influence of social skills training in a community-based stable outpatient sample. *European Journal of Psychiatry*, *21*(3), 189–198.
- Johnson, S. L., McKenzie, G., & McMurrich, S. (2008). Ruminative responses to negative and positive affect among students diagnosed with bipolar disorder and major depressive disorder. *Cognitive Therapy and Research*, *32*(5), 702–713.
- Josefsson, K., Cloninger, C. R., Hintsanen, M., Jokela, M., Pulkki-Raback, L., & Keltikangas-Järvinen, L. (2011). Associations of personality profiles with various aspects of well-being: a population-based study. *Journal of Affective Disorders*, *133*(1–2), 265–273.
- Josefsson, K., Jokela, M., Cloninger, C. R., Hintsanen, M., Salo, J., Hintsanen, T., Pulkki-Raback, L., & Keltikangas-Järvinen, L. (2013). Maturity and change in personality: developmental trends of temperament and character in adulthood. *Development and Psychopathology*, *25*(3), 713–727.
- Jylhä, P., Mantere, O., Melartin, T., Suominen, K., Vuoriolehto, M., Arvilommi, & Isometsa, E. (2010). Differences in neuroticism and extraversion between patients with bipolar I or II and general population subjects or major depressive disorder patients. *Journal of Affective Disorders*, *125*(1–3), 42–52.
- Kagan, J. (1999). The concept of behavioural inhibition. In L. A. Schmidt, & J. Schulkin (Eds.), *Extreme fear, shyness, and social phobia: Origins, biological mechanisms, and clinical outcomes* (pp. 3–13). New York, NY: Oxford University Press.

- Kagan, J. (2008). The biological contributions to temperaments and emotions. *European Journal of Developmental Science*, 2(1–2), 38–51.
- Kagan, J., Arcus, D., Snidman, N., Feng, W. Y., Hendler, J., & Greene, S. (1994a). Reactivity in infants: a cross-national comparison. *Developmental Psychology*, 30(3), 342–345.
- Kagan, J., & Fox, N. (2006). Biology, culture, and temperamental biases. In W. Damon & R. Lerner (Series Eds.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (6th ed., pp. 99–166). New York, NY: Wiley.
- Kagan, J., Snidman, N., Arcus, D., & Reznick, J. S. (1994b). *Galen's prophecy: Temperament in human nature*. New York, NY: Basic Books.
- Kampman, O., & Poutanen, O. (2011). Can onset and recovery in depression be predicted by temperament? A systematic review and meta-analysis. *Journal of Affective Disorders*, 135(1–3), 20–27.
- Karalunas, S. L., Fair, D., Musser, E. D., Aykes, K., Iyer, S. P., & Nigg, J. T. (2014). Subtyping attention-deficit/hyperactivity disorder using temperament dimensions toward biologically based nosologic criteria. *JAMA Psychiatry*, 71(9), 1015–1024.
- Karam, E. G., Salamoun, M. M., Yeretdzian, J. S., Mneimneh, Z. N., Karam, A. N., Fayyad, J., & Akiskal, H. S. (2010). The role of anxious and hyperthymic temperaments in mental disorders: a national epidemiologic study. *World Psychiatry*, 9(2), 103–110.
- Keiley, M. K., Lofthouse, N., Bates, J. E., Dodge, K. A., & Pettit, G. S. (2003). Differential risks of covarying and pure components in mother and teacher reports of externalizing and internalizing behaviour across ages 5 to 14. *Journal of Abnormal Child Psychology*, 31(3), 267–283.
- Keller, H. (2002). Between culture and biology: perspectives on ontogenetic development. In H. Keller, Y. H. Poortinga, & A. Schölmerich (Eds.), *Cambridge studies in cognitive perceptual development* (pp. 215–240). New York, NY: Cambridge University Press.
- Keller, H., Yovsi, R., Borke, J., Kartner, J. H., Jensen, H., & Papaligoura, Z. (2004). Developmental consequences of early parenting experiences: self-recognition and self-regulation in three cultural communities. *Child Development*, 75(6), 1745–1760.
- Kendler, K. S., & Baker, J. H. (2007). Genetic influences on measures of the environment: a systematic review. *Psychological Medicine*, 37(5), 615–626.
- Kim, H. W., Cho, S. C., Kim, B. N., Kim, J. W., Shin, M. S., & Yeo, J. Y. (2010). Does oppositional defiant disorder have temperament and psychopathological profiles independent of attention deficit/hyperactivity disorder? *Comprehensive Psychiatry*, 51(4), 412–418.
- Knyazev, G. G., Zupančič, M., & Slobodskaya, H. R. (2008). Child personality in Slovenia and Russia: structure and mean level of traits in parent and self-ratings. *Journal of Cross-Cultural Psychology*, 39(3), 317–334.
- Kochanska, G., Coy, K. C., Tjebkes, C. T., & Husarek, S. (1998). Individual differences in emotionality in infancy. *Child Development*, 69(2), 375–390.
- Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: antecedents, correlates, and consequences. *Journal of Personality*, 71(6), 1087–1112.
- Kohnstamm, G. A., Halverson, C. F., Mervielde, I., & Havill, V. L. (1998). *Parental descriptions of child personality: Developmental antecedents of the Big Five?* Mahwah, NJ: Lawrence Erlbaum.
- Kolpakov, V. G., Chuguy, V. F., Makarov, V. V., Rovda, Y. I., Chepkasov, I. L., & Kazakova, L. M. (1987). Measurement of temperament in children by means of parental questionnaires. In *Proceedings of the Siberian Branch of the USSR Academy of Sciences. Biological Sciences Series*, 6(1), 128–132.
- Kolpakov, V. G., Makarov, V. V., Khryachkova, N. A., Chuguy, V. F., & Chepkasov, I. L. (1984). Measurement of temperament traits in children of the first two years of life by means of parental questionnaires. In *Proceedings of the Siberian Branch of the USSR Academy of Sciences. Biological Sciences Series*, 13(2), 115–122.
- Kurs, R., Farkas, H., & Ritsner, M. (2005). Quality of life and temperament factors in schizophrenia: comparative study of patients, their siblings and controls. *Quality of Life Research*, 14(2), 433–440.
- Kusanagi, E., Chen, S. J., & Hoshi, N. (2000). Psychometric properties of the Toddler Behaviour Assessment Questionnaire applied to Japanese children. *Psychologia: An International Journal of Psychology in the Orient*, 43(4), 262–274.
- Lemery, K. S., Essex, M. J., & Smider, N. A. (2002). Revealing the relation between temperament and behavior problem symptoms by eliminating measurement confounding: expert rating and factor analyses. *Child Development*, 73(3), 867–882.
- Lemery, K. S., Goldsmith, H. H., Klinnert, M. D., & Mrazek, D. A. (1999). Developmental models of infant and childhood temperament. *Developmental Psychology*, 35(1), 189–204.
- Lengua, L. J., West, S. G., & Sandler, I. N. (1998). Temperament as a predictor of symptomatology in children: addressing contamination of measures. *Child Development*, 69(1), 166–184.
- Liew, J. (2012). Effortful control, executive functions and education: bringing self-regulatory and social-emotional competencies to the table. *Child Development Perspectives*, 6(2), 105–111.
- Lochner, C., Hemmings, S., Seedat, S., Kinnear, C., Schoeman, R., Annerbrink, K., Olsson, M., Eriksson, E., Moolman-Smook, J., Allgulander, C., & Stein, D. J. (2006). Genetics and personality traits in patients with social anxiety disorder: a case-control study in South Africa. *European Neuropsychopharmacology*, 17(5), 321–327.
- Loh, J. M. I., Schutte, N. S., & Thorsteinsson, E. B. (2014). Be happy: the role of resilience between characteristic affect and symptoms of depression. *Journal of Happiness Studies*, 15(5), 1125–1138.
- Luthar, S. S. (2006). Resilience in development: a synthesis of research across five decades. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental psychopathology: Risk, disorder, and adaptation* (pp. 739–795). (Vol. 3). Hoboken, NJ: Wiley.
- Lysaker, P., Bell, M. D., Kaplan, E., Greig, T. C., & Bryson, G. (1999). Personality and psychopathology in schizophrenia: the association between personality traits and symptoms. *Psychiatry*, 62(1), 36–48.
- MacDonald, K., Berlow, R., & Thomas, M. L. (2013). Attachment, affective temperament, and personality disorders: a study of their relationships in psychiatric outpatients. *Journal of Affective Disorders*, 151(3), 932–941.
- Majdandžić, M., & van den Boom, D. C. (2007). Multimethod longitudinal assessment of temperament in early childhood. *Journal of Personality*, 75(1), 121–168.
- Marazziti, D., Dell'Osso, B., Dell'Osso, M. C., Consoli, G., Del Debbio, A., Mungai, F., & Dell'Osso, L. (2007). Romantic attachment in patients with mood and anxiety disorders. *CNS Spectrums*, 12(10), 751–756.

- Maremmani, I., Akiskal, H. S., Signoretta, S., Liguori, A., Perugi, G., & Cloninger, R. (2005). The relationship of Kraepelian affective temperaments (as measured by TEMPS-I) to the Tridimensional Personality Questionnaire (TPQ). *Journal of Affective Disorders*, *85*(1), 17–27.
- Margetić, B. A., Jakovljević, M., Ivanec, D., & Margetić, B. (2011). Temperament, character, and quality of life in patients with schizophrenia and their first-degree relatives. *Comprehensive Psychiatry*, *52*(4), 425–430.
- Markovic, A., Rose-Krasnor, L., & Coplan, R. (2013). Children's coping with social conflict: the role of personality self-theories. *Personality and Individual Differences*, *54*(1), 64–69.
- Markus, H. R., & Kitayama, S. (1994). A collective fear of the collective: implications for selves and theories of selves. *Personality and Social Psychology Bulletin*, *20*(5), 568–579.
- Martin, R. P. (1999). *The Temperament Assessment Battery for Children-Revised (TABCR)*. Athens, GA: School Psychology Clinic.
- Martin, R. P., Wisenbaker, J., & Huttunen, M. (1994). Review of factor analytic studies of temperament measures based on the Thomas-Chess structural model: implications for the Big Five. In C. F. J. Halverson, & G. A. Kohnstamm (Eds.), *The developing structure of temperament and personality from infancy to adulthood* (pp. 157–172). Hillsdale, NJ: Lawrence Erlbaum.
- Martinotti, G., Mandelli, L., Di Nicola, M., Serretti, A., Fossati, A., Borroni, S., & Janiri, L. (2008). Psychometric characteristic of the Italian version of the Temperament and Character Inventory—Revised, personality, psychopathology, and attachment styles. *Comprehensive Psychiatry*, *49*(5), 514–522.
- McDevitt, S. C., & Carey, W. B. (1978). The measurement of temperament in 3- to 7-year-old children. *Journal of Child Psychology and Psychiatry*, *19*(3), 245–253.
- Mehrabian, A. (1995). Distinguishing depression and trait anxiety in terms of basic dimensions of temperament. *Imagination, Cognition and Personality*, *15*(2), 133–143.
- Melegari, M. G., Nanni, V., Lucidi, F., Russo, P. M., Donfrancesco, R., & Cloninger, C. R. (2015). Temperamental and character profiles of preschool children with ODD, ADHD, and anxiety disorders. *Comprehensive Psychiatry*, *58*, 94–101.
- Mervielde, I., & Asendorpf, J. B. (2000). Variable-centered and person-centered approaches to childhood personality. In S. E. Hampson (Ed.), *Advances in personality psychology* (pp. 37–76). (Vol. 1). Philadelphia, PA: Taylor & Francis.
- Mervielde, I., & De Fruyt, F. (1999). Construction of the Hierarchical Personality Inventory for Children (HiPIC). In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe: Proceedings of the eighth European Conference on Personality Psychology* (pp. 107–127). Tilburg, The Netherlands: Tilburg University Press.
- Mervielde, I., & De Fruyt, F. (2002). Assessing children's traits with the Hierarchical Personality Inventory for Children. In B. De Raad, & M. Perugini (Eds.), *Big Five assessment* (pp. 129–142). Ashland, OH: Hogrefe & Huber.
- Mervielde, I., & De Pauw, S. S. W. (2012). Models of child temperament. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 21–40). New York, NY: Guilford Press.
- Mills, R. S. L. (1998). Paradoxical relations between perceived power and maternal control. *Merrill-Palmer Quarterly*, *44*(4), 523–537.
- Mundy, P. C., Henderson, H. A., Inge, A. P., & Coman, D. C. (2007). The modifier model of autism and social development in higher functioning children with autism. *Research and Practice for Persons With Severe Disabilities*, *32*(2), 1–16.
- Muris, P., & Ollendick, T. H. (2005). The role of temperament in the etiology of child psychopathology. *Clinical Child and Family Psychology Review*, *8*(4), 271–289.
- Murphy, B. C., Eisenberg, N., Fabes, R. A., Shepard, S., & Guthrie, I. K. (1999). Consistency and change in children's emotionality and regulation: a longitudinal study. *Merrill-Palmer Quarterly*, *45*(3), 413–444.
- Nigg, J. T. (2000). On inhibition/disinhibition in developmental psychopathology: views from cognitive and personality psychology and a working inhibition taxonomy. *Psychological Bulletin*, *126*(2), 220–246.
- Nigg, J. T. (2001). Is ADHD a disinhibitory disorder? *Psychological Bulletin*, *127*(5), 571–598.
- Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, *47*(3–4), 395–422.
- Nigg, J. T., & Goldsmith, H. H. (1998). Developmental psychopathology, personality, and temperament: reflections on recent behavioural genetics research. *Human Biology*, *70*(2), 387–412.
- Olvera, R. L., Fonseca, M., Caetano, S. C., Hatch, J. P., Hunter, K., Nicoletti, M., Pliszka, S. R., Cloninger, C. R., & Soares, J. C. (2009). Assessment of personality dimensions in children and adolescents with bipolar disorder using the Junior Temperament and Character Inventory. *Journal of Child and Adolescent Psychopharmacology*, *19*(1), 13–21.
- Pallanti, S., Quercioli, L., & Hollander, E. (2004). Social anxiety in outpatients with schizophrenia. a relevant cause of disability. *American Journal of Psychology*, *161*(1), 53–58.
- Plomin, R., & Caspi, A. (1999). Behavioral genetics and personality. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 251–276). New York, NY: Guilford Press.
- Preti, A., Vellante, M., Gabrielli, M., Lai, V., Muratore, T., Pintus, & Carta, M. G. (2013). Confirmatory factor analysis and measurement invariance by gender, age and levels of psychological distress of the short TEMPS-A. *Journal of Affective Disorders*, *151*(3), 995–1002.
- Preti, A., Vellante, M., Zucca, G., Tondo, L., Akiskal, K. K., & Akiskal, H. S. (2010). The Italian version of the validated short TEMPS-A: the Temperament Evaluation of Memphis, Pisa, Paris and San Diego. *Journal of Affective Disorders*, *120*(1–3), 207–212.
- Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: the early childhood behaviour questionnaire. *Infant Behaviour and Development*, *29*(3), 386–401.
- Putnam, S. P., Rothbart, M. K., & Gartstein, M. A. (2008). Homotypic and heterotypic continuity of fine-grained temperament during infancy, toddlerhood, and early childhood. *Infant and Child Development*, *17*, 387–405.
- Putnam, S. P., & Stifter, C. A. (2005). Behavioural approach-inhibition in toddlers: prediction from infancy, positive and negative affect components, and relations with behaviour problems. *Child Development*, *76*(1), 212–226.

- Quoidbach, J., Berry, E. V., Hansenne, M., & Mikolajczak, M. (2010). Positive emotion regulation and well-being: comparing the impact of eight savoring and dampening strategies. *Personality and Individual Differences, 49*(5), 368–373.
- Raes, F., Daems, K., Feldman, G. C., Johnson, S. L., & Van Gucht, D. (2009). A psychometric evaluation of the Dutch version of the Responses to Positive Affect questionnaire. *Psychologica Belgica, 49*(4), 293–310.
- Riese, M. L. (1987). Temperament stability between the neonatal period and 24 months. *Developmental Psychology, 23*(2), 216–222.
- Riggs, S. A., Paulson, A., Tunnell, E., Sahl, G., Atkison, H., & Ross, C. A. (2007). Attachment, personality, and psychopathology among adult inpatients: self-reported romantic attachment style versus Adult Attachment Interview states of mind. *Development and Psychopathology, 19*(1), 263–291.
- Rihmer, Z., Akiskal, K. K., Rihmer, A., & Akiskal, H. S. (2010). Current research on affective temperaments. *Current Opinion in Psychiatry, 23*(1), 12–18.
- Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: a quantitative review of longitudinal studies. *Psychological Bulletin, 126*(1), 3–25.
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. *Psychological Bulletin, 132*(1), 1–25.
- Robins, R. W., John, O. P., Caspi, A., Moffitt, T. E., & Stouthamer-Loeber, M. (1996). Resilient, overcontrolled, and undercontrolled boys: three replicable personality types. *Journal of Personality and Social Psychology, 70*(1), 157–171.
- Rothbart, M. K. (1981). Measurement of temperament in infancy. *Child Development, 52*(2), 569–578.
- Rothbart, M. K. (1989). Biological processes of temperament. In G. Kohnstamm, J. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 77–110). Chichester, UK: Wiley.
- Rothbart, M. K. (2011). *Becoming who we are: Temperament, personality and development*. New York, NY: Guilford Press.
- Rothbart, M. K., & Ahadi, S. A. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology, 103*(1), 55–66.
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at 3–7 years: the Children's Behaviour Questionnaire. *Child Development, 72*(5), 1394–1408.
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon & R. Lerner (Series Eds.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (6th ed., pp. 99–166). New York, NY: Wiley.
- Rothbart, M. K., & Derryberry, D. (1981a). Development of individual differences in temperament. In M. E. Lamb, & A. L. Brown (Eds.), *Advances in developmental psychology* (pp. 37–86). (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum.
- Rothbart, M. K., & Derryberry, D. (1981b). Theoretical issues in temperament. In M. Lewis, & L. Taft (Eds.), *Developmental disabilities: Theory, assessment and intervention* (pp. 383–400). New York, NY: Spectrum Publications.
- Rothbart, M. K., Derryberry, D., & Hershey, K. (2000). Stability of temperament in childhood: laboratory assessment to parent reports at seven years. In V. J. Molfese, & D. L. Molfese (Eds.), *Temperament and personality development across the life-span* (pp. 85–120). Hillsdale, NJ: Lawrence Erlbaum.
- Rothbart, M. K., & Posner, M. (1985). Temperament and the development of self-regulation. In L. C. Hartlage, & C. F. Telzrow (Eds.), *The neuropsychology of individual differences: A developmental perspective* (pp. 93–123). New York, NY: Plenum.
- Rothbart, M. K., Sheese, B. E., & Posner, M. I. (2007). Executive attention and effortful control: linking temperament, brain networks, and genes. *Child Development Perspectives, 1*(1), 2–7.
- Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology, 60*, 141–171.
- Rueda, M. R. (2012). Effortful control. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 145–168). New York, NY: Guilford Press.
- Rueda, M. R., & Rothbart, M. K. (2009). The influence of temperament on the development of coping: the role of maturation and experience. *New Directions for Child and Adolescent Development, 2009*(124), 19–31 Special issue: Coping and the Development of Regulation.
- Ruf, H. T., Schmidt, N. L., Lemery, K. S., & Goldsmith, H. H. (2008). Components of childhood impulsivity and inattention: child, family, and genetic correlates. *International Journal of Developmental Science, 2*(1–2), 52–76.
- Rusalov, V. M. (1989). Object-related and communicative aspects of human temperament: a new questionnaire of the structure of temperament. *Personality and Individual Differences, 10*(8), 817–827.
- Rusalov, V. M. (1997). *Oprosnik formal'no-dinamicheskikh svoystv individual'nosti. Rukovodstvo [Questionnaire of formal-dynamical properties of individuality. Manual]*. Moscow: Russian Academy of Sciences, IPAN Press.
- Rusalov, V. M. (2004). *Formal'no-dinamicheskiye svoystva individual'nosti (temperament) [Formal-dynamical properties of individual (temperament)]*. Moscow: Russian Academy of Sciences, IPAN Press.
- Rusalov, V. M., & Trofimova, I. N. (2007). *Structure of temperament and its measurement*. Toronto, Canada: Psychological Services Press.
- Saklofske, D. H., Nordstokke, D. W., Prince-Embury, S., Crumpler, T., Nugent, S., Vesely, A. K., & Hindes, Y. (2013a). Assessing personal resiliency in young adults: the resiliency scale for children and adolescents. In S. Prince-Embury, & D. H. Saklofske (Eds.), *Resilience in children, adolescents, and adults: Translating research into practice*. New York, NY: Springer.
- Saklofske, D. H., Reynolds, C. R., & Schwann, V. L. (2013b). *Oxford handbook of child psychological assessment*. New York, NY: Oxford University Press.
- Salinas, G. C., Montesinos, H. M. D., & Carnicero, C. J. A. (1999). Adaptación a población española del "Toddler Behavior Assessment Questionnaire" para la medida del temperamento en la infancia [Spanish adaptation of the Toddler Behaviour Assessment Questionnaire for the measurement of temperament in infancy]. *Metodología de las Ciencias del Comportamiento, 1*(2), 207–218.
- Sasayama, D., Hori, H., Teraishi, T., Hattori, K., Ota, M., Matsuo, J., & Okamoto, N. (2011). Difference in Temperament and Character Inventory scores between depressed patients with bipolar II and unipolar major depressive disorders. *Journal of Affective Disorders, 132*(3), 319–324.
- Saudino, K. J., & Wang, M. (2012). Quantitative and molecular genetic studies of temperament. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 315–346). New York, NY: Guilford Press.
- Schaughency, E. C., & Fagot, B. I. (1993). The prediction of adjustment at age 7 from activity level at age 5. *Journal of Abnormal Child Psychology, 21*(1), 29–50.

- Schmidt, L. A., & Fox, N. A. (1999). Conceptual, biological, and behavioural distinctions among different types of shy children. In L. A. Schmidt, & J. Schulkin (Eds.), *Extreme fear, shyness, and social phobia: Origins, biological mechanisms, and clinical outcomes* (pp. 47–66). New York, NY: Oxford University Press.
- Schmidt, L. A., Polak, C. P., & Spooner, A. L. (2005). Biological and environmental contributions to childhood shyness: a diathesis-stress model. In W. R. Crozier, & L. E. Alden (Eds.), *The essential handbook of social anxiety for clinicians* (pp. 33–55). Chichester, UK: Wiley.
- Schwebel, D. C., & Plumert, J. M. (1999). Longitudinal and concurrent relations among temperament, ability estimation, and injury proneness. *Child Development, 70*(3), 700–712.
- Seifer, R., Schiller, M., Sameroff, A. J., Resnick, S., & Riordan, K. (1996). Attachment, maternal sensitivity, and infant temperament during the first year of life. *Developmental Psychology, 32*(1), 12–25.
- Serretti, A., Calati, R., Mandelli, L., & De Ronchi, D. (2006). Serotonin transporter gene variants and behavior: a comprehensive review. *Current Drug Targets, 7*(12), 1659–1669.
- Shannon, K. E., Beauchaine, T. P., Brenner, S. L., Neuhaus, E., & Gatzke-Kopp, L. (2007). Familial and temperamental predictors of resilience in children at risk for conduct disorder and depression. *Development and Psychopathology, 19*(3), 701–727.
- Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives, 6*(4), 436–444.
- Shiner, R. L., & Caspi, A. (2012). Temperament and the development of personality traits, adaptations, and narratives. In M. Zentner, & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 497–516). New York, NY: Guilford Press.
- Shiner, R. L., & DeYoung, C. G. (2013). The structure of temperament and personality traits: a developmental perspective. In P. Zelazo (Ed.), *Oxford handbook of developmental psychology* (pp. 113–141). New York, NY: Oxford University Press.
- Shiner, R. L., & Masten, A. S. (2008). Personality in childhood: a bridge from early temperament to adult outcomes. *European Journal of Developmental Science, 2*(1–2), 158–175 Special issue: Current Trends in the Study of Child Temperament.
- Shorey, H. S., & Snyder, C. R. (2006). The role of adult attachment styles in psychopathology and psychotherapy outcomes. *Review of General Psychology, 10*(1), 1–20.
- Silverman, I. W., & Ippolito, M. F. (1995). Maternal antecedents of delay ability in young children. *Journal of Applied Developmental Psychology, 16*(4), 569–591.
- Simonds, J., & Rothbart, M. K. (2004). The Temperament in Middle Childhood Questionnaire (TMCQ): a computerized self-report measure of temperament for ages 7–10. In *Paper presented at the Occasional Temperament Conference*, Athens, GA.
- Slobodskaya, H. R. (1995). Early temperament: parents' ratings of toddler's behaviour and family characteristics. *Voprosy Psichologii [Psychology Issues, Russia], 6*, 104–112.
- Smith, M. J., Cloninger, C. R., Harms, M. P., & Csernansky, J. G. (2008). Temperament and character as schizophrenia-related endophenotypes in non-psychotic siblings. *Schizophrenia Research, 104*(1–3), 198–205.
- Strelau, J. (2001). *Psychologia temperamentu [Psychology of temperament]*. Warsaw, Poland: Wydawnictwo Naukowe PWN.
- Strelau, J., & Zawadzki, B. (1996). Temperament dimensions as related to the Giant Three and the Big Five factors: a psychometric approach. In A. V. Brushlinsky, & T. N. Ushakova (Eds.), *Life and scientific creativity* (pp. 260–281). Moscow: Ladomir.
- Strelau, J., & Zawadzki, B. (1997). Temperament and personality: Eysenck's three superfactors as related to temperamental dimensions. In H. Nyborg (Ed.), *The scientific study of human nature: Tribute to Hans J. Eysenck at eighty*. Amsterdam, The Netherlands: Pergamon/Elsevier Science.
- Strelau, J., & Zawadzki, B. (2008). Temperament from a psychometric perspective: theory and measurement. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment, Vol. 2: Personality measurement and testing* (pp. 352–374). Thousand Oaks, CA: Sage.
- Stringaris, A., Maughan, B., & Goodman, R. (2010). What's in a disruptive disorder? Temperamental antecedents of oppositional defiant disorder: findings from the Avon Longitudinal Study. *Journal of the American Academy of Child and Adolescent Psychiatry, 49*(5), 474–483.
- Super, C. M., Axia, G., Harkness, S., Welles-Nystrom, B., Zyllicz, P. O., Parmar, P., & Palacios, J. (2008). Culture, temperament, and the “difficult child”: a study in seven western cultures. *International Journal of Developmental Science, 2*(1–2), 136–157.
- Super, C., & Harkness, S. (1986). The developmental niche: a conceptualization at the interface of child and culture. *International Journal of Behavioural Development, 9*(4), 545–569.
- Svrakic, D. M., Whitehead, C., Przybeck, T. R., & Cloninger, C. R. (1993). Differential diagnosis of personality disorders by the seven-factor model of temperament and character. *Archives of General Psychiatry, 50*(12), 991–999.
- Tackett, J. L. (2011). Parent informants for child personality: agreement, discrepancies, and clinical utility. *Journal of Personality Assessment, 93*(6), 539–544.
- Tackett, J. L., Slobodskaya, H. R., Mar, R. A., Deal, J., Halverson, C. F., Baker, S. R., & Besevegis, E. (2012). The hierarchical structure of childhood personality in five countries: continuity from early childhood to early adolescence. *Journal of Personality, 80*(4), 847–879.
- Thomas, A., & Chess, S. (1977). *Temperament and development*. New York, NY: Brunner/Mazel.
- Thompson, R. A. (1994). Emotion regulation: a theme in search of definition. *Monographs of the Society for Research in Child Development, 59*(2–3), 25–52.
- Thompson, S. F., Zalewski, M., & Lengua, L. J. (2014). Appraisal and coping styles account for the effects of temperament on preadolescent adjustment. *Australian Journal of Psychology, 66*(2), 122–129.
- Tornstam, L. (1996). Gerotranscendence: a theory about maturing into old age. *Journal of Aging and Identity, 1*(1), 37–50.
- Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: a psychometric analysis. *Cognitive Therapy and Research, 27*(3), 247–259.

- Trofimova, I. (2010a). An investigation into differences between the structure of temperament and the structure of personality. *American Journal of Psychology*, 123(4), 467–480.
- Trofimova, I. (2010b). Questioning the “general arousal” models. *Open Behavioural and Science Psychology*, 4, 1–8.
- Trofimova, I. (2015). The interlocking between functional aspects of activities and a neurochemical model of adult temperament. In M. C. Arnold (Ed.), *Temperaments: Individual differences, social and environmental influences and impact on quality of life* (pp. 77–147). New York, NY: Nova Science.
- Trofimova, I., & Robbins, T. W. (2016). Temperament and arousal systems: a new synthesis of differential psychology and functional neurochemistry. *Neuroscience and Biobehavioural Reviews*, 64, 382–402.
- Trofimova, I., & Sulis, W. (2010). The lability of behaviour as a marker of comorbid depression and anxiety. *Advances in Bioscience and Biotechnology*, 1(3), 190–199.
- Ullsperger, J. M., Nigg, J. T., & Nikolas, M. A. (2016). Does child temperament play a role in the association between poor parenting practices and child ADHD? *Journal of Abnormal Child Psychology*, 44(1), 167–178.
- Valiente, C., Lemery-Chalfant, K. S., & Swanson, J. (2009). Children’s responses to daily social stressors: relations with parenting, children’s effortful control, and adjustment. *Journal of Child Psychology and Psychiatry*, 50(6), 707–717.
- Van Ammers, E. C., Sellman, J. D., & Mulder, R. T. (1997). Temperament and substance abuse in schizophrenia: is there a relationship? *Journal of Nervous and Mental Disease*, 185(5), 283–288.
- Van Bakel, H. J. A., & Riksen-Walraven, J. M. (2004). Stress reactivity in 15-month-old infants: links with infant temperament, cognitive competence, and attachment security. *Developmental Psychobiology*, 44(3), 157–167.
- Van Ijzendoorn, M. H., Caspers, K., Bakermans-Kranenburg, M. J., Beach, S. R., & Philibert, R. (2010). Methylation matters: interaction between methylation density and serotonin transporter genotype predicts unresolved loss or trauma. *Biological Psychiatry*, 68(5), 405–407.
- Vazquez, G. H., Nasetta, S., Mercado, B., Romero, E., Tifner, S., Ramon, M. L., & Akiskal, H. S. (2007). Validation of the TEMPS-A Buenos Aires: Spanish psychometric validation of affective temperaments in a population study of Argentina. *Journal of Affective Disorders*, 100(1–3), 23–29.
- Vazquez, G. H., Tondo, L., Mazzarini, L., & Gonda, X. (2012). Affective temperaments in general population: a review and combined analysis from national studies. *Journal of Affective Disorders*, 139(1), 18–22.
- Victor, J. B., Rothbart, M. K., & Baker, S. R. (2003). *Manual for the Child Temperament and Personality Questionnaire (CTPQ)*. Hampton, VA: Hampton University.
- Weinstock, L. M., & Whisman, M. A. (2006). Neuroticism as a common feature of the depressive and anxiety disorders: a test of the revised integrative hierarchical model in a national sample. *Journal of Abnormal Psychology*, 115(1), 68–74.
- Weiss, A., Sutin, A. R., Duberstein, P. R., Friedman, B., Bagby, R. M., & Costa, P. T. (2009). The personality domains and styles of the five-factor model are related to incident depression in Medicare recipients aged 65 to 100. *American Journal of Geriatric Psychiatry*, 17(7), 591–601.
- Werner-Seidler, A., Banks, R., Dunn, B. D., & Moulds, M. L. (2013). An investigation of the relationship between positive affect regulation and depression. *Behaviour Research and Therapy*, 51(1), 46–56.
- Windle, M., Iwawaki, S., & Lerner, R. M. (1987). Cross-cultural comparability of temperament among Japanese and American early- and late-adolescents. *Journal of Adolescent Research*, 2(4), 423–446.
- Witkiewitz, K., King, K., McMahon, R. J., Wu, J., Luk, J., Bierman, K. L., & Pinderhughes, E. E. (2013). Evidence for a multi-dimensional latent structural model of externalizing disorders. *Journal of Abnormal Child Psychology*, 41(2), 223–237.
- Yoo, H. J., Kim, M., Ha, J. H., Chung, A., Sim, M. E., Kim, S. J., & Lyoo, I. K. (2006). Biogenetic temperament and character and attention deficit hyperactivity disorder in Korean children. *Psychopathology*, 39(1), 25–31.
- Zaninotto, L., Souery, D., Calati, R., Di Nicola, M., Montgomery, S., Kasper, S., & Janiri, L. (2015). Temperament and character profiles in bipolar I, bipolar II and major depressive disorder: impact over illness course, comorbidity pattern and psychopathological features of depression. *Journal of Affective Disorders*, 184, 51–59.
- Zappitelli, M. C., Bordin, I. A., Hatch, J. P., Caetano, S. C., Zunta-Soares, G., Olvera, R. L., & Soares, J. C. (2013). Temperament and character traits in children and adolescents with major depressive disorder: a case-control study. *Comprehensive Psychiatry*, 54(4), 346–353.
- Zawadzki, B., & Strelau, J. (1997). *Formalna charakterystyka zachowania-kwestionariusz temperamentu (FCZ-KT): Podręcznik [The formal characteristic of Behaviour-Temperament Inventory (FCB-TI): Manual]*. Warsaw, Poland: Pracownia Testów Psychologicznych PTP.
- Zawadzki, B., Strelau, J., Oniszczenko, W., Riemann, R., & Angleitner, A. (2001). Genetic and environmental influences on temperament: the Polish-German twin study, based on self-report and peer-rating. *European Psychologist*, 6(4), 272–286.
- Zentner, M. R. (2004). Der Einfluss des Temperaments auf das Bindungsverhalten [The influence of temperament on attachment]. In L. Ahnert (Ed.), *Frühe Bindung: Entstehung und Entwicklung* (pp. 175–197). Munich, Germany: Reinhardt Verlag.
- Zentner, M., & Shiner, R. (2012). *Handbook of temperament*. New York, NY: Guilford Press.
- Zimmer-Gembeck, M. J., Lees, D., & Skinner, E. A. (2011). Children’s emotions and coping with interpersonal stress as correlates of social competence. *Australian Journal of Psychology*, 63(3), 131–141.

Chapter 8

The Assessment of Family, Parenting, and Child Outcomes

Chapter Outline

| | | | |
|--|------------|---|------------|
| The significance of family context | 187 | Methods of family assessment | 202 |
| Family assessment models and their measures | 188 | Observational procedures | 202 |
| Process model | 188 | Interviews, self-reports, and other report inventories | 202 |
| McMaster model | 189 | Measures of parenting behavior | 203 |
| Circumplex model of marital and family systems | 189 | Marital inventories | 204 |
| Beavers system model of family functioning | 190 | Measures of dyadic interactions | 205 |
| Darlington family assessment system | 190 | Measures for predicting child abuse | 205 |
| The assessment of parenting | 191 | The assessment of externalizing and internalizing problems | 208 |
| Advances in parenting research | 191 | Measures for assessing externalizing behavior | 208 |
| A Historical overview of parenting dimensions | 192 | Internalizing problems | 211 |
| Parenting styles and behaviors | 192 | Measures | 212 |
| Affective dimensions of parenting | 193 | Summary | 213 |
| Aspects of parenting | 194 | References | 213 |
| Dyadic interactions between parent and child | 194 | | |
| Parental stress and maternal depression | 199 | | |
| Family resilience | 199 | | |
| Positive adaptation in children and families | 201 | | |

THE SIGNIFICANCE OF FAMILY CONTEXT

Several theoretical developmental models, such as Bronfenbrenner's (1972) ecological approach and Super and Harkness's (1999) concept of "developmental niche" highlight the influence of caretakers on children's social, emotional, and cognitive development. Direct influence occurs through shared genetics, parenting style, and behaviors, while cultural and social values have an indirect impact. To fully understand the child's psychological adjustment, one should take into account significant contexts, such as the family and the interactions between exogenous and endogenous factors.

During the past decade, the notion of an "agentic framework" (i.e., one's ability to influence one's life) has been proposed (Bandura, 2008, 2011) within the framework of bidirectional models of influence (Maccoby, 2003). Evidence also suggests that the child him- or herself (e.g., temperament) may affect parenting behaviors. Moreover, parents may respond to their child's reactive behavior by adjusting their interpersonal responses and disciplinary tactics (Bandura, 2008, 2011; Paschall & Mastergeorge, 2015). Several researchers have discussed and highlighted such bidirectional and transactional cycles of parent-child behavior, including Patterson's (1980, 1982) coercive cycle of child externalizing behavior, as well as the proposed reciprocal relationship between parental rejection and childhood depression (e.g., McLeod, Weisz, & Wood, 2007).

The assessment of parenting and family functioning serves a number of critical functions across various stages of clinical practice with children (McLeod, Jensen-Doss, & Ollendick, 2013). A first area of assessment information focuses on the impact of child symptoms on family functioning (e.g., disruption to family routine, distress to family members). Second, family assessment is essential to formulation-driven clinical practice, in forming functional hypothesis about the controlling variables (e.g., patterns of social rewards and punishment) commonly targeted in evidence-based interventions. Third, a range of family factors operate as potential barriers to treatment. Such factors include the family's resources for change, such as relationship quality and self-regulation skills, as well as parents' readiness and motivation for treatment (Geffken, Keeley, Kellison, Storch, & Rodrique, 2006). Fourth, proposals about a child's prognostic status—potentially within the context of high-risk scenarios, such as abuse or neglect—require reliable data on the parents' ability to meet the child's

developmental needs. Finally, the ongoing assessment of parents and family context plays a key role in the evaluation of treatment progress and outcomes.

FAMILY ASSESSMENT MODELS AND THEIR MEASURES

The five models that follow share the view that for clinicians and researchers it is useful to conceptualize families or their subsystems as differing along a finite number of dimensions. However, the variations within and between families are a reminder that the number and combinations of dimensions may be used to describe common and unique “family dynamics.” What is noteworthy is that the models with more dimensions separate out constructs that are placed together in models with fewer dimensions not unlike what we see in the assessment of personality and intelligence that can occur at a broad general level to one of the primary factors or facets.

Drumm, Carr, and Fitzgerald (2000) compared the utility of the McMaster, the Circumplex, and the Beaver’s models at distinguishing between clinical and nonclinical families, as well as distinguishing between families with members with different diagnoses. The Beavers scale was most sensitive at distinguishing families with children with emotional disorders, while the McMaster scale was best at detecting families with children diagnosed with mixed disorders of emotion and conduct. The Circumplex model distinguished clinical from nonclinical families, and the McMaster checklist was more likely to identify family strengths. The McMaster Model of Family Functioning (Miller, Ryan, Keitner, Bishop, & Epstein, 2000) and another major description of family functioning and dynamics, the Process Model of Family Functioning (Skinner, Steinhauer, & Sitarenios, 2000), are both derived from the Family Categories Schema (Epstein, Rakoff, & Sigal, 1968).

Process model

The Process Model of Family Functioning (Steinhauer, 1987) integrates seven basic constructs: Communication, Affective expression, Role performance, Task accomplishment, Involvement, Control, and Values and Norms as shown in Fig. 8.1.

The Process Model differs from the McMaster Model to be described next in three significant ways: (1) it goes beyond listing major parameters of family functioning; (2) it addresses and integrates three key levels relevant to the integrity or decomposition of the family (intrapsychic, interpersonal, family systems); and (3) it emphasizes the larger social system and family theory values and norms.

The primary assessment measure used to describe the process model of family functioning is the *Family Assessment Model* (FAM). It was developed according to a construct validation paradigm (Skinner, 1981) based on an operational definition of constructs in the Process Model and comprises four self-report scales:

1. General scale (50 items, 9 subscales). This scale provides a total score of family functioning, seven measures relating to the Process Model, and two response-style subscales (social desirability and defensiveness).
2. Dyadic relationships scale (42 items, 7 subscales). This scale explores the relationships between various pairs (dyads) in the family.
3. Self-rating scale (42 items, 7 subscales). This scale explores the individual’s perception of his or her own functioning in the family.
4. Brief FAMs (14 items). Each version of the FAM (general, dyadic, self) has a corresponding brief 14-item version. These brief versions can be employed in situations where there is limited time available and/or for preliminary screening.

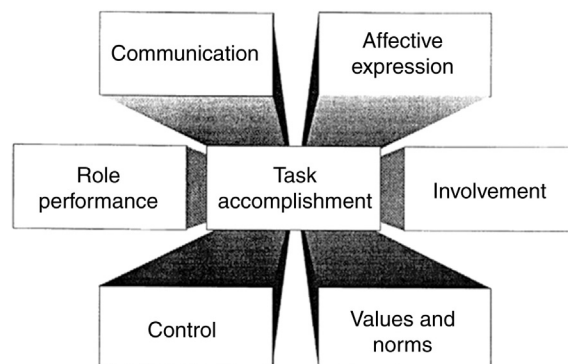


FIGURE 8.1 Process model of family functioning. [Reprinted from Skinner, H., Steinhauer, P., & Sitarenios, G. (2000). *Family Assessment Measure (FAM) and Process Model of Family Functioning*. *Journal of Family Therapy*, 22(2), 190–210, with permission. Copyright 2000 by John Wiley & Sons.]

In addition, brief FAM scales can be implemented in monitoring family functioning over time (e.g., during the course of therapy). One of the most clinically useful aspects of the FAM is that the combination of the three scales (general, self, dyadic) offers a more elaborate profile of the family than by examining only a single level of family functioning, which has implications for diagnostic assessment, treatment planning and evaluation, and prognosis.

McMaster model

The McMaster model of family functioning (MMFF; Miller et al., 2000) is directed at a clinically oriented conceptualization of families that focuses on both the structural and the organizational properties of the family system. It also explores patterns of transactions among family members that have been found to distinguish healthy from nonhealthy families.

The model identifies six dimensions of family functioning:

1. Problem solving—the family’s ability to resolve problems that threaten the integrity and functional capacity of the family.
2. Communication—the exchange of information among family members.
3. Roles—focuses on whether the family has established patterns of behavior for handling a set of functions, and further examines whether tasks are clearly and fairly assigned to family members and whether these tasks are carried out in a responsible manner.
4. Affective responsiveness—examines the extent to which members are able to experience appropriate affects over a range of stimuli.
5. Affective involvement—evaluates the extent to which family members take interest in and value each other’s activities and concerns.
6. Behavior control—assesses the way in which a family expresses and maintains standards for the behavior of its members.

The *Family Assessment Device* (FAD; Epstein, Baldwin, & Bishop, 1983; Epstein, Bishop, Ryan, Miller, & Keitner, 1993; Miller et al., 1994) is a 60-item self-report questionnaire developed to assess the different dimensions of the McMaster model of family functioning. The measure is completed by family members age 13 years or older. It consists of statements for which the respondents have to decide how well they have described their family. Answers are coded on a 4-point Likert scale, with low scores usually indicating better family functioning.

The Family Assessment Device is composed of six subscales and a 7th subscale assessing overall family functioning. The Problem Solving (PS) subscale reflects the family’s ability to resolve its problems. The Communication (CO) subscale assesses the effectiveness of the information exchanged among family members. The Roles (RO) subscale describes whether the family has recurrent patterns of behavior to handle family functioning. The Affective Responsiveness (AR) subscale refers to the family members’ ability to express appropriate emotion to the family context. The Affective Involvement (AI) subscale evaluates the interest family members manifest to one another. The Behavior Control (BC) subscale includes the family’s standards and limits for behavior. The 7th subscale, General Functioning (GF), rates the overall health or pathology of the family. All subscales display adequate internal consistency and temporal stability (e.g., Miller, Epstein, Bishop, & Keitner, 1985; Kabacoff, Miller, Bishop, Epstein, & Keitner, 1990).

Circumplex model of marital and family systems

The Circumplex Model of Marital and Family Systems (CMMFS; Olson, Sprenkle, & Russell, 1979) is one of the most widely used models to describe and analyze family functioning. The model is particularly useful as a “relational diagnosis.” Underlying the Circumplex Model is the *curvilinear hypothesis*, which argues that “balanced levels of cohesion and flexibility are most conducive to healthy family functioning. Conversely, unbalanced levels of cohesion and flexibility are associated with unhealthy family functioning” (Olson, 2011, p.65). It is composed of three key concepts for understanding family functioning: family cohesion, flexibility, and communication (Olson, 2000). The model is specifically designed for family research, clinical assessment, treatment planning, and outcome effectiveness of marital and family therapy.

In order to assess a family or couple on these dimensions, key concepts have been taken from several social science disciplines. These concepts include family power (assertiveness, control, discipline), negotiation styles, role relationships, and relationship rules. A rigid relationship is where one individual is highly controlling, the roles are strictly defined, and the rules do not change. A structured relationship is overall less rigid. Leadership is less authoritarian and controlling and is shared between the parents. Roles are stable and shared. There are a few rule changes. Family flexibility is defined by

the quality and expression of leadership and organization, role relationships, and relationship rules negotiations (Olson & Gorall, 2006). A flexible relationship is more open to change. Leadership is more equally shared. Roles are occasionally shared, and rules could change. A chaotic relationship has erratic or limited leadership. Decisions are impulsive. Roles are unclear and often shifted from one person to another.

Family cohesion is defined as the emotional bonding among family members (Olson, 1993). Within the Circumplex Model, some of the specific concepts that can be used to describe, measure, and diagnose a couple on this dimension are: *emotional bonding, boundaries, coalitions, time, space, friends, decision making, interest, and recreation*. A disengaged relationship often has extreme, emotional separateness among family members. A separated relationship has some emotional separateness. Although most activities and interests are generally separate, a few may be shared. A connected relationship is characterized by some emotional closeness and loyalty. An enmeshed relationship is characterized by an extreme amount of closeness, and loyalty is demanded. Family communication is defined as the positive communication skills used by family members (Olson & Gorall, 2006). Communication among couples is either positive or negative.

The *Family Adaptability and Cohesion Evaluation Scale* (FACES) is a family self-report assessment designed to assess cohesion and flexibility in family interactions, which are two of the central dimensions of the Circumplex Model. The most recent version (FACES IV) was designed to measure cohesion and flexibility in a curvilinear manner, tapping both high and low extremes of these two dimensions, as well as the moderate regions that had been tapped by previous versions. FACES IV measures both balanced and unbalanced aspects of family functioning and provides a comprehensive assessment of family cohesion and flexibility dimensions using six scales. The two balanced scales are *Balanced Cohesion* and *Balanced Flexibility*. The four new unbalanced scales are *Enmeshed* and *Disengaged* in relation to cohesion and *Chaotic* and *Rigid* in terms of flexibility. The original studies have reported that FACES IV is highly reliable in the six scales (Olson, Gorall, & Tiesel, 2007).

Curvilinear interpretation is based on cohesion levels ranging from enmeshed (overly high) to disengage (overly low) and flexibility levels ranging from chaotic (overly high) to rigid (overly low), with balanced and moderate levels in between (Kouneski, 2000). Using cluster analysis of the six FACES IV scales, six family types were identified ranging from the most healthy to the least healthy. These are balanced, rigidly balanced, midrange, flexibly unbalanced, chaotically disengaged, and unbalanced.

Beavers system model of family functioning

The Beavers System Model of family functioning (BSMFF; Beavers & Hampson, 2000) conceptualizes family function along two axes: family competence and family style. *Family competence* requires both the structure and capacity to adapt to changes through time. *Family style* refers to the “stylistic quality of family interaction” (p. 130) and is classified as centripetal or centrifugal. Centripetal families receive affective satisfaction within the family context, whereas centrifugal family members seek satisfaction outside the family.

Beavers and Hampson (1990) have developed two therapist observation scales to aid in the evaluation of family competence and family style, the *Beavers Interactional Competence Scale* (BICS) and the *Beavers Interactional Style Scale* (BISS), in which trained observers rate the family as they discuss the question “What would you like to see changed in your family?” The BICS assesses the family’s overall health and competence according to the following dimensions: Structure of the family, Mythology (from congruent to incongruent), Goal-directed negotiation, Autonomy, Family affect, and Global Health pathology. The BISS evaluates families on the continuum of centripetal to centrifugal through the following eight subscales: Meeting dependence needs, Managing conflict, Use of physical space, Appearance to outsiders, Professed closeness, Managing assertion, Expression of positive and negative feelings, and Global style. Beavers and Hampson (1990) also developed the Self-Report Family Inventory (SRFI), a 36-item inventory that can be completed by family members older than 11 years. The SRFI can be used to discriminate between families with members who have specific psychiatric diagnoses.

Darlington family assessment system

The Darlington Family Assessment System (DFAS) (Wilkinson, 1987, 1998, 2000) consists of a framework of widely accepted concepts in child and family work (Table 8.1). Wilkinson (1998) views family assessment as a historical and cultural product that is socially constructed. Family functioning is determined by multiple and interrelated factors. Wilkinson (2000) adopts a pragmatic view of assessment and links his model to training and psychotherapy.

A semistructured clinical interview schedule and interviewer rating scale were developed to assess the components of the conceptual framework, known as *Darlington Family Interview Schedule* (DFIS) and the *Darlington Family Rating Scale* (DFRS), respectively. The major goal of the interview is to delineate possible problems and consider how they are perceived or constructed by the family members. The rating scale is a purpose-designed record form that accompanies the structured interview. It consists of 18 subscales, 17 of these subscales are 5-point ordinal scales, and one is a 3-point scale.

TABLE 8.1 Conceptual Framework for the Darlington Family Assessment System

| |
|--|
| <p><i>Child-centered problems</i></p> <ul style="list-style-type: none"> <i>Child health (physical)</i> especially chronic illness and disabilities <i>Child development</i> including self-care, communication, independence <i>Emotional disturbance</i>—mood disturbances and their effects <i>Relationships</i> within and outside the family <i>Conduct</i>—behavior toward others <i>Negative life events</i> bereavement, separations, or other traumas^a |
| <p><i>Parent-centered problems</i></p> <ul style="list-style-type: none"> <i>Parental health (physical)</i> especially illness and disability <i>Parental health (psychological)</i> particularly psychiatric illness <i>Marital partnership</i> and its effect on family and parenting <i>Parenting history</i>—the parents' experience of being parented <i>Parents social</i> the support available |
| <p><i>Parent-child interaction</i></p> <ul style="list-style-type: none"> <i>Care</i> (including overinvolvement, as well as neglect) <i>Control</i> (from lack of control to overcontrol) |
| <p><i>Whole family functioning</i></p> <ul style="list-style-type: none"> <i>Closeness and distance</i>—attachment patterns in the family <i>Power hierarchies</i>—responsibilities and dominance <i>Emotional atmosphere + rules</i> patterns of emotional expression <i>Contextual stresses</i> living conditions, poverty, stigma^a <i>Summary of family development</i> (problems viewed in the context of the life cycle) |

^aThese problem dimensions are additions to the original framework.

Source: From Wilkinson, I. (2000) The Darlington Family Assessment System: Clinical Guidelines for Practitioners. *Journal of Family Therapy*, 22(2), 211–224, with permission. Copyright 2000 by Blackwell Publishers.

THE ASSESSMENT OF PARENTING

Advances in parenting research

Parenting is a complex process involving the responsive provision of varied amounts of care, affection, stimulation, support, and control according to the needs of the child (Puckering, Rogers, Mills, Cox, & Mattsson-Graf, 1994). One of the biggest challenges facing parents is to strike a balance between raising children to adjust to the demands of their community or society while at the same time encouraging the expression of their individuality (Joussemet, Landry, & Koestner, 2008). Grolnick and Pomerantz (2009) describe the multiple-forms approach to control, which acknowledges the difficult balance that parents must achieve between socializing their child to comply with social norms and expectations through behavioral control and at the same time acknowledging and promoting the child's autonomy and individuality by avoiding psychologically controlling parenting techniques. Grolnick and Pomerantz (2009) argue that the term "parental control" should be used only to describe authoritarian and psychologically controlling strategies, such as the use of force, intrusiveness, curbing initiative, power assertion, or ignoring the child's perspective. The opposite of this they describe as "autonomy support", which includes encouraging initiative, scaffolding, and taking into account the child's perspective.

Baumrind, Larzelere, and Owens (2010) further emphasize the central role that parents play in their child's socialization by encouraging and promoting self-regulation, self-determination, and social competence. Thus, much research on the effects of parenting has focused on childhood psychological outcomes, problem behaviors, and social competence (Maccoby, 2000). Positive parenting and family functioning appear to be related to greater levels of self-regulation. For example, maternal responsiveness, as well as dyadic mutuality (characterized by high levels of positive affect and connectedness and positive behavior support) has been found to be related to self-regulation. Theory and research have identified several family factors that play a formative role in children's emotional regulation, including parental responses to the child's affect, the family emotional climate, and interparental functioning (Morris, Silk, Steinberg, Myers, & Robinson, 2007).

Maccoby (2007) suggests that an important question in modern parenting research is how parental control can be best exercised in order to facilitate competence and autonomous self-regulation in children. When referring to control, researchers use terms, such as structure, contingency (Seligman, 1975; Watson, 1979), firm versus lax control (Faubert, Forehand, Thomas, & Wierson, 1990), behavioral control (Barber, 1996; Steinberg, Elmen, & Mounts, 1989), psychological control (Barber, 1996; Steinberg et al., 1989), restrictiveness, demandingness (Baumrind, 1991a, 1991b), assertive control, disci-

pline (Locke & Prinz, 2002), forceful control (Kochanska, Aksan, Knaack, & Rhines, 2004), and coercive and inductive control (Rollins & Thomas, 1979). However, Skinner, Johnson, and Snyder (2005) point out that some of these may be broad terms combining two or more of the other specific terms listed, or they may in fact combine control with other dimensions of parenting, such as warmth.

A Historical overview of parenting dimensions

Baldwin and colleagues (Baldwin, 1946; Baldwin, Kalhorn, & Breese, 1945) identified three main clusters of parenting variables, including *acceptance*, as identified by Symonds (1939), as well as two additional dimensions of *indulgence* and *democracy*. Schaefer's (1959, 1965) research is also appreciated for introducing the concept of *psychological control*, which has been the focus of much research on adolescent outcomes in recent years. The results of his studies have suggested that maternal behavior could be organized along the dimensions of love versus hostility, and autonomy versus psychological control. In addition, Becker (1964) identified three parenting dimensions, which he termed warmth versus hostility, restrictiveness versus permissiveness, and anxious involvement versus calm detachment. Although there are significant variations in the terminology used, it appears that many of these earlier researchers agreed on some broad parenting variables, such as *warmth and acceptance*, *behavioral control*, and *psychological control*.

Despite the variation in parent predictors and developmental outcomes, researchers studying parenting have focused on such dimensions as warmth/harshness, discipline strategies, involvement, monitoring, and parenting styles and practices. Empirical findings support the association between parenting practices exemplified by warmth and affection, positive reinforcement, firm and consistent discipline, and active involvement in and monitoring of child activities and psychosocial well-being (Baumrind, 1978; Gray & Steinberg, 1999), including reduced externalizing and internalizing symptoms (e.g., Barber & Olsen, 1997). Research has also revealed that negative parenting is associated with psychosocial maladjustment (e.g., Teicher, Samson, Polcari, & McGreenery, 2006). The results from this early research do seem to suggest that the affective quality of the parent–child relationship is a two-dimensional construct: warmth and acceptance versus negative affect and rejection. Parental acceptance is related to lower levels of emotional and behavioral problems (e.g., Papp, Cummings, & Goeke-Morey, 2005), and parental warmth is related to empathy and prosocial behaviors (e.g., Davidov & Grusec, 2006). On the other hand, negative affect or rejection predicts higher levels of internalizing and externalizing problems (e.g., McLeod et al., 2007a).

A trend in more recent research reflects increasing attention to parental responses to children's emotions, including *emotion responsiveness* and *emotion coaching* (e.g., Gottman, 1997). This has further led to describing parenting control behaviors, including *discipline strategies* and *monitoring*, and psychological control strategies, including *autonomy granting*, *overcontrol*, and *intrusive and oversolicitous parenting*.

PARENTING STYLES AND BEHAVIORS

Parenting style refers to patterns of child rearing evolved from the parents' reactions toward their children. Parenting child attachment refers to the dyadic emotional bond that emerges between parent and child (Desjardins, Zelenski, & Coplan, 2008). Parenting styles vary from direct control and guidance to distal supervising and monitoring. Given that the incidence of high-risk behaviors (e.g., substance abuse) increases in adolescence, the child's acceptance of parental socialization practices and an accepting attitude (*willing stance*) toward parental values and standards of conduct play central roles in adaptive behavior (Kochanska, Koenig, Barry, Kim, & Yoon, 2010). However, it is increasingly recognized that the impact of parenting may be increasingly moderated by children's biologically based characteristics (e.g., Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Belsky & Pluess, 2009a, 2009b; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2011; Pluess & Belsky, 2010).

In a multimethod and multitrait longitudinal study, Kochanska, Brock, Chen, Aksan, and Anderson (2015) examined the interplay of parenting in community families, where children were followed from toddlerhood to preadolescence. Findings revealed that children at higher biobehavioral risk were affected by parenting variability. For this group of children, more optimal parenting was associated with better socialization at 10 years whereas less optimal and effective parenting was associated with poorer outcomes. A combination of high biobehavioral risk and poor parenting skills was associated with the worst outcomes at age 10.

Darling and Steinberg (1993) also divide parenting into two main components: *parenting styles* and *parenting practices*. These authors used Baumrind's typology to exemplify parenting style. According to Baumrind, parenting styles fall into three types: *authoritarian* (demand obedience), *permissive* (acquiesce to child's demands), and *authoritative* (use reasoning) (see Fig. 8.2) (Shahimi, Heaven, & Ciarrochi, 2013). Parenting practices refer to the discipline employed by parents

| | | Demandingness | |
|----------------|------|-------------------------|----------------------|
| | | High | Low |
| Responsiveness | High | Authoritative parenting | Permissive parenting |
| | Low | Authoritarian parenting | Neglectful parenting |

FIGURE 8.2 Baumrind's parenting styles. [From Shahimi, F., Heaven, P., & Ciarrochi, J. (2013). *The Interrelations among the perception of parental styles and psychological well-being in adolescence: a longitudinal study*. *Iranian Journal of Public Health*, 42(6), 570–580.]

to socialize and monitor their child's behavior. They describe context-specific behaviors, such as what a parent does to facilitate physical activity (Gustafson & Rhodes, 2006; Pugliese & Tinsley, 2007).

The authoritative style (high on Responsiveness and on Demandingness) is widely accepted as the most beneficial parenting for American children. The primary goal of authoritative parents is to produce self-reliant individuals who exhibit both competence and moral characteristics. This style of parenting fosters competence and character through children's internalization of parental and cultural values (Baumrind, 1996). The most widely employed disciplinary approach is reasoning/induction. Although the authoritarian parents in Baumrind's original sample were more likely to use harsh physical punishment, authoritative and authoritarian parents were indistinguishable in their rates of normative spanking. Only permissive parents spanked less than other parents (Baumrind, Larzelere, & Owens, 2010).

Research continues to support the observation that dissimilarity between parenting styles is an important factor in the development of emotional and behavioral problems in children (Dwairy, 2010). For example, Jaursch, Lösel, Beelmann, and Stemmler (2009) found that parental dissimilarity and emotional warmth and rejection were correlated with children's internalizing and externalizing problems. *Unpredictability* of parental behavior constitutes a risk for developing anxiety symptoms and depression, as well as *learned helplessness*, which is associated with internalizing and externalizing problems (e.g., Ross & Wynne, 2010).

Parental inconsistency is another important factor regarding the quality of parenting. Parental inconsistency may occur in three forms: temporal, situational, and father–mother inconsistency. The negative effect of parental inconsistency may lead to the development of ambivalence and sense of injustice (Dwairy, 2009). Studies on parental inconsistency (e.g., Dwairy, 2008, 2010) showed that it is culturally dependent and higher among fathers. The published literature generally supports the association between inconsistency and psychological maladjustment for children. Freud (1953); Freud and Brill (1914) associated ambivalence with psychological conflict and neurotism. Hersov (1960) notes that inconsistency between maternal and parental parenting styles may increase the child's separation anxiety and school phobia; while Patterson (1982) argued that inconsistent parenting is associated with conduct disorders. Ross and Gill (2002) found that eating disorder symptoms among female college students were correlated with retrospective ratings of inconsistent parental discipline. Moreover, inconsistency in parenting seems closely related to “splitting” between the “good” and the “bad” mother (Mahler, Pine, & Bergman, 1975).

With respect to the impact of parenting style and behavior on their children's psychological development, an early review of the parenting literature found that the majority of evidence suggested that parental overprotection and control may be more consistently associated with the development of anxiety disorders, while parental rejection may be more strongly associated with depression (Rapee, 1997). A longitudinal study by Beesdo, Pine, Lieb, and Wittchen (2010) of more than 3000 adolescents/young adults reported that anxiety disorders were significantly predicted by baseline reports of parent overprotection, while mood disorders were predicted by rejection and the lack of affection.

Affective dimensions of parenting

Three themes can be identified in the assessment of parenting style over the past 50 years. The first is the centrality of *parental warmth and caring* to child development. The second is *parent provision of structure*, indirectly associated to discipline and authoritarian style of parenting. This theme implies that expectations and limit settings are beneficial to

children with regard to issues of self-efficacy and moral standards. The third theme is that of *autonomy support*, implying that better developmental outcomes are likely to occur when parents support freedom of expression along with initiative and individuality. While these three themes or dimensions still reflect only a subset of dimensions that are critical to the quality of parent–child interactions, they are considered as core features of parenting style. Thus *warmth versus rejection*, *structure versus chaos*, and *autonomy/support versus coercion* are found in the assessment of parenting for children from preschool years to late adolescence.

Aspects of parenting

Quality of Marital Relationship

The term “marital quality” is used generically to describe the overall quality of the parent relationship, and includes such concepts as marital adjustment, satisfaction, and happiness (Spanier & Lewis, 1980; Heyman, Sayers, & Bellak, 1994). Marital satisfaction and happiness both refer to subjective evaluations of positive affect in the marital relationship by one or both of the spouses. Marital adjustment signifies both behavioral and evaluative aspects of a marital relationship. These include dyadic cohesion, satisfaction, consensus, interpersonal tensions, and troublesome dyadic differences (Spanier, 1976). A well-adjusted marriage may be characterized by high interaction and cohesion, low levels of disagreement, high levels of commitment to the relationship, and good communication and problem-solving abilities. Most marital quality measures focus on the identification of troubled marriages or to test theories related to describing the core components of marital functioning and behavior.

Marital life course studies identify factors that account for changes in the husband–wife relationship that reflect the chronological aging of the partners and the marriage and the changing roles and structures of the family as the individuals move through their marital life cycle (Mattessich & Hill, 1987). This approach also explores how patterns of behavior and evaluations early in a marriage carry over into later stages of the relationship.

Interparental Conflict and Externalizing Problems

Research has revealed that children’s consistent exposure to interparental conflict is a precursor of externalizing symptoms in childhood and adolescence (e.g., Buehler et al., 1998; Jouriles, Rosenfield, McDonald, & Mueller, 2015). According to family process models, children’s vulnerability to parental discord may be linked to three distinctive forms of conflict behaviors: *hostility*, *disengagement*, and *uncooperativeness* (e.g., Harold & Leve, 2012; Repetti, Roble, & Reynolds, 2011). Interpersonal hostility specifically consists of parental expression of anger, frustration, and aggression during conflicts, whereas disengagement between parents consists of parental withdrawal, detachment, and avoidance behaviors. Uncooperativeness is reflected in low levels of warmth, support, and collaborative problem solving.

The conceptual emphasis placed on children’s insecurity as a mediator in the pathway between interparental conflict and children’s behavior problems was originated in *emotional security theory* (EST; Davies & Cummings, 1994). EST posits that destructive interparental conflict undermines children’s ability to preserve their emotional security across various developmental periods. In an effort to distinguish between the specific forms of conflict outlined in the family process models, the reformulation of emotional security theory posits that interparental hostility, disengagement, and poor cooperation will vary systematically in their strength as predictors of children’s insecurity (EST-R; Davies & Sturge-Apple, 2007). According to EST-R, the emotional security system has developed over our evolutionary history to selectively respond to cues of interpersonal danger. As a result, interpersonal threat cues (e.g., angry faces, loud voices, aggressive posture, and behavior) assume primacy in organizing children’s fearful responses in close-knit social contexts, such as the family (Davies & Sturge-Apple, 2007; Ohman & Mineka, 2001).

Davies et al. (2016) explored the relative strength of mediational pathways across two longitudinal studies involving hostile, disengaged, and uncooperative forms of interparental conflict; children’s emotional insecurity; and their externalizing problems. Both studies utilized multimethod, multi-informant assessment batteries within a longitudinal design with three measurement occasions. Across both studies, lagged, autoregressive tests of the mediational paths revealed that interparental hostility was a significantly stronger predictor of the prospective cascade of children’s insecurity and externalizing problems than interparental disengagement and low levels of interparental cooperation. Findings further indicated that interparental disengagement was a stronger predictor of the insecurity pathway than was low interparental cooperation.

Dyadic interactions between parent and child

The way the parent and the child organize or “coregulate” their interaction in real time could be particularly influential in shaping the child’s ability to regulate behavior at various developmental points in time. Self-regulation is an active process

that finds expression in the context of environmental or interpersonal challenges (Cole, Martin, & Dennis, 2004). Mutually responsive, positive, harmonious, synchronous early parent–child dyadic relationships have particularly beneficial effects. These effects include a range of outcomes, such as attachment security, adaptive emotion regulation, or social competence (e.g., Lindsey, Caldera, & Tankersley, 2009).

Empirical research has demonstrated that rigid, mutually negative interaction patterns between parent and child contribute to children’s higher levels of externalizing and antisocial behavior problems (Achenbach, 1990) within and across time. An understanding of the link between adaptive parent–child interactions and children’s emerging behavioral adjustment could contribute to a better understanding of the development and prevention of children’s behavioral problems.

Research in infancy (through studies of parental responsiveness to infant needs) has highlighted the importance of positive, reciprocal interactions between parent and newborn. In early childhood, shared positive affect and positive coregulation between parent and child are still important as children begin to internalize the ability to modulate affective responses in interpersonal relationships. Cross-sectional research has demonstrated that positive, well-regulated (e.g., temporarily coordinated) parent–child interactions are associated with children’s lower levels of behavioral problems (e.g., Harrist, Pettit, Dodge, & Bates, 1994). Similarly, longitudinal research has shown that children’s and mothers’ contingent positive responses predict reductions in children’s externalizing behavior problems between 5 and 6 years (e.g., Cole, Teti, & Zahn-Waxler, 2003).

In sum, coregulatory constructs, such as temporal coordination flexibility, contingency, and mutuality between parent and child are related to children’s behavioral adjustment within and across time. Research (e.g., Bigras, LaFreniere, & Dumas, 1996) has demonstrated that the parent domain was more strongly associated with measures of marital adjustment and maternal depression, whereas the child domain was more strongly associated with child difficulties reported by the mother, as well as children’s problems observed during parent–child interactions.

The association between attachment and psychopathology has been a major topic research in recent times. Bowlby (1982) was among the first to highlight the way in which parent–child relationships can contribute to troubled behavior in childhood. Bowlby’s (1944, 1956) studies of children who were separated from their mothers in infancy laid the foundation for his later writings on attachment theory and links with research of Ainsworth (1964, 1979). The Ainsworth Strange Situation Assessment (Ainsworth, 1979) led to the formation of four attachment styles: secure, avoidant, ambivalent-resistant, and disorganized-disoriented. Subsequently, scientists have sought to understand how insecure attachment relates to the development of externalizing and internalizing behaviors (e.g., Kerns & Brumariu, 2014).

Bidirectionality in Parent–Child Relationships

Decades of research evidence implicate both parents and children as mutual socializers of parenting behaviors, children’s development, and relationship quality (e.g., Pardini, 2008)—that is, bidirectional parent–child relationships. Bidirectionality has been incorporated into diverse theoretical frameworks as the mechanism of transmission of psychopathology, socialization, academic skills, and health (e.g., Belsky, 1984; Kochanska et al., 2010). Bidirectionality refers to a process whereby parent and child influence each other, as well as the dyadic relationship (Paschall & Mastergeorge, 2015).

Paschall and Mastergeorge’s (2015) empirical review directed at advancing the study of bidirectionality evaluates evidence from 25 years of research in infancy and early childhood. The first trend is the reciprocal influence of individual characteristics. Studies aligned with this trend identified bidirectional associations between two or more parent and child characteristics. The second trend, the strength and direction of influence in light of developmental risk and psychopathology, focused on specific populations, including children who manifest externalizing behaviors (Del Vecchio & O’Leary, 2006), those with harsh or unsupportive parents (e.g., Brown, McIntyre, Crnic, Baker, & Blacher, 2011), those with parents with depression (e.g., Casalin, Luyten, Besser, Wouters, & Vliegen, 2014), and children at risk of atypical development due to substance exposure or having a sibling with autism (e.g., Chow, Haltigan, & Messinger, 2010). Evidence indicates that parents and children with risks, including developmental delays and low levels of self-regulation, are more likely to engage in reciprocal exchanges that could increase both psychopathological risks for mothers and disengagement and dysregulation for young children.

The still-face paradigm is a laboratory task where mothers are asked to interact with their infants, and then be unresponsive for up to 2 min before resuming play in order to assess how disruption in play impacts infant and parent affect and behavior. The collective evidence from the three studies indicates that positive affective matching between mother and infant during the reunion phase of the paradigm is influenced by several factors, including maternal sensitivity, the presence or absence of touch, and the timing of the unresponsive event.

Many studies tested their child–parent relationships hypothesis with causal modeling procedures to discover if developmental and/or socialization processes were parent-driven or child-driven (e.g., Del Vecchio & Rhoades, 2010). For example, a study of the nature of stability and change in mother–child emotional exchanges utilized the APIM to test

competing hypothesis of parent-driven versus child-driven effects (Feng, Shaw, Skuban, & Lane, 2007). The results of the final model indicated that affective exchanges were a parent-driven process. A second study employed SEM to identify children's inhibitory control as a mediator of the bidirectional effects between maternal depression and children's disruptive behavior across children ages 2–5 (Choe, Sameroff, & McDonough, 2013). The findings from these two studies highlight the importance of coupling focused research questions with research designs that test refutable hypothesis of the nature and variation of reciprocal influence in parent–child interactions (Murnane & Willett, 2011).

Bidirectional Models of Parenting and Temperament

In a transactional model, parenting and child temperament are expected to mutually shape each other over time. The concept of transactional relations is derived from an ecological perspective on development. In the transactional relations between parenting and temperament, parents' effort might target reducing a child's negative affect and disregulated behaviors. At the same time, it is these specific behaviors that might elicit more negative parenting that enhances behavioral and emotional problems. Conversely, parents' efforts might aim at encouraging positive characteristics, such as effortful control, which in turn might elicit more positive parenting that would enhance psychological adjustment. The effects of parenting relate to children's temperament, and interactions between parenting and child temperament might account for the complexity in the developmental process. Several theories have been formulated to explain how and why temperament may interact with parenting.

Bell's (1968) early model on a bidirectional influence between parent and child behaviors emphasized these transactional influences in a series of cycles over time. More recent models have examined children's differential responsiveness to parenting behaviors. The model of "organismic specificity" developed by Wachs (1987, 1994), supports the view that individuals variously respond to environmental factors based on their individual characteristics. Several more recent extensions of this model include the "biological sensitivity" to context model, which claims that individuals vary in the degree to which the environment affects their development, suggesting that some individuals are highly susceptible to environmental factors, whereas others are much less susceptible (Ellis & Boyce, 2008).

Belsky et al. (2007) proposed a more specific model of differential responsiveness, referred to as the "differential susceptibility hypothesis" (Belsky et al., 2007; Belsky & Pluess, 2009a, 2009b). This model proposes that individual characteristics and in particular reactivity may increase the child's responsiveness to parenting, both positively and negatively. Thus, highly reactive children prosper in response to positive parenting and stumble in response to negative parenting.

A "diathesis-stress" model underlines that vulnerable individuals are mostly affected by negative or risky environments, with temperamental vulnerabilities and risky environments each enhancing the possibility for risk. Three of these theories (organismic specificity, biological sensitivity to context, and the differential susceptibility hypothesis) maintain that temperament will moderate the relation between parenting and adjustment. Additionally, these models suggest that temperament has both synergistic and buffering effects (Wachs, 1991).

Further, these models propose that temperament serves as a risk or protective factor and impacts the effect of parenting on the child's development. That is, environmental effects vary across levels of individual reactivity. An alternative hypothesis to the aforementioned theories is "environmental specificity" in which developmental outcomes vary as a function of diverse environmental variations, including specific parenting behaviors (Wachs, 1991).

The various transactional models between parenting practices and child outcome have influenced treatments of parent–child relations. Although there are various treatments for disruptive behavior that are primarily parent-directed, such as Parent Management Training (Patterson, Reid, Jones, & Conger, 1975), Helping the Non-Compliant Child (McMahon & Forehand, 2003), and Parent–Child Interaction Therapy, or are child-directed, such as Problem-Solving Skills Training (Kazdin, 2010) and Anger Coping Program (Larson & Lochman, 2002), some treatments include protocols for working with both children and their parents and consider the family as a unit—for example, Incredible Years (Webster-Stratton & Reid, 2010), Combined Parent Management Training, and Problem Solving Skills Training (Kazdin, 2010).

There is increasing interest in the relationship between the quality of parenting and young children's self-regulation and externalizing problems. In particular, investigators have paid attention to such constructs as positive and negative functioning (e.g., Blair et al., 2011; Gustafsson, Cox, & Blair, 2012).

One type of negative parenting that has recently captured the attention of researchers is parental intrusiveness or over-control. Intrusive parenting might undermine the child's behavioral and emotional self-regulation (e.g., Graziano, Keane, & Calkins, 2010).

Eisenberg, Taylor, Widaman, and Spinrad (2015) examined potential bidirectional relations among intrusive maternal parenting, children, effortful control, and children's externalizing problems during the preschool period. A panel structural equation model was applied to examine relations among these constructs when controlling for prior levels of the variables (i.e., controlling for stability). In order to examine child effects, the authors investigated paths from child maladjustment

and effortful control to intrusive parenting, as well as paths between maladjustment and effortful control and within-time associations among parenting, effortful control, and maladjustment. The findings are consistent with the view that children's externalizing behavior undermines their effortful control and contributes to intrusive mothering and that relations between intrusive parenting and effortful control are bidirectional across time. Thus, interventions that focus on modifying children's externalizing problems (as well as the quality of parenting) might affect the quality of parenting they receive and, hence, subsequent problems with adjustment.

Child Abuse and Maltreatment as an Outcome of Negative Parenting

The National Society for the Prevention of Cruelty to Children defines maltreatment as “all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment, or commercial or other exploitation, resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust, or power” (Butchart, Putney, Furniss, & Kahane, 2006, p. 9).

A great difficulty in the investigation of child maltreatment is that the range of phenomena covered by the term is quite varied. Neglect involves failure to provide for the child's basic physical needs for adequate food, clothing, shelter, and medical treatment, whereas emotional maltreatment involves extreme thwarting of children's basic emotional needs for psychological safety and security, acceptance and self-esteem, and age-appropriate autonomy (e.g., belittling and ridiculing the child, showing extreme negativity and hostility, exposing the child to severe marital violence, abandoning the child, or making suicidal or homicidal threats). Physical abuse includes the nonaccidental infliction of physical injury on the child (e.g., bruises, welts, burns, choking, broken bones) for which the injuries can range from minor and temporary to permanently harming. Sexual abuse is defined by attempted or actual sexual contact between the child and the caregiver for purposes of the caregiver's sexual satisfaction or financial benefit by forced prostitution; events range from exposure to pornography or adult sexual activity, to sexual touching and fondling, to forced intercourse with the child (Masten & Cicchetti, 2016).

Crooks and Wolfe (2007) develop a model of child abuse and neglect that emphasizes the need to understand not only the abusive behavior of the parent, but also the family context in which the abuse takes place. They note that “the impact of maltreatment depends on not only the severity and chronicity of the abusive events themselves, but also how such events interact with the child's individual and family characteristics” (p. 646). Consequently, a comprehensive family assessment must focus on individual, familial, and cultural factors and their interrelations. According to Crooks and Wolfe (2007), assessment methods should address the following general purposes: (1) identify the general strengths and needs of the family system, (2) assess parental responses to the demands of child rearing, (3) identify the needs of the child, and (4) assess parent-child relationship and abuse dynamics.

A recent advancement in child maltreatment research is the application of *multilevel developmental approaches*. In the past, studies on the effects of child abuse consisted on the whole of correlational methods and behavioral observations. Most recent emphases in developmental psychopathology focus on clarifying the way child abuse affects developmental processes that often result in maladaptive behavior. This approach mirrors significant changes in the way many developmentalists now conceptualize psychopathology. For example, cutting-edge researchers in the field of child maltreatment now tend to deemphasize distinctions between what would have previously been construed as mental versus physical disorders. There is also a renewed emphasis among researchers on the interactions between persons and their environments.

Physical child abuse is typically defined as nonaccidental injury to a child (Child Abuse Prevention, Adoption and Family Services Act of 1988), implying that the resultant harm was intentional. Physical discipline has been defined as “the use of physical force with the intention of causing a child to experience pain, but not injury, for the purpose of correction or control of the child's behavior” (Straus, 2000, p. 110). The distinction between physical abuse and physical discipline is not always clear. Parent-child aggression has been linked to whether the parental behavior is expressed as child abuse or corporal punishment (e.g., Gershoff, 2002).

Understanding Child Maltreatment From a Multilevel Perspective

Studies of attention, executive functioning, and the neuroscience underlying emotion regulation serve to highlight associations between biological systems of behavior development and the problems experienced by maltreated children. It has been shown that a major facet of risk for maltreated children involves altered neural processing of social stimuli, which appears to impair their regulatory processes.

A study by Shackman and Pollak (2014) investigated the association between child maltreatment and externalizing problems. Maltreated children in this study exhibited greater negative emotions when confronted by an interpersonal stressor. This higher level of negative affect was subsequently associated with more aggressive behavior toward their peers dur-

ing the same laboratory session. This relationship between emotion and behavior was mediated by children's allocation of attention to angry faces as measured by brain event-related potentials (Shackman & Pollak, 2014).

There are several ways in which an abusive family environment might influence a child's associative *learning processes*. Physically abusive parents tend to be impulsive, emotionally unstable, and inconsistent in their parenting (e.g., Shackman, Shackman, & Pollak, 2007; Timmons & Margolin, 2015). Such conditions may encourage children to learn and base their behavior on aberrant outcomes, such as physical violence, that are not typical of most parent-child relationships. For this reason, greater understanding of the brain regions associated with learning reward or punishment is likely to help account for the effects of the environment on these children's interpersonal behaviors.

Integrating research about the neurobiology of learning may prove to be a powerful way to test novel hypothesis about how the environment comes to regulate behavior. This is because successful social adaptation reflects children's ability to learn from complex and varied interpersonal experiences. Thus, children should gradually learn to identify cues for approach versus withdrawal, actions that lead to punishments versus rewards, and behaviors that eventually satisfy needs and desires.

Models of Predicting Child Abuse

Researchers in the field of child maltreatment agree on the urgency of investigating this major problem and have focused on the identification of critical antecedents or risk factors for the maltreatment as a way to reduce and, it is hoped, prevent its occurrence. Commonly used methods for obtaining child maltreatment incidence rates include parental self-reports and the number of referrals to Child Protective Services. However, these methods have several disadvantages, such as parental reluctance to admit abuse or neglect (Ammerman, 1998) and difficulties involved in assessing Child Protective Services databases (Chaffin & Valle, 2003). In order to overcome these obstacles, researchers have utilized child maltreatment risk tools. The most widely used child maltreatment risk tool is the *Child Abuse Potential Inventory* (CAPI; Milner, 1986). It is important to understand the limitations of risk potential inventories and to note the distinction often made between risk factors and risk markers.

Risk markers are defined as variables that are correlated with the outcomes of interest, such as the child's age, physical health, and disruptive behavior, while risk factors imply causation. Chaffin and Valle (2003) distinguished between child abuse occurrence and child abuse potential. The former refers the estimation of child abuse via an official agency, whereas the latter refers to a parent's self-report of the likelihood of abuse perpetration. Two well-established theoretical frameworks for predicting child abuse potential are (1) the developmental-ecological model and (2) the cumulative risk model.

The Developmental Ecological Model of Child Maltreatment

Researchers have expanded Bronfenbrenner's (1977) theory to child maltreatment by investigating the correlational and causal relationships among multiple markers associated with child abuse potential (Ayoub, Willett, & Robinson, 1992). The developmental ecological theory assumes that multiple levels of risk, ranging from individual characteristics to larger socioenvironmental variables, should be taken into account with regard to the antecedents of child maltreatment (Belsky, 1993). The developmental ecological model assumes (Belsky, 1993) that risk markers for physical child abuse are organized around three major conceptual domains: the *developmental psychological*, the *immediate*, and the *broader domains* (Begle, Dumas, & Hanson, 2010). The developmental-psychological domain includes markers that caregivers and children carry with them to the family setting and that affect the potential for child maltreatment, including caregiver and child markers. The immediate conceptual domain includes sociodemographic characteristics, home disorganization, family size, household space, and caregiver-child interactions. Finally, the broad conceptual domain refers to neighborhood characteristics, available resources, involvement in the neighborhood, and access to a peer network.

Cumulative Risk Model

The cumulative risk model differs from the developmental ecological model in that it measures the total number of risk markers rather than specific scores on each individual risk marker. The cumulative risk model assumes that the more risk markers endorsed, the higher the potential for negative outcomes. The cumulative risk model investigates how specific risk markers function in the context of one another (Appleyard, Egeland, van Dulman, & Sroufe, 2005). Findings from studies on child maltreatment (Appleyard et al., 2005) overall support the cumulative risk model as a significant predictor of child abuse potential. Results have indicated that the number of risk markers rather than scores on each individual risk marker play a more important role in evaluating behavioral problems in preschoolers and adolescents.

Parental stress and maternal depression

Parental stress is a distinct type of stress that arises when a parent's perception of the demands of parenting outstrip his or her resources. The dominant view for describing parental stress delineates two major components: a child domain arising directly from child characteristics and a parent domain that is more affected by parental functioning (Abidin, 1995). More so than other types of stress, parental stress is associated with parenting practices (e.g., Abidin, 1992). Parents who experience extreme levels of parenting stress may be less able to implement interventions to support their children (Kazdin, 1995). A high level of parental stress can influence children's adjustment in several ways, one of which is by making it more difficult for a parent to use optimal parenting strategies (Whiteside-Mansell et al., 2007). For example, elevated stress can lead to lower levels of parental warmth and higher rates of harsh parenting (e.g., Haskett, Ahern, Ward, & Allaire, 2006).

Maternal depression has been linked to a variety of negative outcomes for children. These include low attachment among infants and increased behavioral problems among toddlers (Caughy, Huang, & Lima, 2009), and externalizing and internalizing behavior problems in elementary school children (e.g., Ashman, Dawson, & Panagiotides, 2008). Maternal depression has also been found to be a predictor of adolescents' depression, poor social and emotional adjustment, substance use, and early sexual risk behavior (Leve, Kim, & Pears, 2005). Studies have shown that low income is associated with higher likelihood of depression.

Parental psychopathology, particularly maternal depression, has been shown to be associated with parenting stress (e.g., van der Oord, Prins, Oosterlaan, & Emmelkamp, 2006). Recent studies using more direct measures than in the past (e.g., Parenting Stress Index) have revealed that the parent-child dysfunctional interaction domain of parenting stress is associated to internalizing symptoms in the child, when parental psychopathology is controlled for (Costa, Weems, Pellerin, & Dalton, 2006). There are two types of measures that can be used to assess parenting stress: general life stress (e.g., life event scales) and measures specific to parenting.

FAMILY RESILIENCE

Resilience is a complex construct that is fundamentally interdisciplinary and dynamic. There are multiple approaches to defining resilience, either at the individual, family, or system level. Perhaps the most dominant modern approach defines resilience as a dynamic process by which individuals or groups adapt positively to adverse circumstances (Luthar, Cicchetti, & Becker, 2000; Masten, 2007; Prince-Embury & Saklofske, 2013, 2014). By extension, resilience can be considered an outcome—that is, a specific set of behaviors or characteristics that arise when an individual or a group (e.g., family) succeeds despite the odds. Family resilience in particular considers how resilience processes at the individual level may also function at the family level (e.g., Patterson, 2002). For example, Walsh (2007) identified a framework for identifying nine family resilience processes that fall into three categories: communication/problem solving, organizational patterns, and belief systems. Considerable applied work, therefore, focuses on bolstering protective factors while reducing risk factors to promote resilience—that is, positive and healthy adaptation, including supportive and healthy relationships among individuals and increasingly families facing adversity (Black & Lobo, 2008; Masten, 2001; Patterson, 2002).

Resilience is the capacity to withstand and rebound from disruptive life changes. Resilience has increasingly become an important concept in developmental science and in the field of mental health. It involves dynamic processes denoting positive adaptation in the context of adversity (Masten & Cicchetti, 2016). *Family resilience* can be defined as the family's capacity, as a functional system, to withstand and rebound from stressful life challenges—emerging strengthened and more resourceful (Walsh, 1996, 2002a, 2002b, 2003). Family resilience theory, research, and practice also build on a body of family systems research on transactional processes in well-functioning families (Lebow & Stroud, 2012). Effective functioning and positive adaptation are related to the type, severity and chronicity of adverse challenges and on the resources constraints and aims of the family in its social context and life passage (Walsh, 2016).

According to Walsh (2016), a resilience-oriented family assessment aims at identifying members who are—or could become—invested in the positive development of at-risk children, help them believe in their potential, support their best efforts, and encourage positive contributions by family members (Ungar, 2004). Key transactional processes enable the family to rally in highly stressful times: to take proactive steps, to buffer disruptions, to reduce the risk of dysfunction, and to support positive adaptation and resourcefulness in facing future challenges.

A family resilience framework, by definition, focuses on strengths under stress, in response to a crisis or with prolonged adversity. Second, such a framework assumes that no single model of healthy functioning fits all families or their situations. Family functioning should be carried out in context: relative to each family's values, structural and relational resources, and life challenges. Third, processes for optimal functioning and the well-being of members may vary over time. Based on a meta-analysis of the research literature on resilience and family functioning, Walsh (2003) identified nine key transactional

processes that facilitate family resilience and organized them in three domains (dimensions). These key family processes (Table 8.2) and overall effective functioning in family systems tend to strengthen resilience in children in dealing with adversity (Walsh, 2016).

Resilience has been conceptualized and studied for decades at the level of the individual child (Cicchetti, 2013; Masten, 2013, 2014b) and also at the level of the family (Becvar, 2013; Goldenberg & Goldenberg, 2013; Walsh, 2006, 2011a, 2011b). Beginning as early as the 1960s, researchers investigating the etiology of mental health and developmental problems shifted their attention to individuals in high-risk categories who were doing well, in an effort to improve theory and practice (Masten, 2014a, 2014b). Thus, researchers have acknowledged the significant role of family function and caregiving quality in high-risk children. This body of research contributed to a shift from deficit- to strength-based developmental frameworks (e.g., Masten, 2014b).

During recent decades, definitions of resilience have become more dynamic, multilevel, and process-oriented in focus, reflecting a broad theoretical shift toward a relational developmental systems framework (e.g., Overton, 2013; Zelazo, 2013).

TABLE 8.2 Key Processes in Family Resilience

Belief systems

1. Making meaning of adversity
 - Relational view of resilience
 - Normalize, contextualize distress
 - Sense of coherence: view crisis as meaningful, comprehensible, manageable challenge
 - Facilitative appraisal: explanatory attributions; future expectations
2. Positive outlook
 - Hope, optimistic bias; confidence in overcoming challenges
 - Encouragement; affirm strengths, focus on potential
 - Active initiative and perseverance (can-do spirit)
 - Master the possible; accept what can't be changed; tolerate uncertainty
3. Transcendence and spirituality
 - Larger values, purpose
 - Spirituality: faith, contemplative practices, community; connection with nature
 - Inspiration: envision possibilities, aspirations; creative expression; social action
 - Transformation: learning, change, and positive growth from adversity

Organizational processes

4. Flexibility
 - Rebound, adaptive change to meet new challenges
 - Reorganize, restabilize: continuity, dependability, predictability
 - Strong authoritative leadership: nurture, guide, protect
 - Varied family forms: cooperative parenting/caregiving teams
 - Couple/coparent relationship: mutual respect; equal partners
5. Connectedness
 - Mutual support, teamwork, and commitment
 - Respect individual needs, differences
 - Seek reconnection and repair grievances
6. Mobilize social and economic resources
 - Recruit extended kin, social, and community supports; models and mentors
 - Build financial security; navigate stressful work/family challenges
 - Transactions with larger systems: access institutional, structural supports

Communication/problem-solving processes

7. Clarity
 - Clear, consistent messages, information
 - Clarify ambiguous situation; truth seeking
8. Open emotional sharing
 - Painful feelings: (sadness, suffering, anger, fear, disappointment, remorse)
 - Positive interactions: (love, appreciation, gratitude, humor, fun, respite)
9. Collaborative problem solving
 - Creative brainstorming; resourcefulness
 - Share decision making; repair conflicts; negotiation, fairness
 - Focusing on goals; concrete steps; build on success; learn from setbacks
 - Proactive stance: preparedness, planning, prevention

Source: From Walsh, F. (2016) Family resilience: a developmental systems framework. *European Journal of Developmental Psychology*, 13(3), 313–324, with permission. Copyright 2016 by Taylor & Francis.

This perspective integrates principles from general systems theory (Von Bertalanffy, 1968), ecological theory (Bronfenbrenner & Morris, 1998), developmental systems theory (e.g., Lerner, 2006; Sameroff, 2010), biology (Lickliter, 2013), family systems theory (Goldenberg & Goldenberg, 2013), developmental psychopathology (Cicchetti, 2013), and resilience theory (Cicchetti, 2013; Masten, 2014b). Masten and Monn (2015) propose the following core components and integrative processes to be incorporated into an integrative framework for child and family resilience:

- Definitions of positive adaptation at the level of child and family and processes that link adaptive function across system levels
- Delineation of pathways of adaptive function in child and family over time and the interplay of these adaptive pathways
- Identifying promotive processes for adaptive development in children and families and processes by which these effects spread across systems
- Identifying risks to positive adaptation or development for child and family and processes by which risk spreads across systems
- Identifying protective processes that prevent or mitigate adverse effects or boost recovery from adversity in a child or a family and processes by which protective influences spread across systems

Positive adaptation in children and families

Issues concerning positive child development, adaptation, competence, or success have received increasing attention in the field of child resilience (e.g., Masten & Coatsworth, 1998; Wright, Masten, & Narayan, 2013; Prince-Embury & Saklofske, 2014). One major approach for judging adaptation is positive, focusing on age-related expectations for behavior and achievement defined by communities and societies, often referred to as “developmental tasks” (McCormick, Kuo, & Masten, 2011). There is widespread agreement that competence and developmental tasks are multidimensional. Some studies of psychosocial resilience focus on one particular dimension or competence domain, such as academic achievement, whereas others use multiple criteria to define resilience (i.e., doing well in all major developmental tasks for a given age period). A second approach for judging adaptation is defined by low levels or absence of symptoms or disorder.

What does it mean for a system, a child, or a family to be “doing well” or “OK”? Child resilience investigators have long recognized that resilience is inferred from judgments about risk (discussed further later) and adaptive function or development (Luthar et al., 2000; Masten & Coatsworth, 1998). What are the criteria or standards by which we identify whether a person, a family, or any other system is adapting well? What is this system “supposed” to be doing? How can we tell if things are going well or not? Who decides?

Developmental perspectives are important for defining how well a family is doing. Families form, develop, and change over time, moving through life cycles related to the development of individuals within a family and multiple generations (Goldenberg & Goldenberg, 2013; Walsh, 2011a, 2011b). Expected functions of the family depend on life cycles of the family and its members. For instance, parents in a family are not judged on how well they are rearing children unless or until children join the family. When an individual or couple in a family has children, caring for children becomes a developmental task for the family. Later, socializing children to behave according to sociocultural norms is a family task. Some tasks are social and cultural, and some are legal. Failure to meet expectations can result in criticism, legal action, or both.

In family theory, qualities of effective or adaptive families have been described for decades. For example, Pratt (1976) described the “energized family” as responsive, involved, open, flexible, connected to the community, active in problem solving, and providing age-appropriate parenting to their children. Over the years, effective parenting has also been described in reference to desirable outcomes in children, such as school success.

The observable pattern, course, or trajectory over time of adaptive function in a system—child, adult, or family—is often called a pathway. Pathways reflect the combined net influence of all the interacting systems that shape the life course of any specified domain of adaptive behavior, illustrating the ups and downs of adaptive success by whatever criterion is being considered. Theoretical pathway models of positive and negative adaptation in the context of acute and chronic risk have been portrayed by a number of scholars (e.g., Gottesman, 1974; Masten & Narayan, 2012; Sroufe, 1997). Family therapists also describe pathways of family function as they adapt in the face of challenges or journey through the process of family therapy (Walsh, 2006).

Although there are significant similarities in the concepts and processes of child and family resilience, Masten and Monn (2015) posit that there will be significant benefits from a systematic effort to integrate the two. They propose three key benefits: (1) advances in theory and knowledge from assembling scattered pieces of knowledge into a more cohesive science, (2) translational advances for practice and policy that lead to new or more effective strategies for managing interventions, and (3) better training of scholars for collaborative research and intervention.

METHODS OF FAMILY ASSESSMENT

There are a number of different methods that may be used by psychologists and allied professionals for gathering information needed to assess the dynamics of the family and to plan and evaluate the effectiveness of the many methods of interventions and strength-based programs that may be employed. Broadly stated, this includes formal assessments (e.g., standardized tests and questionnaires), observation, and interviews.

Observational procedures

Direct observation allows for the systematic analysis of the functional relationships between problematic child behavior and the family environment in which it occurs. It is now well accepted that functional behaviors important to many psychological disorders occur in highly “overlearned patterns” (Dishion & Stormshak, 2007). That is, such behaviors can be manifested spontaneously as a consequence of frequent repetitions. The major points for observation are the extent to which family members listen to each other’s point of view, take time to agree on a problem definition, and generate solutions and action strategies, or, conversely, interrupt each other, criticize, and inhibit problem solving.

A primary limitation of observational assessment of the family is “accessibility.” With regard to the observational setting, there is considerable evidence that the observation of family members in home-based (naturalistic) assessment is not confounded by the presence of an observer. Although clinic-based (analogue) observations offer a range of advantages, relevant research has revealed that not all such procedures are representative of natural interactions in the home (e.g., Gardner, 2000).

Sanders and Dadds (1993) outlined five key steps in planning and implementing an observational assessment of a clinic-referred family.

- The first step is the generation of hypothesis about the nature of the family’s problem.
- Second, select the target behaviors to be coded. These generally include the features of the child’s problems that have led to the referral, as well as the behaviors of important others that may be related in maintaining the problem. Targets can be manifested as independent actions or as interactional sequences. This is operationalized by existing coding systems.
- The third step is the selection of the procedures used to schedule and structure the observation. This includes any task given to family members, the means of instructing the family to engage in the task, and the activities of the therapist throughout the process.
- The fourth step is the selection of a data collection method. The behaviors of family members may be recorded and interpreted descriptively; however, quantitative data are often better suited to clinical purposes, such as the evaluation of behavioral change. Certain parameters or dimensions of family members’ behavior may be useful to code for clinical purposes, such as frequency, intensity, and temporal properties.
- The last step is the evaluation of the initial hypotheses regarding the role of the family context in the presenting problem.

Observational Coding Systems

Some examples of a coding system include the *Dyadic Parent–Child Interaction Coding System* (DPICS, 3rd edition; Eyberg, Nelson, Duke, & Boggs, 2004), the *Family Problem Solving Code* (FAMROS; Forbes, Vuchinich, & Kneedler, 2001), the *Rapid Marital Interaction Coding System* (RMICS; Heyman, 2004), and the *Iowa Family Interaction Rating Scales* (IFIRS; Melby et al., 1998).

Interviews, self-reports, and other report inventories

The initial discussion of the child’s presenting problem, typically the first major topic of the clinical interview, is of major importance for establishing the impact of those problems on family functioning and the assessment of the contextual dynamics. Self-report inventories are widely used in the collection of parent and child report data on a range of family variables. Some of the advantages of these measures are: the capacity to assess a broad range of domains and levels of functioning, the individual in comparison to clinical and nonclinical norm data, and the facilitation of disclosure of information that respondents may be reluctant to discuss during an interview.

One useful strategy to minimize the any drawbacks of self-report inventories, such as socially desirable responding and deliberate faking is a multimethod measurement approach whereby self-report inventories are employed in combination with other methods, such as the clinical interview and direct observation (Hawes & Dadds, 2013). The collection of

TABLE 8.3 Dimensions and Subscales of the Family Environment Scale*Family Environment Scale (FES): dimensions and subscales*

Family Relationship Index

| | |
|-------------------|--|
| 1. Cohesion | Degree of commitment, help and support family members provide for each other |
| 2. Expressiveness | Extent to which family members are encouraged to act openly and express their feelings |
| 3. Conflict | Amount of openly expressed anger, aggression and conflict among family members |

Personal Growth

| | |
|--------------------------------------|--|
| 4. Independence | Extent to which family members are assertive, self-sufficient and make their own decisions |
| 5. Achievement Orientation | Extent to which activities are seen in an achievement-oriented or competitive manner |
| 6. Intellectual-Cultural Orientation | Degree to which family members show interest in political, social and cultural activities |
| 7. Active-Recreational Orientation | Extent to which family members participate actively in social and recreational activities |
| 8. Moral-Religious Emphasis | Extent to which family members emphasize ethical and religious issues and values |

System Maintenance

| | |
|-----------------|---|
| 9. Organization | Degree of clear organization and structure in planning family activities and responsibilities |
| 10. Control | The extent to which set rules and procedures are followed and enforced by family members |

Source: From Moos R. H., & Moos, B. S. (1986). *Family Environment Scale Manual* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.

multiinformant self-report measures is another advantage in the assessment of family functioning. This multimethod and multisource data collection is highly recommended in order to have the most valid and representative information on the family as a unit and on each of its members.

One of the most widely known measures to assess parenting style or family climate is the *Family Environment Scale* (FES; Moos & Moos, 1986). The FES is a 90-item true/false questionnaire to assess individuals' perceptions of their family environment. The FES can be completed by the parent or child (> 11 years). There are three forms of the FES: the Real Form (Form R), which measures the respondent's actual perceptions of the family environment; the Ideal Form (Form I), which assesses the type of family the respondent would ideally like; and The Expectations Form (Form F), which includes items that reflect the respondent's expectations of what family environments should be like. The FES is divided into 10 subscales from 3 domains: Relationships, Personal Growth, and System Maintenance (see Table 8.3).

The FES has been used with various clinical samples of children and adolescents. For example, Suveg, Zeman, Flannery-Schroeder, and Cassano (2005) noted that mothers of children (8–12 years) with an anxiety disorder demonstrated less emotional expressiveness than mothers in nonclinical groups.

Measures of parenting behavior

Alabama Parenting Questionnaire

The *Alabama Parenting Questionnaire* (APQ; Shelton, Frick, & Wootton, 1996) is a measure of parenting behavior for use with parents of children 6–17 years. It consists of 42 items that are presented to parents either in the form of questionnaires or as part of an interview, including interviews conducted by telephone. Elgar, Waschbusch, Dadds, and Sigvaldason (2007) have developed a 9-item short version of the scale. Most of the research studies using the APQ have applied the questionnaire format. Items on this format are rated on a 5-point Likert frequency scale.

The content of the APQ was developed to assess the five dimensions of parenting that have been most consistently related to behavior problems in youth: Involvement, Positive Parenting, Poor Monitoring/Supervision, Inconsistent Discipline, and Corporal Punishment (Shelton et al., 1996). It also includes several other items assessing "other discipline practices." The most common use of the APQ has been to study parenting in families of children with conduct problems. In particular, Frick, Christian, and Wootton (1999) found inconsistent discipline to be more frequently associated with conduct problems at different ages.

Parenting Scale

The *Parenting Scale* (Arnold, O'Leary, Wolff, & Acker, 1993) is another commonly used measure of parenting that focuses specifically on parents' attitudes and beliefs about discipline. It consists of 30 items that are rated on a 7-point scale in

which parents are asked to estimate the probability with which they would use a particular discipline strategy. The Parenting Scale yields a total score to indicate overall dysfunctional parenting style. This general dysfunctional style subsumes three separate response styles: Overreactivity (harsh discipline style consistent with an authoritarian parenting style), Laxness (permissive style of parenting), and Verbosity (verbal persuasion). One of the main limitations in the Parenting Scale is the lack of norm-referenced scores. Most studies of the Parenting Scale demonstrate adequate internal consistency and retest reliability. Criterion-related validity has been studied in correlation with other measures of parenting practices (Rhoades & O'Leary, 2007).

The authors report a moderately high internal consistency (.82–.84) for all scales. Retest reliability was relatively high for the Total, Overreactivity, and Laxness Scales. As evidence for construct validity—scores were significantly correlated to clinical observations of parent–child interactions (Arnold et al., 1993). The Parenting Scale was originally developed for use with preschool children, but there is evidence for its utility with older children (e.g., Prinzie, Onghena, & Hellinckx, 2007).

Parenting Style and Dimensions Questionnaire

The *Parenting Style and Dimensions Questionnaire* (PSDQ; Robinson, Mandlco, Olsen, & Hart, 2001) consists of 62 items and assesses both parenting styles and their underlying subdimensions. The authoritative style consists of four subdimensions: warmth/involvement (11 items), reasoning/induction (7 items), democratic participation (5 items), and good nature/easygoing (4 items). The authoritarian style contains four subdimensions: verbal hostility (four items), corporal punishment (six items), nonreasoning/punitive strategies (six items), and directiveness (four items). The permissive style contains three subdimensions: lack of follow-through (six items), ignoring misbehavior (four items), and self-confidence (five items). The score for each subdimension is calculated on the mean of all items within the subdimension. Each parenting style is calculated by taking the mean of the scores for the subdimensions within each style. Furthermore, the authors also provide, upon request, a G1 version of the scale specifically designed to retrospectively investigate how adolescents or adults were parented during childhood (Olivari, Tagliabue, & Confalonieri, 2013).

Since 1995, several articles (Olivari et al., 2013) have been published providing different uses of the scale, and most of the findings have supported the significant impact of parenting style on children's adjustment. According to the ways in which the instrument has been applied, different uses of the scale can be described. Only 18.87% of studies used the complete 62-item instrument, whereas the others selected particular items in which the authors were interested. Regarding the dimensions, 54.72% of the authors investigated the three parenting styles measured by the instrument. Furthermore, in 15.09% of the articles, the authors measured only two parenting styles (in five studies, the authoritarian and authoritative styles were investigated; in three studies, the authoritarian and permissive styles were investigated). In 7.55% of the studies, the authoritative style was investigated on its own. The authors of the remaining 20.75% of the studies used the scale to measure some specific subdimensions of parenting styles (i.e., warmth/involvement, corporal punishment, verbal hostility). Only one article (number 8) used the instrument as a retrospective measure (Olivari et al., 2013).

Robinson et al. (2001) scale has been used frequently in the published journal literature and applied to multiple cultural contexts: North America (58.49%), Europe (15.09%), Africa (1.89%), Asia (18.87%), and Oceania (5.66%). Another interesting property of this scale is that it has been used in different ways: In 64.15% of the studies, the authors investigated both maternal and paternal parenting styles through a self-report paradigm. In addition, it appears that the value of this instrument is its adaptability. Through this scale, the researchers were able to evaluate parents' perception of themselves, adults' perceptions of their own parents, and offspring's perceptions of their parents. These different uses of the instrument allow multiple perceptions of the same parenting style, increasing its validity (Olivari et al., 2013).

Marital inventories

There are several marital inventories that are frequently used in research and clinical practice (McMahon & Frick, 2007). One of the most popular instruments in this domain is the *O'Leary–Porter Scale* (OPS; Porter & O'Leary, 1980). The OPS is a brief inventory that focuses on overt marital conflict and in particular on marital conflict that is witnessed by the child. The OPS consists of 20 items. The parent rates on a 5-point frequency scale how often a child witnesses arguments between the parents over such issues as money and expenses, discipline, or personal habits of the spouse.

The *Dyadic Adjustment Scale* (DAS; Spanier, 1976) is a global measure of marital or relationship quality. Dyadic adjustment is the outcome of a process determined by the degree of problematic dyadic differences, interpersonal tensions and personal anxiety, dyadic satisfaction, dyadic cohesion, and consensus on matters of importance to dyadic functioning. It consists of 32 items, and four underlying factors form the subscales of Dyadic Consensus, Dyadic Cohesion, Dyadic Satisfaction, and Affectional Expression. The DAS taps both behavioral (e.g., frequency of quarrels, discussion of separation, or marital interaction) and evaluative (marital happiness, feelings about the future of the relationship).

The *Marital Satisfaction Inventory–Revised* (MSI-R; Snyder, 1981, 1997) is a complete revision and restandardization of the earlier MSI. The MSI-R is a self-report inventory that identifies the nature and extent of distress separately for each partner. The measure consists of 150 items that are responded to in “true”–“false” format. Responses are scored on the 13 scales of the inventory, which include two validity scales (Inconsistency and Conventionalization), one global affective scale (Global Distress), and 10 additional scales that assess specific dimensions of relationship stress (Affective Communication, Problem Solving Communication, Aggression, Time Together, Disagreement about Finances, Sexual Dissatisfaction, Role Orientation, Family History of Distress, Dissatisfaction with Children, Conflict over Child Rearing). According to the author, the MSI-R possesses high levels of internal consistency and temporal stability. There is also evidence of the scales discriminant and convergent validity (Snyder, 1997).

Measures of dyadic interactions

The *Dyadic Parent–Child Interaction Coding System* (DPICS, 3rd edition; Eyberg et al., 2004) was designed to assess parent–child relationship quality (with families of children 3–6 years), as expressed through overt verbal and physical behaviors during dyadic interactions. The coded child behaviors are intended to reflect child reciprocity and cooperation in dyadic interactions. The parent codes concern behaviors that express reciprocity, nurturance, and parental control. The parent and child codes in the DPICS are organized into categories, such as Verbalization, Vocalization, Physical Behavior, and Response. Parental behavior is captured predominantly in verbalization codes, the broadest of which is Negative Talk. Successive revisions of the DPICS have been successful in improving the reliability of its codes (Eyberg et al., 2004). Measures of general stress have proven to be important for understanding children with behavioral problems (e.g., Snyder, 1991) and have been related to abusive behavior in parents (Whipple & Webster-Stratton, 1991).

The *Parenting Stress Index–Second Edition* (PSI; Abidin, 1986) consists of 151 items, and administration takes approximately 30 minutes. The items of the full PSI are divided into two main categories: Child Domain and Parent Domain. The Child Domain consists of items that make it hard for parents to fulfill their parental role. The Parent Domain assesses sources of stress and disability related to parental functioning. There is also a composite score that provides an overall indicator of the amount of stress in the parent–child system. A short form of the PSI of 36 items has also been developed (Abidin, 1995), and it consists of 3 subscales.

Parental stress is assessed by the *Parenting Stress Index–Short Form* (PSI-SF; Abidin, 1995), a 36-item self-report measure of parenting stress. It consists of 3 subscales, and each scale includes 12 items that are scored on a 5-point scale to indicate the degree to which the participant agrees with each statement. The Parental Distress subscale yields a score that indicates level of distress resulting from personal factors, such as depression or conflict with a partner and from life restrictions due to the demands of child rearing. The Parent–Child Dysfunctional Interaction subscale provides an indication of parents’ dissatisfaction with interactions with their children and the degree to which parents consider their children unacceptable. The Difficult Child subscale assesses parents’ perceptions of their children’s self-regulatory abilities. The Parenting Stress Index–Short Form (PSI-SF) includes a Defensive Responding scale (seven items from the Parental Distress subscale) that highlights the degree to which the parent might be attempting to deny or minimize problems.

Parental satisfaction is assessed by the satisfaction subscale of the Being a Parent. This subscale is a 16-item questionnaire with response choices ranging from “strongly agree” to “strongly disagree.” Parental control attributions refers to the extent to which a parent felt he or she was able to exert personal control over the child’s behavior. This risk marker was assessed by the Parental Locus of Control Scale (PLOC-SF; Lovejoy, Verda, & Hays, 1997) that consisted of 30 items. A brief 24-item version of the scale is also available and has proven to be highly correlated with the original version (Ondersma, Chaffin, Mullins, & Lebreton, 2005).

Measures for predicting child abuse

Crooks and Wolfe (2007) suggest a conceptual model to guide assessments of child abuse and neglect. They suggest the need to understand not only the parental abusive behavior but also the family context in which the abuse takes place. They advocate that “the impact of maltreatment depends on not only the severity and chronicity of the abusive events themselves but also how such events interact with the child’s individual and family characteristics,” (p. 646). Thus, an assessment must focus on a number of individual, familial, and cultural factors that research has related to child abuse and neglect, as well as the possibility of these risk factors.

Consequently, Crooks and Wolfe (2007) advocate that assessments be comprehensive and address the following objectives (Table 8.4): (1) identify the general strengths and needs of the family system, (2) assess parental responses

TABLE 8.4 Assessment Objectives Advocated by Crooks and Wolfe (2007)

| |
|---|
| <p>Goal 1: Identify General Strengths and Problem Areas Of Family system</p> <p>A. Family Background</p> <ol style="list-style-type: none"> 1. Parental history of rejection and abuse during own childhood. 2. Discipline experienced by parents during own childhood. 3. Family planning and effect of children on the marital relationship. 4. Parents' preparedness for and sense of competence in child rearing. <p>B. Marital Relationship</p> <ol style="list-style-type: none"> 1. Length, stability, and quality of marital relationship. 2. Degree of conflict and physical violence in marital relationship. 3. Support from partner in child rearing. <p>C. Areas of Perceived Stress and Supports</p> <ol style="list-style-type: none"> 1. Employment history and satisfaction of parents. 2. Economic stability of family. 3. Social support for parents, both within and outside the family (e.g., number and quality of contacts with extended family, neighbors, social workers, and church members). <p>D. Parental Physical and Mental Health</p> <ol style="list-style-type: none"> 1. Recent or chronic health problems 2. Drug and alcohol use 3. Emotional disturbance and social dysfunction <p>Goal 2: Assess Parental Responses to Child-Rearing Demands</p> <p>A. Emotional Reactivity of Parent</p> <ol style="list-style-type: none"> 1. Parents' perception of how abused child differs from siblings and other children. 2. Parents' feelings of anger and loss of control when interacting with child. 3. Typical methods of coping with arousal during stressful episodes. <p>B. Child-Rearing Methods</p> <ol style="list-style-type: none"> 1. Appropriateness of parental expectations for child behavior, given child's developmental level. 2. Typical methods used by parents for controlling/disciplining the child. 3. Willingness of parents to learn new methods of discipline. 4. Parents' perception of effectiveness of discipline strategies. 5. Child's response to discipline attempts. <p>Goal 3: Identify Needs of the Child</p> <p>A. Child Social, Emotional, and Behavioral Functioning</p> <ol style="list-style-type: none"> 1. Behaviors that may place this child at risk for abuse. 2. Problems in adjustment resulting from abuse and living in family with multiple stressors. <p>B. Child Cognitive and Adaptive Abilities</p> <ol style="list-style-type: none"> 1. Identify child's developmental level and coping capacity to determine most appropriate method and level of intervention. 2. Determine if abuse or chronic family stressors have led to cognitive delays or delays in the child's development of adaptive behaviors. 3. Child's attributions for the abuse and reaction to family difficulties. <p>Goal 4: Assessing Parent–Child Relationship and Abuse Dynamics</p> <p>A. Risk of parent for future abuse and neglect.</p> <p>B. The quality of the parent relationships.</p> <p>C. Parental empathy toward children's feelings.</p> |
|---|

Source: Reprinted from Frick, P. J., Barry, C. T., & Kamphaus, R. W. (2010) *Clinical Assessment of Child and Adolescent Personality and Behavior* (3rd ed.). New York, NY: Springer Science + Business Media.

to the demands of child rearing, (3) identify the needs of the child, and (4) assess parent–child relationship and abuse dynamics.

When investigating child maltreatment, it is important to consider the method of measurement, as often the information provided will vary according to the data source. The most commonly used methods are parental self-reports. Researchers have utilized child maltreatment risk measures that provide information regarding the likelihood or “potential” for the respondent to perpetrate child maltreatment.

One major line of research focuses on identifying the parental attributes and beliefs that are associated with child maltreatment or abuse or child abuse potential. The likelihood for child abuse is estimated by such measures as the *Child Abuse Potential Inventory* (CAPI). The CAPI incorporates interpersonal and intrapersonal difficulties as well as inflexible attitudes toward children (Milner, 1986). Scores on the CAPI distinguish substantiated child abusers from nonabusers and predict which parents are likely to become abusive. CAPI scores also demonstrate an association with observed coercive parenting styles (Margolin, Gordis, Medina, & Oliver, 2003).

The CAPI is a 160-item rating scale responded to by the parent. Although the CAPI was originally designed to assess dimensions of parental behavior that have proven to be risk factors for physical abuse of children, it may also be used to assess several areas of family functioning. The full form takes approximately 15 min to complete, and the items are presented in a forced-choice “agree–disagree” format. The CAPI contains three validity scales: Lie, Random Response, and Inconsistency. There are six primary scales that are combined into a composite abuse scale.

- The Distress scale assesses parental anger, frustration, impulse control, anxiety and depression.
- The Rigidity scale assesses parents’ flexibility and realism in their expectations of children’s behavior.
- The Unhappiness scale assesses a parent’s degree of personal fulfillment as an individual, as a parent, as a marital/sex partner, and as a friend.
- The Problems with Child and Self is a scale that assesses parents’ perceptions of their child’s behavior and their perceptions of their own self-concepts as a parent.
- The last two scales, Problems with Family and Problems with Others, assess the level of family conflict in the extended family, as well as the level of conflict with persons outside the family or with community agencies.

It appears that the CAPI provides a reliable measure in assessing dysfunctional features of a child’s family environment. Furthermore, the composite abuse scale seems to be an index of risk for abuse, but further evidence is necessary to confirm it. Although CAPI is widely regarded as a leading tool to assess child abuse risk, it does not provide any information regarding actual discipline practices or maltreatment behaviors.

The *Parent–Child Conflict Tactics Scale* (CTSPC; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998) is used to determine the frequency of substantiated behaviors displayed toward children during parent–child conflict. The CTSPC is a revision of an epidemiological survey of family violence, the Conflict Tactics Scale (Straus, 1979). It consists of 22 items in which parents report on the frequency with which they have engaged in a series of behaviors derived from parent–child conflicts. Thirteen items making up a subscale entitled Physical Assault address varying levels of physical tactics toward children with subcategories of minor assault/corporal punishment and severe assault/severe physical maltreatment. In addition to the Physical Assault subscale, four items of the CTSPC make up the Non-Violent Discipline subscale (removal of privileges and “time out”), and five items constitute the Psychological Aggression subscale (verbal threats, yelling). The authors report moderate internal consistency at .55 for the Psychological Assessment scale, .60 for the Psychological Aggression subscale, and .70 for the Non-Violent Discipline subscale. The authors also provide supportive evidence of construct and discriminant validity (Straus et al., 1998).

The *Eyberg Child Behavior Inventory* (ECBI; Eyberg & Pincus, 1999) is widely used for early screening of disruptive child behavior within both clinical and research settings. The ECBI is a parent rating scale, designed to measure the level of disruptive behavior in children aged between 2 and 16. The ECBI has several strengths. First, the ECBI has been shown to be sensitive in measuring the effect of treatment on disruptive behavior problems (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993); Nixon, Sweeney, Erickson, & Touyz, 2004). Second, the ECBI is short (36 items) and easy to complete. It contains short and concisely described child behaviors with little room for interpretation, which makes it easy to understand. Moreover, the ECBI is unique in its use of two different scales to assess disruptive child behavior: the Intensity Scale and the Problem Scale. For each item, parents are asked how often their child displays this behavior (Intensity Scale) and whether they find this behavior problematic (Problem Scale). High internal consistency of the two scales ($\alpha > .90$) has been demonstrated in several sociodemographic subgroups (Colvin, Eyberg, & Adams, 1999). There is evidence suggesting the ECBI has good retest reliability ($r = .75$) over a 10-month period (Funderburk, Eyberg, Rich, & Behar, 2003).

Another self-report inventory is the *Childhood Trauma Questionnaire* (CTQ; Bernstein & Fink, 1998) for individuals 12 years and older. The instrument consists of 28 items in which clients (child, parent) respond on a Likert scale. The CTQ provides an overview of clients’ experiences related to several areas of victimization, with subtests in the following areas: emotional abuse, physical abuse, sexual abuse, physical neglect, and minimization/denial.

While most of the aforementioned instruments assess various “trauma” effects on the child’s behavior and functioning, there are other instruments specifically designed to assess the effects of sexual abuse. One of the most widely used measures to assess sexual abuse is the *Child Sexual Behavior Inventory* (CSBI-2; Friedrich, 1997). The CSBI consists of 38 items and aims to assess children who have been sexually abused or are suspected of having been sexually abused. The measure is designed to be completed by a female caregiver (Foster & Carson, 2013) and is extensively used in the field of child sexual abuse. It yields a total CSBI score, a Developmentally Related Sexual Behavior score, and a Sexual Abuse Specific items score. It also yields scores on nine domains: Boundary Problems, Exhibitionism, Gender Role Behavior, Self-Stimulation, Sexual Anxiety, Sexual Interest, Sexual Intrusiveness, Sexual Knowledge, and Voyeuristic Behavior. Higher scores are indicative of greater likelihood that child sexual abuse has occurred. The CSBI discriminates between sexually abused and non–sexually abused children.

THE ASSESSMENT OF EXTERNALIZING AND INTERNALIZING PROBLEMS

Family environment may contribute in early years to the risk for psychopathology. However, it has not yet been determined if specific characteristics of the family environment may differentially contribute to different types of mental disorders. Some studies have used instruments that assess different characteristics of family environment (e.g., levels of conflict, cohesion, control), such as the FES (Pressman et al., 2006).

Adolescent internalizing and externalizing problems that persist throughout adulthood often originate in childhood (e.g., Ashford, van Lier Pol, Timmermans, Cuijpers, & Koot, 2008; Maggs, Patrick, & Feinstein, 2008). Specifically, while internalizing problems in childhood have been linked to pervasive and adverse developmental outcomes, such as depression and anxiety disorders, academic underachievement, and problems with employment (Aronen & Soininen, 2000; Woodward and Fergusson, 2001), externalizing problems in childhood increase the risk for aggression and substance use later in life (e.g., Loeber & Hay, 1997; Maggs et al., 2008). The development of such problems in childhood depends on the interplay between individuals and environmental factors. Parenting, and in particular parenting stress, can be considered as one of the most important environmental factors.

Across early to middle childhood, externalizing problems have been associated with high levels of harsh and inconsistent discipline and low levels of parental warmth and involvement (e.g., Hawes, Dadds, Frost, & Hasking, 2011; Salihovic, Kerr, Özdemir, & Pakalniskien, 2012). The parent–child dynamics through which these parenting practices operate include the modeling of aggression, as well as escalating cycles of coercion based on escape-avoidance mechanisms. These cycles function as “reinforcement traps” that reinforce both parents’ and children’s use of aversive control tactics (e.g., whining, nagging, shouting, hitting) and thus limit positive family interactions (Hawes & Dadds, 2005; Patterson, 1982). Patterson’s Social Coercion Theory (Patterson, 2002) postulates that children often become more hostile, noncompliant, and antisocial in response to parental use of physical discipline, often setting up a cycle of coercion. Bell (1977) argues that parents and children have specific tolerance levels for one another’s behavior. For example, if a child’s aggressive behavior exceeds the upper limit of tolerance, the parent may react through control or punishment. On the other hand, if parents exceed children’s tolerance for particular behaviors, the children may respond in an emotionally dysregulated manner.

The siblings’ behavior may also contribute to risk for conduct problems. Apart from siblings, peers could play an important role in the emergence of externalizing problems. The life-course persistent trajectory of externalizing manifestations has also been associated with prenatal and perinatal medical risks, as well as neuropsychological risk during infancy (e.g., Brennan, Hall, Bor, Najman, & Williams, 2003).

Neuropsychological deficits may impact the child’s cognitive abilities, and result in a difficult temperament. Additionally, family adversity, maternal depression, and sociodemographic risk factors, such as low socioeconomic status and single-parent status are among the strongest predictors of later externalizing problems (Gross, Shaw, & Moilanen, 2008). More recently Fanti and Henrich (2010) when investigating the development of externalized problems identified children with normative, moderate, high, decreasing, and chronic external problems.

Internalizing problems appear in the form of withdrawal, anxiety, fearfulness, and depression, whereas externalizing problems are manifested in the form of hyperactivity, aggression, defiance, and destructive behavior (e.g., Campbell, 1995). Both emotional and behavioral problems have been found to precede child, adolescent, and adult antisocial and depressive psychopathology as distinct behaviors or can co-occur in periods of life.

Measures for assessing externalizing behavior

Child Behavior Checklist (CBCL)

The *Child Behavior Checklist* (CBCL; Achenbach, 2001) has a long history of research and usage. The current version of the CBCL is similar to its predecessors, with some items changes, response format changes, and the introduction of DSM-oriented scales. The CBCL is part of an extensive system of scales, including teacher rating (TRF), self-report (YSR), and classroom observation measures. The latest version of the CBCL (Achenbach & Rescorla, 2001) has two separate forms, one for children 1.5–5 years old and one for children 6–18 years old.

The development of the CBCL rests on the author’s contention that parents and other significant adults are a major source of information in any multi-informant system of child evaluation. The CBCL is completed by parents or teachers, and measures a wide range of behavioral and emotional problems. The teacher’s version focuses on academic performance and adaptive functioning in addition to behavioral and emotional problems. The CBCL provides information on six scales: affective problems, attention-deficit/hyperactivity, anxiety, oppositional defiance, somatic problems, and conduct problems. An additional version is available for parents or caregivers of children aged 1.5–5 years.

The Child Behavior Checklist for Youth Self-Report (CBCLY-SR; Achenbach & Rescorla, 2007) is completed by children aged 11–18. Children rate themselves on how true each item has been of them in the prior 6 months. This tool provides information on internalizing, externalizing, and total problems. Responses are rated on a three-point scale (Not True, Sometimes/Somewhat True; Very Often True). The CBCL syndrome scales are primarily empirically derived via factor analytic methods. The CBCL parent–teacher scales have closely matched items and scales that make it easier for clinicians to make cross-informant comparisons. The scales for the 6–18 years old group are: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. The item content for the preschool version of the CBCL differs from the child version with regard to some of its syndrome scales, which are: Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn, Sleep Problems, Attention Problems, and Aggressive Behavior.

On both versions, there is a Total Problems score, as well as composites for Internalizing and Externalizing Problems. *DSM-Oriented Scales* were formed based on experts' ratings of how well the items fit *DSM* criteria for relevant Major and Dysthymia for Affective Problems, Anxiety Problems, Oppositional Defiant Problems, and Conduct Problems. The preschool version the *DSM-Oriented* scales are for Affective Problems, Anxiety Problems, Pervasive Developmental Problems, Attention-Deficit/Hyperactivity Problems, and Oppositional Defiant Problems.

Behavioral and Emotional Screening System (BESS)

To identify problematic behaviors, current efforts in prevention science have suggested conducting universal screening, typically within the school environment (Glover & Albers, 2007). Universal screening is one strategy to enhance the early identification of behavioral and emotional problems among young people. Although it appears to be effective, it is unclear if universal screening is more or less effective than current teacher referral practices (Eklund et al., 2009). Universal emotional and behavioral screening is an efficient, quick way to assess all young children and identify those at risk for illness or disorders.

The *Behavioral and Emotional Screening System* (BESS; Kamphaus & Reynolds, 2007) is a measure designed to detect current or emergent emotional and behavioral problems. The BESS consists of brief screening measures to assess behavioral and emotional characteristics of children age 2–18 years, with forms developed to measure behavioral tendencies of preschoolers (2–5 years). Rating forms may be completed by parents or teachers to provide an initial view of a child's behavior or emotional status. The BESS differs from other similar measures in that its forms assess adaptive competencies, as well as maladaptive behaviors.

The BESS Teacher Rating Scale for Preschoolers (BESS TRS-P) consists of 25 items measuring children's behavioral and emotional risk in the school environment. The scale consists of approximately 200 items that measure young children's behavioral characteristics across four interrelated dimensions: Internalizing Problems, Externalizing Problems, (Emerging) School Problems, and Adaptive Skills. As a whole, the TRS-P screener is thought to measure only one construct—Maladaptive Behavior.

The Behavior Assessment System for Children 2nd Edition (BASC-2)

The *Behavior Assessment System for Children* (BASC-2 RRS; Reynolds & Kamphaus, 2004) comprises Parent Rating Scales (PRS), Teacher Rating Scales (TRS), and the Self-Report of Personality (SRP). Each type of rating scale includes forms for three age levels. Recently, a fourth level for the SRP was released. The SRP-Interview was designed for 6- and 7-year-olds. Its items are read to the child. In addition, the BASC-2 comprises a Structured Developmental History form and a Student Observation System for recording and classifying directly observed classroom behavior.

The PRS contains 134–160 items and the TRS contains 100–139 items concerning emotional and behavioral problems and adaptive behavior. All items of the PRS and TRS are rated on a 4-point scale, with responses: never, sometimes, often, and almost always. The SRP contains 139–185 items on emotions and self-perceptions. Most items of the SRP are also rated on the same 4-point scale, but the rest of the items are scored on a true/false scale. The PRS, TRS, and SRP can be scored on three types of scales: *primary scales*, *composite scales*, and *content scales*.

The *primary scales* are based on factor analysis of the items. The common primary scales of the PRS and TRS are Adaptability, Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Functional Communication, Hyperactivity, Leadership, Social Skills, Somatization, and Withdrawal. In addition, the PRS includes Activities of Daily Living, and the TRS includes Learning Problems and Study Skills. The primary scales of the SRP are Anxiety, Attention Problems, Attitude to School, Attitude to Teachers, Atypicality, Depression, Hyperactivity, Interpersonal Relations, Locus of Control, Relations with Parents, Self-Esteem, Self-Reliance, Sensation Seeking, Sense of Inadequacy, Social Stress, and Somatization.

Composite scales are based on factor analysis of the primary scales. The composite scales of both the PRS and TRS are Adaptive Skills, Behavioral Symptoms Index, Externalizing Problems, and Internalizing Problems. In addition, the TRS includes School Problems. The composite scales of the SRP are Emotional Symptoms Index, Inattention/Hyperactivity, Internalizing Problems, Personal Adjustment, and School Problems.

Content scales consist of a combination of items belonging to the primary scales and items not a part of any primary scale. The content scales of both the PRS and TRS are Anger Control, Bullying, Developmental Social Disorders, Emotional Self-Control, Executive Functioning, Negative Emotionality, and Resiliency. The content scales of the SRP are Anger Control, Ego Strength, Mania, and Test Anxiety.

In addition, the PRS, TRS, and SRP comprise validity indexes for assessing the quality of a completed form. The F index on the PRS, TRS, and SRP indicates the respondent's tendency to be excessively negative; the L index on the SRP indicates the child's tendency to be extremely positive; and the V index on the SRP indicates the validity of the SRP scores in general. The Consistency index and the Response Pattern index on the PRS, TRS, and SRP are available in the computer program. They detect whether respondents disregard item content and give inconsistent or patterned responses.

Regarding reliability, median test–retest correlations over 8- to 70-days intervals ranged from 0.76 to 0.84 for the PRS, from 0.79 to 0.88 for the TRS, and from 0.71 to 0.84 for the SRP. Median Cronbach's alphas across scales per age and norm group ranged from 0.80 to 0.87 for the PRS, from 0.84 to 0.89 for the TRS, and from 0.75 to 0.86 for the SRP. In addition, correlations of BASC-2 scales with scales that measure similar constructs were generally high, although correlations for internalizing scales across instruments were more variable than for externalizing scales.

Conners' Scales for Teachers and Parents 3rd Edition

The *Conners-3* (Conners, 2008) Parent Rating Scale (Conners-3-P) is the most recent revision to a widely used behavior rating scale system. The Conners-3-P is designed similarly to the BASC-2 Achenbach systems in that it includes a number of clinically relevant domains for which normative scores are derived. The parent rating scale is designed for children age 6–18 years. The Conners-3-P exists in two forms: Long Form (110 items) and Short Form (45 items). There is also a 10-item Global Index Form.

The Conners-3-P includes 5 empirically derived scales: Hyperactivity/Impulsivity, Executive Functioning, Learning Problems, Aggression, and Peer Relations. An Inattention scale is also available, as are 5 *DSM-IV-TR* Symptom scales for each of the Disruptive Behavior Disorders (i.e., 3 ADHD subtypes, oppositional defiant disorder, and conduct disorder). The Conners-3-P includes screening items for depression and anxiety to social relationships. Like the BASC, the Conners-3 includes critical items that may signal the need for further follow-up. These critical items are particularly directed toward severe conduct problems. Consistent with its predecessors, the Conners-3 includes a brief ADHD Index. The Conners-3 has 3 validity scales: Positive Impression (fake good), Negative Impression (fake bad), and the Inconsistency Index.

Personality Inventory for Children (PIC-2)

The *Personality Inventory for Children* (PIC-2; Lachar & Gruber, 2001) is based closely on its predecessor, the PIC-R (Wirt, Lachar, Klinedinst, Seat, & Broen, 1990). The PIC-2 is a 275-item rating scale designed for use with parents of children between 6–10 years. The PIC-2 scales have a long clinical history. In the PIC-2 scales content overlap between Stanford scales was either reduced or eliminated, item total correlation had to be high, and 2 validity scales were added (Lachar & Gruber, 2001).

The PIC-2 also includes a 96-item short form (the first 96 items of the Standard Form) called the "Behavioral Summary." The PIC-2 consists of 9 clinical scales: Cognitive Impairment, Impulsivity and Distractibility, Delinquency, Family Dysfunction, Reality Dysfunction, Somatic Concern, Psychological Discomfort, Social Withdrawal, and Social Skills Deficits. In addition to these scales, the PIC-2 provides 3 validity scales: Inconsistency, Dissimulation, and Defensiveness.

The Student Behavior Survey (SBS; Lachar, Wingenfeld, Kline, & Gruber, 2000) is the teacher version of the rating scale system. The SBS consists of 102 items that are rated on a 1–4 Likert scale. The content of the SBS can be classified into three major categories: Academic Resources, Adjustment Problems, and Disruptive Behavior. Academic Resources contains four subscales: Academic Performance, Academic Habits, Social Skills, and Parent Participation. Adjustment Problems contains 7 subscales: Health Concerns, Emotional Distress, Unusual Behavior, Social Problems, Verbal Aggression, Physical Aggression, and Behavior Problems. The Disruptive Behavior scale contains 3 subscales: Attention-Deficit/Hyperactivity, Oppositional-Defiant, and Conduct Problems.

The Reactive/Proactive Questionnaire and Impulsive/Premeditated Aggression Scale

The Reactive/Proactive Questionnaire (RPQ; Raine et al., 2006) has been validated cross-culturally among adolescents (Fossati et al., 2009). The Impulsive/Premeditated Aggression Scale (IPAS; Stanford et al., 2003) has been validated with

a variety of clinical and nonclinical adult samples (e.g., Haden, Scarpa, & Stanford, 2008). Each instrument reflects the qualities of the aggressive classification that it measures; the IPAS provides a time frame for recalling events, thus capturing state characteristics, while the RPQ asks about typical or traitlike aggressive responses. The RPQ is a 23-item measure that yields continuous subscale scores for the reactive (11 items) and proactive (12 items) subscale by summing item responses. The IPAS is a 30-item measure that classifies an individual's aggressive acts. In the IPAS, participants are asked to consider their aggressive acts over the past 6 months and then indicate their agreement on a 0–5-point scale (strongly agree to strongly disagree).

Internalizing problems

Critical and rejecting parenting, apart from being associated with children's conduct problems, has also been associated with risk for internalizing problems—in particular, child and adolescent depression (McLeod et al., 2007a). Alternatively, risk for anxiety disorder has been associated mostly with overprotective/controlling parenting. This may lead to psychological control expressed through intrusive or passive-aggressive parenting behaviors that inhibit autonomy granting. Such parents may withdraw affection or induce guilt as a means of discipline. Metaanalytic research has not confirmed the association between such parenting practices and child anxiety to be moderated by age, suggesting that they may confer risk across development (McLeod, Wood, & Weisz, 2007). Some evidence suggests that anxiety or externalizing problems often precede depression (Hankin, Lakdawalla, Carter, Abela, & Adams, 2007).

Internalized problems tend to increase from infancy to early childhood (Gilliom & Shaw, 2004), with girls showing a higher increase in internalized problems across time (Bongers, Koot, Van der Ende, & Verhulst, 2003). Achenbach, Howell, Quay, and Conners (1991), in their longitudinal study of children from 4 to 16 years, demonstrated that among clinically referred children internalizing problems tend to increase with age. This increase may be the outcome of cognitive maturation and/or self-reflection (Kovacs & Devlin, 1998). Sterba, Prinstein, and Cox (2007) investigated the development of internalized problems from 2 to 11 years. Their study provided evidence for heterogeneity in the course of internalized problems. They identified children exhibiting low, decreasing, and increasing internalized problems across development. Environmental risk factors, such as low familial sociodemographic status, exposure to negative family context, and maternal depression have been associated with internalizing problems across development (Duggal, Carlson, Sroufe, & Egeland, 2001). Additionally, as with externalized problems, limited cognitive abilities and difficult temperament can be contributive factors in the development of emotional problems (e.g., Booth-La Force & Oxford, 2008).

Much less is known about childhood anxiety disorder compared to what is known about depression. In many respects, anxiety disorder can be conceptualized as exaggerations of responses to developmental issues (e.g., separation anxiety). Fears of animals, the darkness, or heights are more likely to occur at younger ages than social phobias or agoraphobia (Strauss, 1993). The phenomenology of childhood anxiety disorder appears to be very similar to that of adults (Silverman, 1993). Anxiety disorders in children may appear either in conjunction with depression or independently. Silverman and Ollendick (2005) highlight Barlow's definition of anxiety as being particularly useful for assessment and subsequent intervention. According to Barlow (2002), anxiety is expressed as concerns about the future, unpredictability, loss of control, and potentially threatening events (p. 104). For children and adults, motoric, physiological, and subjective responses are commonly experienced when confronted with an anxiety-provoking stimulus. From the *DSM-5* criteria, the anxiety disorders that are commonly diagnosed in children and adolescents share common features, such as (1) persistent and excessive anxious arousal or fear and (2) symptoms that “cause” clinically significant distress or impairment in social, academic, or other important areas of functioning. Two disorders that occur primarily in children or adolescents, according to the *DSM*, are separation anxiety disorder and selective mutism. Approximately 8%–27% of children and adolescents experience the debilitating effects of anxiety and depression (e.g., Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Frick, Barry, and Kamphaus (2010) recommend a five-stage assessment process for the assessment of depression, with each stage involving an assessment question (screening, classification, comorbidities, alternative causes, and treatment considerations) and its implications.

1. Screening: administering measures or conducting an interview to screen; assessing critical symptoms (e.g., suicide risk, psychotic symptoms); determining the need for further assessment
2. Classification: assessing clinical signs that meet *DSM* criteria; determining onset, stability, and duration of the symptomatology
3. Comorbidities: assessing for comorbid disorders (e.g., anxiety disorders, ADHD, LD/MR, eating disorders, Oppositional Defiant Disorder/Conduct Disorder); determining the impact of depression on school performance; assessing social relations/peer status and the presence of substance abuse

4. Alternative causes: acquiring developmental and medical histories; differentially diagnosing from mental disorders with similar clinical presentation (e.g., Dysthymia, Posttraumatic Stress Disorder) or medical problems associated with depression
5. Treatment Considerations: assessing maladaptive cognitions, chronic stressors, parental depression, and parenting style; evaluating response to previous interventions (e.g., medication)

There is a plethora of self-report tools that have been developed for the assessment of anxiety and depression in young people. Among the most popular are the Children's Depression Inventory, the Multidimensional Anxiety Scale for Children, the Revised Children's Manifest Anxiety Scale, the State Trait Anxiety Inventory for Children, and the Youth Self-Report.

Measures

Internalizing Symptoms Scale for Children

The *Internalizing Symptoms Scale for Children* (ISSC; Merrell & Walters, 1998) is a 48-item measure for children 8–12 years. It is designed for the self-report assessment of internalizing symptoms of children (i.e., depression, anxiety, social withdrawal, and somatic problems) and positive and negative affect. Children respond to the items on a 4-point scale to indicate how true the items are for them.

Scoring of the ISSC results in three scores: the Total score, the Negative Affect/General Distress score, and the Positive Affect score. Internal consistency reliability for the ISSC Total score is generally strong, and for the three scores it is high (.86–.94). Construct validity evidence through the application of factor analyses indicated that a two-factor structure provides the best fit for the data. The two factors were Negative Affect/General Distress and Positive Affect.

Children's Depression Inventory (CDI)

The *Children's Depression Inventory* (CDI; Kovacs, 1992) is a 27-item depression self-report scale for children 7–17 years. The CDI has its origins in the Beck Depression Inventory. The 27 items assess a wide range of depressive symptoms, such as sadness, cognitive symptoms, social problems, somatic complaints, and acting-out behaviors. In addition to a total score, there are 5 subscales available: Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia, and Negative Self-Esteem. The CDI 2 (Kovacs, 2015) is a revision of the Children's Depression Inventory (CDI). It includes the following enhancements: (1) new items focusing on the core aspects of childhood depression, (2) revised scales that are more reliable and valid, and (3) updated norms that are more representative of the US population. The properties of the CDI are well established, with researchers finding strong evidence of convergent, discriminant, and predictive validity, albeit in predominantly White/Non-Hispanic samples (Craighead, Smucker, Craighead, & Illardi, 1998; Gomez, Vance, & Gomez, 2012; Kovacs, 1992; Myers & Winters, 2002).

Reynolds Children Depression Scale 2nd Edition (RCDS-2)

The *Reynolds Children Depression Scale-2nd ed* (RCDS-2; Reynolds, 2010a) is a brief self-report measure that assesses depressive symptomatology in children age 7–13 years. The RCDS-2 consists of 30 items and assesses the severity of a range of depressive symptoms, such as cognitive, vegetative, somatic, and social-interpersonal symptoms. Children respond on a 1 (almost never) to 4 (all the time) Likert scale. One of the 30 items consists of 5 smiley-type faces (including degrees of sad/happy faces). Children select the face that best represents how they have felt during the past 2 weeks. Seven of the 30 items are reverse scored to provide a check for inconsistent responding. There are also seven critical items that discriminate between children who are depressed and those who are nondepressed. The RCDS-2 can be administered either in groups or individually.

There is also a short form of the RCDS-2, the RCDS-2: SF (Reynolds, 2010b). Similar to the RCDS-2, the RCDS-2: SF assesses the severity of depressive symptomatology and takes approximately 2–3 min to complete. This measure consists of 11 items, and the response format is similar to the standard version. When compared to its RCDS predecessor, the RCDS-2 and the RCDS-2: SF are easier and faster to administer and score, and have a lower reading level for younger children. Internal consistency reliability estimates for the RCDS-2 for the standardization sample was .90. Additionally, there is evidence regarding the construct validity of both the RCDS-2 and the RCDS-2: SF (Reynolds, 2010a, 2010b).

Revised Children's Manifest Anxiety Scale 2nd Edition

The *Revised Children's Manifest Anxiety Scale-2nd Ed* (RCMAS-2; Reynolds & Richmond, 2008) is a self-report inventory to assess anxiety symptoms in children aged 6–19 years. The RCMAS-2 consists of 49 items to which individuals respond

in a “yes” or “no” manner. The RCMAS-2 consists of three subscales (Physiological Anxiety, Social Anxiety, and Worry), a Total Anxiety scale, and two validity indexes (Inconsistent Responding and Defensiveness).

A new feature found on the RCMAS-2 is the Short Form Total Anxiety scale that incorporates the first 10 items of the RCMAS-2. The internal consistency reliability estimates ranged from .75 to .92 and retest reliability over 1 week ranged from .64 to .76. There is evidence of construct validity (Reynolds & Richmond, 1979), as well as convergent and discriminant validity (Reynolds & Richmond, 2008).

Multidimensional Anxiety Scale for Children

The *Multidimensional Anxiety Scale for Children* (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997) is a self-report inventory of anxiety that consists of 39 items designed for children and adolescents aged 8–19 years. The MASC consists of 4 scales (Physical Harm, Harm Avoidance, Social Anxiety, and Panic/Separation Anxiety) and 6 subscales (Tense, Somatic, Perfectionism, Anxious Coping, Humiliation Fears, and Performance Fears). In addition, a Total Anxiety scale, an Anxiety Disorders Index (reflecting diagnostic criteria from the *DSM-IV-TR*), and a validity scale are also available. Examinees respond to the items on a 4-point scale ranging from 0 (never) to 3 (often). According to the authors, there is moderate to very strong internal consistency (.60–.90) estimates for the 4 scales. Much lower internal consistency reliability estimates were found for the 6 subscales. Confirmatory factor analyses indicated that a four-factor structure provides the best fit for the data. Evidence suggests that the MASC scores were able to differentiate between anxious and nonanxious children (March & Sullivan, 1999).

SUMMARY

This chapter examines family relations and family functioning and their impact on children’s emotional and behavioral problems. The chapter starts by presenting the most popular family assessment models and their corresponding measures. Further, it introduces central affective dimensions and aspects of parenting, such as quality of marital relationship and quality of attachment on child mental well-being. The processes that contribute to family resiliency are delineated. Methods of family assessment and parenting marital inventories, measures of dyadic interactions, and measures for predicting child abuse are presented. The chapter concludes with the assessment of externalizing and internalizing problems.

REFERENCES

- Abidin, R. R. (1986). *Parenting stress index* (2nd ed.). Charlottesville, VA: Pediatric Psychology Press.
- Abidin, R. R. (1992). The determinants of parenting behavior. *Journal of Clinical Child Psychology*, 21(4), 407–412.
- Abidin, R. R. (1995). *Parenting stress index: Professional manual* (3rd ed.). Odessa, FL: Psychological Assessment Resources.
- Achenbach, T. M. (1990). Conceptualization of developmental psychopathology. In M. Lewis, & S. M. Miller (Eds.), *Handbook of developmental psychopathology* (pp. 3–14). New York, NY: Plenum Press.
- Achenbach, T. M. (2001). *Manual for the Child Behaviour Checklist 4–18, 1991 profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Achenbach, T. M., Howell, C. T., Quay, H. C., & Conners, C. K. (1991). National survey of problems and competencies among four- to sixteen-year-olds: parents’ reports for normative and clinical samples. *Monographs of the Society for Research in Child Development*, 56(3), 1–131.
- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms and Profiles*. Burlington, VT: University of Vermont.
- Achenbach, T. M., & Rescorla, L. A. (2007). *Multicultural supplement to the manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: University of Vermont.
- Ainsworth, M. D. S. (1964). Patterns of attachment behaviour shown by the infant in interaction with his mother. *Merrill-Palmer Quarterly of Behaviour and Development*, 10(1), 51–58.
- Ainsworth, M. D. S. (1979). Infant–mother attachment. *American Psychologist*, 34(10), 932–937.
- Ammerman, R. T. (1998). Methodological issues in child maltreatment research. In J. R. Lutzker (Ed.), *Handbook of child abuse research and treatment* (pp. 117–132). New York, NY: Plenum Press.
- Appleyard, K., Egeland, B., van Dulman, M. H., & Sroufe, L. A. (2005). When more is not better: the role of cumulative risk in child behaviour outcomes. *Journal of Child Psychology and Psychiatry*, 46(3), 235–245.
- Arnold, D. S., O’Leary, S. G., Wolff, L. S., & Acker, M. M. (1993). The parenting scale: a measure of dysfunctional parenting in discipline situations. *Psychological Assessment*, 5(2), 137–144.
- Aronen, E. T., & Soininen, M. (2000). Childhood depressive symptoms predict psychiatric problems in young adults. *Canadian Journal of Psychiatry*, 45(5), 465–470.
- Ashford, J., van Lier Pol, A. C., Timmermans, M., Cuijpers, P., & Koot, H. M. (2008). Prenatal smoking and internalizing and externalizing problems in children studied from childhood to late adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, 47(7), 779–787.
- Ashman, S. B., Dawson, G., & Panagiotides, H. (2008). Trajectories of maternal depression over 7 years: relations with child psychophysiology and behaviour and role of contextual risks. *Development and Psychopathology*, 20(1), 55–77.

- Ayoub, C., Willett, J. B., & Robinson, D. S. (1992). Families at risk for child maltreatment: entry-level characteristics and growth in family functioning during treatment. *Child Abuse & Neglect, 16*(4), 495–511.
- Baldwin, A. L. (1946). Differences in parent behavior toward three- and nine-year-old children. *Journal of Personality, 15*, 143–165.
- Baldwin, A. L., Kalhorn, J., & Breese, F. H. (1945). Patterns of parent behaviour. *Psychological Monographs, 58*(3), 1–75.
- Bandura, A. (2008). An agentic perspective on positive psychology. In S. J. Lopez (Ed.), *Positive psychology: Exploring the best in people, Vol. 1: Discovering human strengths. Praeger perspectives* (pp. 167–196). Westport, CT: Praeger Publishers/Greenwood Publishing Group.
- Bandura, A. (2011). The social and policy impact of social cognitive theory. In M. M. Mark, S. I. Donaldson, & B. Campbell (Eds.), *Social psychology and evaluation* (pp. 31–71). New York, NY: Guilford Press.
- Barber, B. K. (1996). Parental psychological control: revisiting a neglected construct. *Child Development, 67*(6), 3296–3319.
- Barber, B. K., & Olsen, J. A. (1997). Socialization in context: connection, regulation, and autonomy in the family, school, and neighbourhood, and with peers. *Journal of Adolescent Research, 12*(2), 287–315.
- Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York, NY: Guilford Press.
- Baumrind, D. (1978). Parental disciplinary patterns and social competence in children. *Youth & Society, 9*(3), 239–267.
- Baumrind, D. (1991a). The influence of parenting style on adolescent competence and substance use. *The Journal of Early Adolescence, 11*(1), 56–95.
- Baumrind, D. (1991b). Effective parenting during the early adolescent transition. In P. A. Cowan, & E. M. Hetherington (Eds.), *Family transitions. Advances in family research series* (pp. 111–163). Hillsdale, NJ, US: Lawrence Erlbaum Associates.
- Baumrind, D. (1996). The discipline controversy revisited. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 45*(4), 405–414.
- Baumrind, D., Larzelere, R. E., & Owens, E. B. (2010). Effects of preschool parents' power assertive patterns and practices on adolescent development. *Parenting: Science and Practice, 10*(3), 157–201.
- Beavers, W. R., & Hampson, R. B. (1990). *Successful families: Assessment and intervention*. New York, NY: W.W. Norton.
- Beavers, W. R., & Hampson, R. B. (2000). The Beavers systems model of family functioning. *Journal of Family Therapy, 22*(2), 128–143.
- Becker, W. C. (1964). Consequences of different types of parental discipline. In M. L. Hoffman, & L. W. Hoffman (Eds.), *Review of child development research* (pp. 169–208). New York, NY: Russell Sage Foundation.
- Becvar, D. S. (2013). *Handbook of family resilience*. New York, NY: Springer.
- Beesdo, K., Pine, D. S., Lieb, R., & Wittchen, H. U. (2010). Incidence and risk patterns of anxiety and depressive disorders and categorization of generalized anxiety disorder. *Archives of General Psychiatry, 67*(1), 47–57.
- Begle, A. M., Dumas, J. E., & Hanson, R. (2010). Predicting child abuse potential: an empirical investigation of two theoretical frameworks. *Journal of Clinical Child and Adolescent Psychology, 39*(2), 208–219.
- Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review, 75*(2), 81–95.
- Bell, R. Q. (1977). Socialization findings re-examined. In R. Q. Bell, & R. V. Harper (Eds.), *Child effects on adults* (pp. 53–84). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Belsky, J. (1984). The determinants of parenting: a process model. *Child Development, 55*(1), 83–96.
- Belsky, J. (1993). Etiology of child maltreatment: a developmental-ecological analysis. *Psychological Bulletin, 114*(3), 413–434.
- Belsky, J., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2007). For better and for worse: differential susceptibility to environmental influences. *Current Directions in Psychological Science, 16*(6), 300–304.
- Belsky, J., & Pluess, M. (2009a). Beyond diathesis-stress: differential susceptibility to environmental influences. *Psychological Bulletin, 135*(6), 885–908.
- Belsky, J., & Pluess, M. (2009b). The nature (and nurture?) of plasticity in early human development. *Perspectives on Psychological Science, 4*(4), 345–351.
- Bernstein, D. P., & Fink, L. (1998). *Childhood Trauma Questionnaire: A retrospective self-report manual*. San Antonio, TX: The Psychological Corporation.
- Bigras, M., LaFreniere, P. J., & Dumas, J. E. (1996). Discriminant validity of the parent and child scales of the parenting stress index. *Early Education and Development, 7*(2), 167–178.
- Black, K., & Lobo, M. (2008). A conceptual review of family resilience factors. *Journal of Family Nursing, 14*(1), 33–55.
- Blair, C., Granger, D. A., Willoughby, M., Mills-Koonce, R., Cox, M., Greenberg, M. T., Kivlighan, K. T., & Fortunato, C. K. (2011). Salivary cortisol mediates effects of poverty and parenting on executive functions in early childhood. *Child Development, 82*(6), 1970–1984.
- Bongers, I. L., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2003). The normative development of child and adolescent problem behaviour. *Journal of Abnormal Psychology, 112*(2), 179–192.
- Booth-La Force, C., & Oxford, M. L. (2008). Trajectories of social withdrawal from grades 1 to 6: prediction from early parenting, attachment, and temperament. *Developmental Psychology, 44*(5), 1298–1313.
- Bowlby, J. (1944). Forty-four juvenile thieves: their characters and home life. *International Journal of Psychoanalysis, 25*(19–52), 107–127.
- Bowlby, J. (1956). Mother-child separation. *Mental Health and Infant Development, 1*, 117–122.
- Bowlby, J. (1982). *Attachment and loss. Vol. 1: Attachment* (2nd ed.). New York, NY: Basic Books.
- Brennan, P. A., Hall, J., Bor, W., Najman, J. M., & Williams, G. (2003). Integrating biological and social processes in relation to early-onset persistent aggression in boys and girls. *Developmental Psychology, 39*(2), 309–323.
- Bronfenbrenner, U. (1972). *Influences on human development*. Fort Worth, TX: Dryden Press.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist, 32*(7), 513–531.
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon, & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1: Theoretical models of human development* (5th ed., pp. 993–1023). New York, NY: John Wiley and Sons.
- Brown, M. A., McIntyre, L. L., Crnic, K. A., Baker, B. L., & Blacher, J. (2011). Preschool children with and without developmental delay: risk, parenting, and child demandingness. *Journal of Mental Health Research in Intellectual Disabilities, 4*(3), 206–226.

- Buehler, C., Krishnakumar, A., Stone, G., Anthony, C., Pemberton, S., Gerard, J., & Barber, B. K. (1998). Interparental conflict styles and youth problem behaviors: a two-sample replication study. *Journal of Marriage and Family, 60*(1), 119–132.
- Butchart, A., Putney, H., Furniss, T., & Kahane, T. (2006). *Preventing child maltreatment: a guide to taking action and generating evidence*. Geneva, Switzerland: World Health Organisation.
- Campbell, S. B. (1995). Behaviour problems in preschool children: a review of recent research. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 36*(1), 113–149.
- Casalin, S., Luyten, P., Besser, A., Wouters, S., & Vliegen, N. (2014). A longitudinal cross-lagged study of the role of parental self-criticism, dependency, depression, and parenting stress in the development of child negative affectivity. *Self and Identity, 13*(4), 491–511.
- Caughy, M. O. B., Huang, K. Y., & Lima, J. (2009). Patterns of conflict interaction in mother–toddler dyads: differences between depressed and non-depressed mothers. *Journal of Child and Family Studies, 18*(1), 10–20.
- Chaffin, M., & Valle, L. A. (2003). Dynamic prediction characteristics of the Child Abuse Potential Inventory. *Child Abuse and Neglect, 27*(5), 463–481.
- Choe, D. E., Sameroff, A. J., & McDonough, S. E. (2013). Infant functional regulatory problems and gender moderate bidirectional effects between externalizing behavior and maternal depressive symptoms. *Infant Behavior and Development, 36*(3), 307–318.
- Chow, S. M., Haltigan, J. D., & Messinger, D. S. (2010). Dynamic infant–parent affect coupling during the face-to-face/still-face. *Emotion, 10*(1), 101–114.
- Cicchetti, D. (2013). Annual research review: resilient functioning in maltreated children—past, present, and future perspectives. *Journal of Child Psychology and Psychiatry, 54*(4), 402–422.
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development, 75*(2), 317–333.
- Cole, P. M., Teti, L. O., & Zahn-Waxler, C. (2003). Mutual emotion regulation and the stability of conduct problems between preschool and early school age. *Development and Psychopathology, 15*(1), 1–18.
- Colvin, A., Eyberg, S. M., & Adams, C. D. (1999). *Restandardization of the Eyberg Child Behaviour Inventory*. Gainesville, FL: University of Florida, Child Study Laboratory.
- Conners, C. K. (2008). *Conners 3rd edition manual*. Toronto, ON, CA: Multi-Health Systems.
- Costa, N. M., Weems, C. F., Pellerin, K., & Dalton, R. (2006). Parenting stress and childhood psychopathology: an examination of specificity to internalizing and externalizing symptoms. *Journal of Psychopathology and Behavioural Assessment, 28*(2), 113–122.
- Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry, 60*(8), 837–844.
- Craighead, W. E., Smucker, M. R., Craighead, L. W., & Ilardi, S. S. (1998). Factor analysis of the Children’s Depression Inventory in a community sample. *Psychological Assessment, 10*(2), 156–165.
- Crooks, C. V., & Wolfe, D. A. (2007). Child abuse and neglect. In E. J. Mash, & R. A. Barkley (Eds.), *Assessment of childhood disorders* (4th ed., pp. 639–684). New York, NY: Guilford Press.
- Darling, N., & Steinberg, L. (1993). Parenting style as context: an integrative model. *Psychological Bulletin, 113*(3), 487–496.
- Davidov, M., & Grusec, J. E. (2006). Untangling the links of parental responsiveness to distress and warmth to child outcomes. *Child Development, 77*(1), 44–58.
- Davies, P. T., & Cummings, E. M. (1994). Marital conflict and child adjustment: an emotional security hypothesis. *Psychological Bulletin, 116*(3), 387–411.
- Davies, P. T., Hentges, R. F., Coe, J. L., Martin, M. J., Sturge-Apple, M. L., & Cummings, E. M. (2016). The multiple faces of interparental conflict: implications for cascades of children’s insecurity and externalizing problems. *Journal of Abnormal Psychology, 125*(5), 664–678.
- Davies, P. T., & Sturge-Apple, M. L. (2007). Advances in the formulation of emotional security theory: an ethologically-based perspective. *Advances in Child Behaviour and Development, 35*, 87–137.
- Del Vecchio, T., & O’Leary, S. G. (2006). Antecedents of toddler aggression: dysfunctional parenting in mother-toddler dyads. *Journal of Clinical Child and Adolescent Psychology, 35*(2), 194–202.
- Del Vecchio, T., & Rhoades, K. A. (2010). Bidirectional influences in mother–toddler dyads: an examination of the relative influence of mothers’ and children’s behaviours. *Infant and Child Development, 19*(5), 516–529.
- Desjardins, J., Zelenski, J. M., & Coplan, R. J. (2008). An investigation of maternal personality, parenting styles, and subjective well-being. *Personality and Individual Differences, 44*(3), 587–597.
- Dishion, T. J., & Stormshak, E. A. (2007). *Intervening in children’s lives: An ecological, family-centered approach to mental health care*. Washington, DC: American Psychological Association.
- Drumm, M., Carr, A., & Fitzgerald, M. (2000). The Beavers, McMaster and Circumplex clinical rating scales: a study of their sensitivity, specificity and discriminant validity. *Journal of Family Therapy, 22*(2), 225–238.
- Duggal, S., Carlson, E. A., Sroufe, L. A., & Egeland, B. (2001). Depressive symptomatology in childhood and adolescence. *Development and Psychopathology, 13*(1), 143–164.
- Dwairy, M. (2008). Parental inconsistency versus parental authoritarianism: associations with symptoms of psychological disorders. *Journal of Youth and Adolescence, 37*(5), 616–626.
- Dwairy, M. (2009). Parenting and adolescents’ psychological adjustment: towards a systemic approach in parenting research. *The Open Family Studies Journal, 2*, 73–81.
- Dwairy, M. (2010). Parental inconsistency: a third cross-cultural research on parenting and psychological adjustment of children. *Journal of Child and Family Studies, 19*(1), 23–29.

- Eisenberg, N., Taylor, Z. E., Widaman, K. F., & Spinrad, T. L. (2015). Externalizing symptoms, effortful control, and intrusive parenting: a test of bidirectional longitudinal relations during early childhood. *Development and Psychopathology*, *27*(4), 953–968.
- Eisenstadt, T. H., Eyberg, S. M., McNeil, C. B., Newcomb, K., & Funderburk, B. (1993). Parent–child interaction therapy with behaviour problem children: relative effectiveness of two stages and overall treatment outcome. *Journal of Clinical Child Psychology*, *22*(1), 42–51.
- Eklund, K., Renshaw, T. L., Dowdy, E., Jimerson, S. R., Hart, R. H., Jones, C. N., & Earhart, J. (2009). Early identification of behavioral and emotional problems in youth: universal screening versus teacher-referral identification. *Contemporary School Psychology*, *14*(1), 89–95.
- Elgar, F. J., Waschbusch, D. A., Dadds, M. R., & Sigvaldason, N. (2007). Development and validation of a short form of the Alabama Parenting Questionnaire. *Journal of Child and Family Studies*, *16*(2), 243–259.
- Ellis, B. J., & Boyce, W. T. (2008). Biological sensitivity to context. *Current Directions in Psychological Science*, *17*(3), 183–187.
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: an evolutionary–neurodevelopmental theory. *Development and Psychopathology*, *23*(1), 7–28.
- Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). The McMaster Family Assessment Device. *Journal of Marital and Family Therapy*, *9*(2), 171–180.
- Epstein, N. B., Bishop, D., Ryan, C., Miller, I., & Keitner, G. I. (1993). The McMaster model: view of healthy family functioning. In F. Walsh (Ed.), *Normal family processes. Guilford family therapy series* (2nd ed., pp. 138–160). New York, NY: Guilford Press.
- Epstein, N. B., Rakoff, V., & Sigal, J. J. (1968). *The family categories schema*. Montreal, QC, CA: McGill University.
- Eyberg, S. M., Nelson, M. M., Duke, M., & Boggs, S. R. (2004). *Manual for the dyadic parent–child interaction coding system* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Eyberg, S., & Pincus, D. (1999). *Eyberg Child Behaviour Inventory & Sutter–Eyberg Student Behaviour Inventory–Revised: professional manual*. Odessa, FL: Psychological Assessment Resources.
- Fanti, K. A., & Henrich, C. C. (2010). Trajectories of pure and co-occurring internalizing and externalizing problems from age 2 to age 12: findings from the National Institute of Child Health and Human Development Study of Early Child Care. *Developmental Psychology*, *46*(5), 1159–1175.
- Fauber, R., Forehand, R., Thomas, A., & Wierson, M. (1990). A mediational model of the impact of marital conflict on adolescent adjustment in intact and divorced families: the role of disrupted parenting. *Child Development*, *61*(4), 1112–1123.
- Feng, X., Shaw, D. S., Skuban, E. M., & Lane, T. (2007). Emotional exchange in mother–child dyads: stability, mutual influence, and associations with maternal depression and child problem behaviour. *Journal of Family Psychology*, *21*(4), 714–725.
- Forbes, C., Vuchinich, S., & Kneedler, B. (2001). Assessing families with the Family Problem Solving Code. In P. K. Kerig, & K. M. Lindahl (Eds.), *Family observational coding systems: Resources for systemic research* (pp. 59–75). Mahwah, NJ: Lawrence Erlbaum Associates.
- Fossati, A., Raine, A., Borroni, S., Bizzozero, A., Volpi, E., Santalucia, I., & Maffei, C. (2009). A cross-cultural study of the psychometric properties of the Reactive-Proactive Aggression Questionnaire among Italian nonclinical adolescents. *Psychological Assessment*, *21*(1), 131–135.
- Foster, J. M., & Carson, D. K. (2013). Child sexual abuse in the United States: perspectives on assessment and intervention. *American Journal of Humanities and Social Sciences*, *1*(3), 97–108.
- Freud, A. (1953). The bearing of the psychoanalytic theory of instinctual drives on certain aspects of human behavior. In R. M. Loewenstein (Ed.), *Drives, affects, behaviour* (pp. 259–277). Madison, CT: International Universities Press, Inc.
- Freud, S., & Brill, A. A. (1914). *Psychopathology of everyday life*. New York, NY: Macmillan Publishing.
- Frick, P. J., Barry, C. T., & Kamphaus, R. W. (2010). *Clinical assessment of child and adolescent personality and behaviour* (3rd ed.). New York, NY: Springer Science + Business Media.
- Frick, P. J., Christian, R. E., & Wootton, J. M. (1999). Age trends in association between parenting practices and conduct problems. *Behaviour Modification*, *23*(1), 106–128.
- Friedrich, W. N. (1997). *Child Sexual Behaviour Inventory: professional manual*. Odessa, FL: Psychological Assessment Resources.
- Funderburk, B. W., Eyberg, S. M., Rich, B. A., & Behar, L. (2003). Further psychometric evaluation of the Eyberg and Behar rating scales for parents and teachers of preschoolers. *Early Education and Development*, *14*(1), 67–81.
- Gardner, F. (2000). Methodological issues in the direct observation of parent–child interaction: do observational findings reflect the natural behaviour of participants? *Clinical Child and Family Psychology Review*, *3*(3), 185–198.
- Geffken, G. R., Keeley, M. L., Kellison, I., Storch, E. A., & Rodrigue, J. R. (2006). Parental adherence to child psychologists’ recommendations from psychological testing. *Professional Psychology: Research and Practice*, *37*(5), 499–505.
- Gershoff, E. T. (2002). Corporal punishment by parents and associated child behaviors and experiences: a meta-analytic and theoretical review. *Psychological Bulletin*, *128*(4), 539–579.
- Gilliom, M., & Shaw, D. S. (2004). Co-development of externalizing and internalizing problems in early childhood. *Development and Psychopathology*, *16*(2), 313–333.
- Glover, T. A., & Albers, C. A. (2007). Considerations for evaluating universal screening assessments. *Journal of School Psychology*, *45*(2), 117–135.
- Goldenberg, H., & Goldenberg, I. (2013). *Family therapy: An overview* (8th ed.). Belmont, CA: Brooks/Cole.
- Gomez, R., Vance, A., & Gomez, A. (2012). Children’s Depression Inventory: invariance across children and adolescents with and without depressive disorders. *Psychological Assessment*, *24*(1), 1.
- Gottesman, I. I. (1974). Developmental genetics and ontogenetic psychology: overdue detente and propositions from a matchmaker. In A. D. Pick (Ed.), *Minnesota Symposium on Child Psychology* (pp. 55–80). (Vol. 8). Minneapolis, MN: University of Minnesota Press.
- Gottman, J. M. (1997). *The heart of parenting: Raising an emotionally intelligent child*. New York, NY: Simon & Schuster.
- Gray, M. R., & Steinberg, L. (1999). Unpacking authoritative parenting: reassessing a multidimensional construct. *Journal of Marriage and the Family*, *61*(3), 574–587.

- Graziano, P. A., Keane, S. P., & Calkins, S. D. (2010). Maternal behavior and children's early emotion regulation skills differentially predict development of children's reactive control and later effortful control. *Infant and Child Development, 19*(4), 333–353.
- Grolnick, W. S., & Pomerantz, E. M. (2009). Issues and challenges in studying parental control: toward a new conceptualization. *Child Development Perspectives, 3*(3), 165–170.
- Gross, H. E., Shaw, D. S., & Moilanen, K. L. (2008). Reciprocal associations between boys' externalizing problems and mothers' depressive symptoms. *Journal of Abnormal Psychology, 36*(5), 693–709.
- Gustafson, S. L., & Rhodes, R. E. (2006). Parental correlates of physical activity in children and early adolescents. *Sports Medicine, 36*(1), 79–97.
- Gustafsson, H. C., Cox, M. J., & Blair, C. (2012). Maternal parenting as a mediator of the relationship between intimate partner violence and effortful control. *Journal of Family Psychology, 26*(1), 115–123.
- Haden, S. C., Scarpa, A., & Stanford, M. S. (2008). Validation of the Impulsive/Premeditated Aggression Scale in college students. *Journal of Aggression, Maltreatment & Trauma, 17*(3), 352–373.
- Hankin, B. L., Lakdawalla, Z., Carter, I. L., Abela, J. R. Z., & Adams, P. (2007). Are neuroticism, cognitive vulnerabilities and self-esteem overlapping or distinct risks for depression? Evidence from confirmatory factor analyses. *Journal of Social and Clinical Psychology, 26*(1), 29–63.
- Harold, G. T., & Leve, L. D. (2012). Parents as partners: how the parental relationship affects children's psychological development. In A. Balfour, M. Morgan, & C. Vincent (Eds.), *How couple relationships shape our world*. London: Karnac.
- Harrist, A. W., Pettit, G. S., Dodge, K. A., & Bates, J. E. (1994). Dyadic synchrony in mother-child interaction: relation with children's subsequent kindergarten adjustment. *Family Relations: An Interdisciplinary Journal of Applied Family Studies, 43*(4), 417–424.
- Haskett, M. E., Ahern, L. S., Ward, C. S., & Allaire, J. C. (2006). Factor structure and validity of the Parenting Stress Index-Short Form. *Journal of Clinical Child and Adolescent Psychology, 35*(2), 302–312.
- Hawes, D. J., & Dadds, M. R. (2005). Oppositional and conduct problems. In J. Hudson, & R. Rapee (Eds.), *Current thinking on psychopathology and the family* (pp. 73–91). New York, NY: Elsevier.
- Hawes, D. J., & Dadds, M. R. (2013). Parent and Family Assessment Strategies. In B. D. McLeod, A. Jensen-Doss, & T. Ollendick (Eds.), *Handbook of child and adolescent diagnostic and behavioural assessment* (pp. 316–347). New York, NY: Guilford Press.
- Hawes, D., Dadds, M., Frost, A., & Hasking, P. (2011). Do callous-unemotional traits drive change in parenting practices? *Journal of Clinical Child & Adolescent Psychology, 40*(4), 507–518.
- Hersov, L. A. (1960). Refusal to go to school. *Journal of Child Psychology & Psychiatry, 1*(2), 137–145.
- Heyman, R. E. (2004). Rapid Marital Interaction Coding System (RMICS). In P. K. Kerig, & D. H. Baucom (Eds.), *Couple observational coding systems* (pp. 67–94). Mahwah, NJ: Lawrence Erlbaum Associates.
- Heyman, R. E., Sayers, S. L., & Bellack, A. S. (1994). Global marital satisfaction versus marital adjustment: an empirical comparison of three measures. *Journal of Family Psychology, 8*(4), 432–446.
- Jaurisch, S., Lösel, F., Beelmann, A., & Stemmler, M. (2009). Inkonsistenz im Erziehungsverhalten zwischen Müttern und Vätern und Verhaltensprobleme des Kindes/Inconsistency in parenting between mothers and fathers and children's behaviour problems]. *Psychologie in Erziehung und Unterricht, 56*(3), 172–186.
- Jouriles, E. N., Rosenfield, D., McDonald, R., & Mueller, V. (2015). Child involvement in interparental conflict and child adjustment problems: a longitudinal study of violent families. *Journal of Abnormal Child Psychology, 42*(5), 693–704.
- Joussemet, M., Landry, R., & Koestner, R. (2008). A self-determination theory perspective on parenting. *Canadian Psychology, 49*(3), 194–200.
- Kabacoff, R. I., Miller, I. W., Bishop, D. S., Epstein, N. B., & Keitner, G. I. (1990). A psychometric study of the McMaster Family Assessment Device in psychiatric, medical, and nonclinical samples. *Journal of Family Psychology, 3*(4), 431–439.
- Kamphaus, R. W., & Reynolds, C. R. (2007). *Behavioural and Emotional Screening System manual*. Bloomington, MN: Pearson.
- Kazdin, A. E. (1995). Child, parent and family dysfunction as predictors of outcome in cognitive-behavioural treatment of antisocial children. *Behaviour Research and Therapy, 33*(3), 271–281.
- Kazdin, A. E. (2010). Problem-solving skills training and parent management training for oppositional defiant disorder and conduct disorder. In J. R. Weisz, & A. E. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 211–226). New York, NY: Guilford Press.
- Kerns, K. A., & Brumariu, L. E. (2014). Is insecure parent-child attachment a risk factor for the development of anxiety in childhood or adolescence? *Child Development Perspectives, 8*(1), 12–17.
- Kochanska, G., Aksan, N., Knaack, A., & Rhines, H. M. (2004). Maternal parenting and children's conscience: early security as moderator. *Child Development, 75*(4), 1229–1242.
- Kochanska, G., Brock, R. L., Chen, K. H., Aksan, N., & Anderson, S. W. (2015). Paths from mother-child and father-child relationships to externalizing behaviour problems in children differing in electrodermal reactivity: a longitudinal study from infancy to age 10. *Journal of Abnormal Child Psychology, 43*(4), 721–734.
- Kochanska, G., Koenig, J. L., Barry, R. A., Kim, S., & Yoon, J. E. (2010). Children's conscience during toddler and preschool years, moral self, and a competent, adaptive developmental trajectory. *Developmental Psychology, 46*(5), 1320–1332.
- Kouneski, E. F. (2000). *The Family Circumplex Model, FACES II, and FACES III: Overview of research and applications*. Twin Cities, MN, US: University of Minnesota Press.
- Kovacs, M. (1992). *The Children's Depression Inventory (CDI) manual*. North Tonawanda, NY: Multi-Health Systems.
- Kovacs, M. (2015). Children's depression inventory (CDI and CDI 2). *The Encyclopedia of Clinical Psychology, 1*–5.
- Kovacs, M., & Devlin, B. (1998). Internalizing disorders in childhood. *Journal of Child Psychology and Psychiatry, 39*(1), 47–63.
- Lachar, D., & Gruber, C. P. (2001). *Personality Inventory for Children (PIC-2): Standard form and behavioural summary manual* (2nd ed.). Los Angeles, CA: Western Psychological Services.

- Lachar, D., Wingenfeld, S. A., Kline, R. B., & Gruber, C. P. (2000). *Student behaviour survey*. Los Angeles, CA: Western Psychological Services.
- Larson, J., & Lochman, J. E. (2002). *Helping schoolchildren cope with anger: A cognitive behavioural intervention*. New York, NY: Guilford Press.
- Lebow, J., & Stroud, C. B. (2012). Assessment of effective couple and family functioning: prevailing models and instruments. In F. Walsh (Ed.), *Normal family processes: Diversity & complexity* (4th ed., pp. 501–528). New York, NY: Guilford Press.
- Lerner, R. M. (2006). Resilience as an attribute of the developmental system. *Annals of the New York Academy of Sciences*, 1094(1), 40–51.
- Leve, L. D., Kim, H. K., & Pears, K. C. (2005). Childhood temperament and family environment as predictors of internalizing and externalizing trajectories from ages 5 to 17. *Journal of Abnormal Child Psychology*, 33(5), 505–520.
- Lickliter, R. (2013). Modeling psychobiological development in the post-genomic era. *International Journal of Developmental Science*, 7(2), 79–82.
- Lindsey, E. W., Caldera, Y. M., & Tankersley, L. (2009). Marital conflict and the quality of young children's peer play behaviour: the mediating and moderating role of parent-child emotional reciprocity and attachment security. *Journal of Family Psychology*, 23(2), 130–145.
- Locke, L. M., & Prinz, R. J. (2002). Measurement of parental discipline and nurturance. *Clinical Psychology Review*, 22(6), 895–930.
- Loeber, R., & Hay, D. (1997). Key issues in the development of aggression and violence from childhood to early adulthood. *Annual Review of Psychology*, 48(1), 371–410.
- Lovejoy, M. C., Verda, M. R., & Hays, C. E. (1997). Convergent and discriminant validity of measures of parenting efficiency and control. *Journal of Clinical Child Psychology*, 26(4), 366–376.
- Luthar, S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: a critical evaluation and guidelines for future work. *Child Development*, 71(3), 543–562.
- Maccoby, E. E. (2000). Parenting and its effects on children: on reading and misreading behaviour genetics. *Annual Review of Psychology*, 51, 1–27.
- Maccoby, E. E. (2003). Dynamic viewpoints on parent-child relations: their implications for socialization processes. In L. Kuczynski (Ed.), *Handbook of dynamics in parent-child relations* (pp. 439–452). Thousand Oaks, CA: Sage Publications.
- Maccoby, E. E. (2007). Historical overview of socialization research and theory. In J. E. Grusec, & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 13–41). New York, NY: Guilford Press.
- Maggs, J. L., Patrick, M. E., & Feinstein, L. (2008). Childhood and adolescent predictors of alcohol use and problems in adolescence and adulthood in the National Child Development Study. *Addiction*, 103, 7–22.
- Mahler, M. S., Pine, F., & Bergman, A. (1975). *The psychological birth of the human infant*. New York, NY: Basic Books, A Division of Harper Collins Publisher.
- March, J. S., Parker, J. D. A., Sullivan, K., Stallings, P., & Conners, C. (1997). The Multidimensional Anxiety Scale for Children (MASC): factor structure, reliability, and validity. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(4), 554–565.
- March, J. S., & Sullivan, K. (1999). Test-retest reliability of the Multidimensional Anxiety Scale for Children. *Journal of Anxiety Disorders*, 13(4), 349–358.
- Margolin, G., Gordis, E. B., Medina, A. M., & Oliver, P. H. (2003). The co-occurrence of husband-to-wife aggression, family-of-origin aggression, and child abuse potential in a community sample. *Journal of Interpersonal Violence*, 18(4), 413–440.
- Masten, A. (2001). Ordinary magic: resilience processes in development. *American Psychologist*, 56(3), 227–238.
- Masten, A. S. (2007). Resilience in developing systems: progress and promise as the fourth wave rises. *Development and Psychopathology*, 19(3), 921–930.
- Masten, A. S. (2013). Risk and resilience in development. In P. D. Zelazo (Ed.), *Oxford handbook of developmental psychology: Self and other* (pp. 579–607). (Vol. 2). New York, NY: Oxford University Press.
- Masten, A. S. (2014a). Global perspectives on resilience in children and youth. *Child Development*, 85(1), 6–20.
- Masten, A. S. (2014b). *Ordinary magic: Resilience in development*. New York, NY: Guilford Press.
- Masten, A. S., & Cicchetti, D. (2016). Resilience in development: progress and transformation. *Developmental Psychopathology*, 6, 1–63.
- Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: lessons from research on successful children. *American Psychologist*, 53(2), 205–220.
- Masten, A. S., & Monn, A. R. (2015). Child and family resilience: a call for integrated science, practice, and professional training. *Family Relations*, 64(1), 5–21.
- Masten, A. S., & Narayan, A. J. (2012). Child development in the context of disaster, war and terrorism: pathways of risk and resilience. *Annual Review of Psychology*, 63(1), 227–257.
- Mattessich, P., & Hill, R. (1987). Life cycle and family development. In M. B. Sussman, & S. K. Steinmetz (Eds.), *Handbook of marriage and the family* (pp. 437–470). New York, NY: Plenum Press.
- McCormick, C. M., Kuo, S. I. C., & Masten, A. S. (2011). Developmental tasks across the lifespan. In K. L. Fingerman, C. Berg, T. C. Antonucci, & J. Smith (Eds.), *The handbook of lifespan development*. New York, NY: Springer.
- McLeod, B. D., Jensen-Doss, A., & Ollendick, T. H. (2013). *Diagnostic and behavioural assessment in children and adolescents: a clinical guide*. New York, NY: Guilford Press.
- McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007a). Examining the association between parenting and childhood depression: a meta-analysis. *Clinical Psychology Review*, 27(8), 986–1003.
- McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007b). Examining the association between parenting and childhood anxiety: a meta-analysis. *Clinical Psychology Review*, 27(2), 155–172.
- McMahon, R. J., & Forehand, R. L. (2003). *Helping the noncompliant child: A clinician's guide to effective parent training* (2nd ed.). New York, NY: Guilford Press.

- McMahon, R., & Frick, P. (2007). Conduct and oppositional disorders. In E. Mash, & R. Barkley (Eds.), *Assessment of childhood disorders* (4th ed., pp. 132–183). New York, NY: Guilford Press.
- Melby, J. N., Conger, R. D., Book, R., Rueter, M., Lucy, L., Repinski, D., Rogers, S., Rogers, B., & Scaramella, L. (1998). *The Iowa Family Interaction Rating Scales* (5th ed.). Ames, IA: Iowa State University Institute for Social and Behavioural Research.
- Merrell, K. W., & Walters, A. S. (1998). *Internalizing Symptoms Scale for Children*. Austin, TX: Pro-ED.
- Miller, I. W., Epstein, N. B., Bishop, D. S., & Keitner, G. I. (1985). The McMaster Family Assessment Device: reliability and validity. *Journal of Marital and Family Therapy, 11*(4), 345–356.
- Miller, I. W., Kabacoff, R. I., Epstein, N. B., Bishop, D. S., Keitner, G. I., Baldwin, L. M., & van der Spuy, H. I. J. (1994). The development of a clinical rating scale for the McMaster model of family functioning. *Family Process, 33*(1), 53–69.
- Miller, I. W., Ryan, C. E., Keitner, G. I., Bishop, D. S., & Epstein, N. B. (2000). The McMaster approach to families: theory, assessment, treatment and research. *Journal of Family Therapy, 22*(2), 168–189.
- Milner, J. S. (1986). *The Child Abuse Potential Inventory: Manual* (2nd ed.). Webster, NC: Psytec.
- Moos, R. H., & Moos, S. (1986). *Family Environment Scale manual* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*(2), 361–388.
- Murnane, R., & Willett, J. (2011). *Methods matter*. New York, NY: Oxford University Press.
- Myers, K., & Winters, N. C. (2002). Ten-year review of rating scales. II: scales for internalizing disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(6), 634–659.
- Nixon, R. D., Sweeney, L., Erickson, D. B., & Touyz, S. W. (2004). Parent–child interaction therapy: one- and two-year follow-up of standard and abbreviated treatments for oppositional preschoolers. *Journal of Abnormal Child Psychology, 32*(3), 263–271.
- Ohman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: toward an evolved module of fear and fear learning. *Psychological Review, 108*(3), 483–522.
- Olivari, M. G., Tagliabue, S., & Confalonieri, E. (2013). Parenting Style and Dimensions Questionnaire: a review of reliability and validity. *Marriage & Family Review, 49*(6), 465–490.
- Olson, D. H. (1993). Circumplex model of marital and family systems: assessing family functioning. In F. Walsh (Ed.), *Normal family processes. Guilford family therapy series* (2nd ed., pp. 104–137). New York, NY: Guilford Press.
- Olson, D. (2011). FACES IV and the Circumplex Model: Validation study. *Journal of Marital and Family Therapy, 37*(1), 64–80.
- Olson, D. H. (2000). Circumplex model of marital and family systems. *Journal of Family Therapy, 22*(2), 144–167.
- Olson, D. H., & Gorall, D. M. (2006). *FACES IV & the Circumplex model*. Minneapolis, MN, US: Life Innovations.
- Olson, D. H., Gorall, D. M., & Tiesel, J. W. (2007). *FACES IV & the Circumplex model: Validation study*. Minneapolis, MN: Life Innovations.
- Olson, D. H., Sprenkle, D. H., & Russell, C. S. (1979). Circumplex model of marital and family systems: I. Cohesion and adaptability dimensions, family types, and clinical applications. *Family Process, 18*(1), 3–28.
- Ondersma, S. J., Chaffin, M. J., Mullins, S. M., & Lebreton, J. M. (2005). A brief form of the Child Abuse Potential Inventory: development and validation. *Journal of Clinical Child and Adolescent Psychology, 34*(2), 301–311.
- Overton, W. F. (2013). A new paradigm for developmental science: relationism and relational-developmental systems. *Applied Developmental Science, 17*(2), 94–107.
- Papp, L. M., Cummings, E. M., & Goeke-Morey, M. C. (2005). Parental psychological distress, parent–child relationship qualities, and child adjustment: direct, mediating, and reciprocal pathways. *Parenting: Science and Practice, 5*(3), 259–283.
- Pardini, D. A. (2008). Novel insights into longstanding theories of bidirectional parent–child influences: introduction to the special section. *Journal of Abnormal Child Psychology, 36*(5), 627–631.
- Paschall, K. W., & Mastergeorge, A. M. (2015). A review of 25 years of research in bidirectionality in parent–child relationships: an examination of methodological approaches. *International Journal of Behavioural Development, 40*(5), 442–451.
- Patterson, G. R. (1980). Mothers: the unacknowledged victims. *Monographs of the Society for Research in Child Development, 45*(5), 64.
- Patterson, G. R. (1982). *Coercive family process*. Eugene, OR: Castalia.
- Patterson, G. R. (2002). The early development of coercive family process. In J. B. Reid, G. R. Patterson, & J. Snyder (Eds.), *Antisocial behaviour in children and adolescents: A developmental analysis and model for intervention* (pp. 25–44). Washington, DC: American Psychological Association.
- Patterson, G. R., Reid, J. B., Jones, R. R., & Conger, R. E. (1975). *A social learning approach to family intervention: Families with aggressive children, Vol. 1*. Eugene, OR: Castalia.
- Pluess, M., & Belsky, J. (2010). Differential susceptibility to parenting and quality child care. *Developmental Psychology, 46*(2), 379–390.
- Porter, B., & O’Leary, K. D. (1980). Marital discord and childhood behavior problems. *Journal of Abnormal Child Psychology, 8*(3), 287–295.
- Pratt, L. (1976). *Family structure and effective health behaviour for the energized family*. Boston, MA: Houghton Mifflin.
- Pressman, L. J., Loo, S. K., Carpenter, E. M., Asarnow, J. R., Lynn, D., McCracken, J. T., McGough, J. J., Lubke, G. H., Yang, M. H., & Smalley, S. L. (2006). Relationship of family environment and parental psychiatric diagnosis to impairment in ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 45*, 346–354.
- Prince-Embury, S., & Saklofske, D. H. (2013). Translating resilience theory for application: introduction. In S. Prince-Embury, & D. H. Saklofske (Eds.), *Resilience in children, adolescents and adults: Translating research into practice* (pp. 3–7). New York, NY: Springer.
- Prince-Embury, S., & Saklofske, D. H. (2014). Building a science of resilience intervention for youth. In S. Prince-Embury, & D. H. Saklofske (Eds.), *Resilience interventions for youth in diverse populations* (pp. 3–12). New York, NY: Springer.

- Prinzle, P., Onghena, P., & Hellinckx, W. (2007). Re-examining the Parenting Scale: reliability, factor structure, and concurrent validity of a scale for assessing the discipline practices of mothers and fathers of elementary-school-aged children. *European Journal of Psychological Assessment, 23*(1), 24–31.
- Puckering, C., Rogers, J., Mills, M., Cox, A. D., & Mattsson-Graf, M. (1994). Process and evaluation of a group intervention for mothers with parenting difficulties. *Child Abuse Review, 3*(4), 299–310.
- Pugliese, J., & Tinsley, B. (2007). Parental socialization of child and adolescent physical activity: a meta-analysis. *Journal of Family Psychology, 21*(3), 331–343.
- Raine, A., Dodge, K., Loeber, R., Gatzke-Kopp, L., Lynam, D., Reynolds, C., Stouthamer-Loeber, M., & Liu, J. (2006). The Reactive-Proactive Aggression Questionnaire: differential correlates of reactive and proactive aggression in adolescent boys. *Aggressive Behaviour, 32*(2), 159–171.
- Rapee, R. M. (1997). Potential role of childrearing practices in the development of anxiety and depression. *Clinical Psychology Review, 17*(1), 47–67.
- Repetti, R. L., Robles, T. F., & Reynolds, B. (2011). Allostatic processes in the family. *Development and Psychopathology, 23*(3), 921–938.
- Reynolds, W. M. (2010a). *Reynolds Children Depression Scale* (2nd ed.). Lutz, FL: Psychological Assessment Resources.
- Reynolds, W. M. (2010b). *Reynolds Children Depression Scale: Short fForm* (2nd ed.). Lutz, FL: Psychological Assessment Resources.
- Reynolds, C. R., & Kamphaus, R. W. (2004). *BASC-2: Behaviour assessment system for children* (2nd ed.). Circle Pines, MN: American Guidance Service.
- Reynolds, C. R., & Richmond, B. O. (1979). Factor structure and construct validity of What I think and feel: the Revised Children's Manifest Anxiety Scale. *Journal of Personality Assessment, 43*(3), 281–283.
- Reynolds, C. R., & Richmond, B. O. (2008). *Revised children's manifest anxiety scale (RCMAS-2)* (2nd ed.). Los Angeles, CA: Western Psychological Services.
- Rhoades, K. A., & O'Leary, S. G. (2007). Factor structure and validity of the Parenting Scale. *Journal of Clinical Child and Adolescent Psychology, 36*(2), 137–146.
- Robinson, C. C., Mandleco, B., Olsen, S. F., & Hart, C. H. (2001). The Parenting Styles and Dimensions Questionnaire (PSQD). In B. F. Perlmutter, J. Toulaitos, & G. W. Holden (Eds.), *Handbook of family measurement techniques: Vol. 3. Instruments & index* (pp. 319–321). Thousand Oaks, CA: Sage Publications.
- Rollins, B. C., & Thomas, D. L. (1979). Parental support, power, and control techniques in the socialization of children. In W. R. Burr, R. Hill, F. I. Nye, & I. L. Reiss (Eds.), *Contemporary theories about the family: Research-based theories* (pp. 317–364). New York, NY: Free Press.
- Ross, L. T., & Gill, J. L. (2002). Eating disorders: relations with inconsistent discipline, anxiety and drinking among college women. *Psychological Reports, 91*(1), 289–298.
- Ross, L. T., & Wynne, S. (2010). Parental depression and divorce and adult children's well-being: the role of family unpredictability. *Journal of Child and Family Studies, 19*(6), 757–761.
- Salihovic, S., Kerr, M., Özdemir, M., & Pakalniskiene, V. (2012). Directions of effects between adolescent psychopathic traits and parental behaviour. *Journal of Abnormal Child Psychology, 40*(6), 957–969.
- Sameroff, A. (2010). A unified theory of development: a dialectic integration of nature and nurture. *Child Development, 81*(1), 6–22.
- Sanders, M. R., & Dadds, M. R. (1993). *Behavioural family intervention: Psychology practitioner guidebooks*. Needham Heights, MA: Allyn & Bacon.
- Schaefer, E. S. (1959). A Circumplex model for maternal behaviour. *The Journal of Abnormal and Social Psychology, 59*(2), 226–235.
- Schaefer, E. S. (1965). A configurational analysis of children's reports of parent behaviour. *Journal of Consulting Psychology, 29*(6), 552–557.
- Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death. A series of books in psychology*. San Francisco, CA: W.H. Freeman.
- Shackman, J. E., & Pollak, S. D. (2014). Impact of physical maltreatment on the regulation of negative affect and aggression. *Development and Psychopathology, 26*(4), 1021–1033 Advance online publication.
- Shackman, J. E., Shackman, A. J., & Pollak, S. D. (2007). Physical abuse amplifies attention to threat and increases anxiety in children. *Emotion, 7*(4), 838–852.
- Shahimi, F., Heaven, P., & Ciarrochi, J. (2013). The interrelations among the perception of parental styles and psychological well-being in adolescence: a longitudinal study. *Iranian Journal of Public Health, 42*(6), 570–580.
- Shelton, K. K., Frick, P. J., & Wootton, J. M. (1996). Assessment of parenting practices in families of elementary school-age children. *Journal of Clinical Child Psychology, 25*(3), 317–329.
- Silverman, W. K. (1993). DSM and the classification of anxiety disorders in children and adults. In C. G. Last (Ed.), *Anxiety across the lifespan: A developmental perspective on anxiety and the anxiety disorders* (pp. 7–36). New York, NY: Springer.
- Silverman, W. K., & Ollendick, T. H. (2005). Evidence-based assessment of anxiety and its disorders in children and adolescents. *Journal of Clinical Child and Adolescent Psychology, 34*(3), 380–411.
- Skinner, H. A. (1981). Toward the integration of classification theory and methods. *Journal of Abnormal Psychology, 90*(1), 68–87.
- Skinner, E., Johnson, S., & Snyder, T. (2005). Six dimensions of parenting: a motivational model. *Parenting: Science and Practice, 5*(2), 175–235.
- Skinner, H., Steinhauer, P., & Sitarenios, G. (2000). Family Assessment Measure (FAM) and process model of family functioning. *Journal of Family Therapy, 22*(2), 190–210.
- Snyder, D. K. (1981). *Marital Satisfaction Inventory (MSI): Manual*. Los Angeles, CA: Western Psychological Services.
- Snyder, J. (1991). Discipline as a mediator of the impact of maternal stress and mood on child conduct problems. *Development and Psychopathology, 3*(3), 263–276.
- Snyder, D. K. (1997). *Marital Satisfaction Inventory, Revised (MSI-R): Manual*. Los Angeles, CA: Western Psychological Services.
- Spanier, G. B. (1976). Measuring dyadic adjustment: new scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family, 38*(1), 15–28.

- Spanier, G. B., & Lewis, R. A. (1980). Marital quality: a review of the seventies. *Journal of Marriage and the Family*, 42(4), 825–839.
- Sroufe, L. A. (1997). Psychopathology as an outcome of development. *Development and Psychopathology*, 9(2), 251–268.
- Stanford, M. S., Houston, R. J., Mathias, C. W., Villemarette-Pittman, N. R., Helfritz, L. E., & Conklin, S. M. (2003). Characterizing aggressive behavior. *Assessment*, 10(2), 183–190.
- Steinberg, L., Elmen, J. D., & Mounts, N. S. (1989). Authoritative parenting, psychosocial maturity, and academic success among adolescents. *Child Development*, 60(6), 1424–1436.
- Steinhauer, P. D. (1987). The family as a small group: the process model of family functioning. In T. Jacob (Ed.), *Family interaction and psychopathology: Theories, methods, and findings. Applied clinical psychology* (pp. 67–115). New York, NY: Plenum Press.
- Sterba, S. K., Prinstein, M. J., & Cox, M. J. (2007). Trajectories of internalizing problems across childhood: heterogeneity, external validity, and gender differences. *Development and Psychopathology*, 19(2), 345–366.
- Straus, M. A. (1979). Measuring intra-family conflict and violence: the Conflict Tactics Scales. *Journal of Marriage and the Family*, 41(1), 75–88.
- Straus, M. A. (2000). *Beating the devil out of them: Corporal punishment in American families and its effects on children* (2nd ed.). New Brunswick, NJ: Transaction Publishers.
- Strauss, C. C. (1993). Anxiety disorders. In T. H. Ollendick, & M. Hersen (Eds.), *Handbook of child and adolescent assessment* (pp. 239–250). Boston, MA: Allyn & Bacon.
- Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the Parent–Child Conflict Tactics Scales: development and psychometric data for a national sample of American parents. *Child Abuse & Neglect*, 22(4), 249–270.
- Super, C. M., & Harkness, S. (1999). The environment as culture in developmental research. In S. L. Friedman, & T. D. Wachs (Eds.), *Measuring environment across the life span: Emerging methods and concepts* (pp. 279–323). Washington, DC: American Psychological Association.
- Suveg, C., Zeman, J., Flannery-Schroeder, E., & Cassano, M. (2005). Emotion socialization in families of children with an anxiety disorder. *Journal of Abnormal Child Psychology*, 33(2), 145–155.
- Symonds, P. W. (1939). *The psychology of parent–child relationships*. Oxford, UK: Appleton–Century.
- Teicher, M. H., Samson, J. A., Polcari, A., & McGreenery, C. E. (2006). Sticks, stones, and hurtful words: relative effects of various forms of childhood maltreatment. *The American Journal of Psychiatry*, 163(6), 993–1000.
- Timmons, A. C., & Margolin, G. (2015). Family conflict, mood, and adolescents' daily school problems: moderating roles of internalizing and externalizing symptoms. *Child Development*, 86(1), 241–258.
- Ungar, M. (2004). The importance of parents and other caregivers to the resilience of high-risk adolescents. *Family Process*, 43(1), 23–41.
- van der Oord, S., Prins, P. J. M., Oosterlaan, J., & Emmelkamp, P. M. G. (2006). The association between parenting stress, depressed mood and informant agreement in ADHD and ODD. *Behaviour Research and Therapy*, 44(11), 1585–1595.
- Von Bertalanffy, L. (1968). *General system theory: Foundations, development, applications*. New York, NY: George Braziller.
- Wachs, T. D. (1987). Specificity of environmental action as manifest in environmental correlates of infant's mastery motivation. *Developmental Psychology*, 23(6), 782–790.
- Wachs, T. D. (1991). Synthesis: promising research designs, measures, and strategies. In T. D. Wachs, & R. Plomin (Eds.), *Conceptualization and measurement of organism-environment interaction* (pp. 162–182). Washington, DC: American Psychological Association.
- Wachs, T. D. (1994). Fit, context, and the transition between temperament and personality. In C. F. Halverson, Jr., D. Kohnstamm, & R. Martin (Eds.), *Development of the structure of temperament and personality from infancy to adulthood* (pp. 209–220). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Walsh, F. (1996). The concept of family resilience: crisis and challenge. *Family Process*, 35(3), 261–281.
- Walsh, F. (2002a). A family resilience framework: innovative practice applications. *Family Relations*, 51(2), 130–137.
- Walsh, F. (2002b). Bouncing forward: resilience in the aftermath of September 11. *Family Process*, 40(1), 34–36.
- Walsh, F. (2003). Family resilience: a framework for clinical practice. *Family Process*, 42(1), 1–18.
- Walsh, F. (2006). *Strengthening family resilience* (2nd ed.). New York, NY: Guilford Press.
- Walsh, F. (2007). Traumatic loss and major disasters: strengthening family and community resilience. *Family Process*, 46(2), 207–227.
- Walsh, F. (2011a). Families in later life: challenges, opportunities, and resilience. In M. McGoldrick, B. Carter, & N. Garcia-Preto (Eds.), *The expanded family life cycle* (4th ed., pp. 261–277). Boston, MA: Allyn & Bacon.
- Walsh, F. (2011b). Resilience in families with serious health challenges. In M. Kraft Rosenberg, & S. R. Pehler (Eds.), *Encyclopedia of family health* (pp. 895–899). Thousand Oaks, CA: Sage.
- Walsh, F. (2016). Family resilience: a developmental systems framework. *European Journal of Developmental Psychology*, 13(3), 313–324.
- Watson, J. S. (1979). Perception of contingency as a determinant of social responsiveness. In E. G. Thoman (Ed.), *Origins of the infant's social responsiveness* (pp. 33–64). Hillsdale, NJ, US: Lawrence Erlbaum Associates.
- Webster-Stratton, C., & Reid, M. J. (2010). The Incredible Years parents, teachers and children training series: a multifaceted treatment approach for young children with conduct problems. In A. E. Kazdin, & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (2nd ed., pp. 194–210). New York, NY: Guilford Publications.
- Whipple, E. E., & Webster-Stratton, C. (1991). The role of parental stress in physically abusive families. *Child Abuse & Neglect*, 15(3), 279–291.
- Whiteside-Mansell, L., Ayoub, C., McKelvey, L., Faldowski, R. A., Hart, A., & Shears, J. (2007). Parenting stress of low-income parents of toddlers and preschoolers: psychometric properties of a short form of the Parenting Stress Index. *Parenting: Science and Practice*, 7(1), 27–56.
- Wilkinson, I. (1987). Family assessment: a review. *Journal of Family Therapy*, 9(4), 367–380.
- Wilkinson, I. (1998). *Child and family assessment: Clinical guidelines for practitioners*. London, UK: Routledge.
- Wilkinson, I. (2000). The Darlington Family Assessment System: clinical guidelines for practitioners. *Journal of Family Therapy*, 22(2), 211–224.

- Wirt, R., Lachar, D., Klinedinst, J., Seat, P., & Broen, W. (1990). *Multidimensional description of child personality: A manual for the personality inventory for children*. Los Angeles, CA: Western Psychological Services.
- Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40(9), 1086–1093.
- Wright, M. O. D., Masten, A. S., & Narayan, A. J. (2013). Resilience processes in development: four waves of research on positive adaptation in the context of adversity. In R. B. Brooks, & S. Goldstein (Eds.), *Handbook of resilience in children* (pp. 15–37). New York, NY: Springer Science + Business Media.
- Zelazo, P. D. (2013). Developmental psychology: a new synthesis. In P. D. Zelazo (Ed.), *The Oxford handbook of developmental psychology. Vol. 1: Body and mind* (pp. 3–12). New York, NY: Oxford University Press.

Chapter 9

Perspectives and Advances in Personality

Chapter Outline

| | | | |
|---|------------|--|------------|
| Recent advances in personality research | 223 | Personality and culture | 238 |
| Integrating personality, intelligence, and cognitive abilities | 224 | Cross-cultural variability in levels of personality traits | 239 |
| The cognitive implications of personality and related models | 225 | Cultural issues regarding relatedness and self-definitions | 239 |
| The situation construal model | 226 | Etic and emic approaches | 240 |
| Causes and evaluation models of personality stability and change | 227 | When personality goes astray: from personality to personality disorders | 242 |
| Stability and social personality models | 229 | Models of psychopathology and personality traits | 243 |
| Continuity and stability of personality traits across the life-span | 229 | Hierarchical models of personality and psychopathology | 244 |
| Intraindividual change in personality stability | 231 | The general factor of personality | 245 |
| Subjective age and personality development | 232 | Etiological models of personality and psychopathology | 245 |
| The five-factor model—a landmark in personality trait models | 232 | Two-polarities models of personality development | 247 |
| Origins and descriptions of the FFM | 232 | Personality and resilience | 248 |
| Criticisms of the Big Five | 235 | Measures of resilience | 250 |
| Alternative personality trait models | 236 | The role of humor in coping and adaptation | 251 |
| | | Summary | 252 |
| | | References | 252 |

RECENT ADVANCES IN PERSONALITY RESEARCH

Personality is most commonly defined as the sum of all characteristics that describe individual differences in thoughts, feelings, and behaviors that are relatively stable across situations and over time within a certain reference group (Kandler, Zimmermann, & McAdams, 2014). In an invited essay Maslow (2016) conceptualizes personality as:

the dynamic integration of the totality of a person's subjective experience and behavioral patterns including both (a) conscious, concrete and habitual behaviors, experiences of self and of the surrounding world, conscious explicit psychic thinking and habitual desires and fears and (b) unconscious behavioral patterns, experiences and views and intentional states (p. 145).

Kernberg (2016) exemplifies dynamic integration as an organized integrated association and interacting between multiple traits and experiences that is the outcome of the coordination of multiple dispositions. Kernberg and his colleagues (Kernberg & Caligor, 2005; Posner et al., 2003) consider personality as “an umbrella organization that includes a small number of major component systems: temperament, object relations, character, identity, ethical value systems and cognitive capability” (p. 147).

While there are several personality models that are in line with this broad definition of personality (e.g., McAdams & Olson, 2010; McCrae & Costa, 2008; Shiner & DeYoung, 2013), they differ on the number of traits or dimensions that define personality. The concept of personality has been increasingly expanded in recent decades. One of the most significant developments in the field of personality assessment is the several efforts in structuring the vast number of personality traits into cohesive frameworks basically through the application of factor-analytic techniques.

Hierarchical models gradually began to be formulated, culminating in the five-factor model (FFM), a landmark in personality research, which has been renamed the five-factor theory (FFT) (McCrae & Costa, 2008). Since the early 2000s, the FFM and its relevant measures, such as the NEO PI-R, began to overwhelm personality research. The worldwide

recognition of the FFM was by no means fortuitous. The major advantages of the FFM include the universality of the five factors, their stability over time, their resemblance with temperament models, and their implications in psychopathology. As research on normal-range personality traits and their development in childhood and adolescence grows, the relevance of normal personality development for the emergence of personality pathology becomes ever more salient (Shiner, 2009; Tackett & Kushner, 2014). Mainly because of the FFM, the role of personality has been reconceptualized and expanded from both a theoretical perspective and an empirical perspective. One key issue concerns the role of personality in psychopathology and in particular its relation with personality disorders.

The influential role of personality has greatly affected the reformulation of the most recent edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. One crucial development regards the notion of mental illness as a simple categorical construct characterized by a specific number of symptoms or as a dimensional disorder. Personality characteristics central to psychopathology include aggression, depression, anxiety, and self-concept, or, in FFM terminology, externalizing/internalizing symptoms, neuroticism, or emotional instability.

Another important development in the field of personality concerns the associations among personality, intelligence, and cognition. The convergence between intelligence and personality has been featured in the development of some contemporary personality and psychopathology models, such as the relational frame theory (RFT) or the intellectual framework for personality or, conversely, from the intelligence perspective, the development of theories, such as emotional intelligence.

Dynamic affective processes have historically been neglected in psychopathology research (Ebner-Priemer & Trull, 2011). This is mainly owing to the difficulty in regulating and analyzing dynamic processes. According to Trull, Lane, Koval, and Ebner-Priemer (2015), traditional assessment methods and classical statistical indexes (e.g., group means) are not appropriate for fully evaluating within-personality processes over time, and they often generate biases into measurement. To have an accurate estimate of affective dynamics, Trull and Ebner-Priemer (2013) argue that is essential to employ time-sensitive assessment and analyses. Assessment occasions may be either event-contingent, at random intervals, or a combination of both. Trull et al. (2015) focus on three variations of affective dynamics that have been employed in psychopathology research: *affective instability*, *inertia*, and *emotional differentiation*. The authors suggest how these affective dynamics should be operationalized and measured in daily life, using time-intensive methods like ecological momentary assessment or ambulatory assessment, and recommend time-sensitive analyses that take into account both the variability and the temporal dependency of reports.

INTEGRATING PERSONALITY, INTELLIGENCE, AND COGNITIVE ABILITIES

Personality, intelligence, and cognitive functions are inextricably related. The personalization, emotionalization, and socialization of intelligence have grown since the early 1900s. It was Thorndike (1920) who first proposed three types of intelligence, abstract/verbal, practical, and social intelligence, to be later expanded and elaborated by other theorists, such as Sternberg's triarchic model and Daniel Goleman's model of social intelligence. Studies that examine the connection between personality and intelligence have mainly focused on: (1) correlations between major personality traits and intelligence, (2) the relation between intelligence and mental health, and (3) emotional intelligence (Austin et al., 2011).

The role of intelligence in the study of personality is highlighted in the following domains: (1) adjustment to environmental pressures or adversities and the individual's level of resiliency, (2) social desirability responding or the person's tendency to make a good impression in self-report questionnaires, and (3) the role of intelligence as a mediating factor between personality and psychopathology.

Austin et al. (2011) propose certain explanations of intelligence as risk factors for personality disorders: First, the *etiological model* whereby *g* is considered as a direct causal factor. It has been hypothesized (e.g., Dempster & Corkill, 1999) that intelligence influences the inhibitory processes in selective attention. According to Claridge (2009), positive symptoms of schizophrenia (e.g., hallucinations and delusions) are the outcome of inadequate inhibitory processes, which in turn decrease the efficacy of distinguishing relevant from irrelevant information. Second, in the *compensatory model*, instead of affecting underlying pathology, intelligence affects the extent to which pathology inhibits adaptive functioning. For example, intelligence may affect the patient's degree of insight. Third, the *performance deficit model* proposes that intelligence, as measured by intelligence tests, can be affected by factors linked to psychopathology. For example, individuals with depressive symptoms may manifest cognitive deterioration prior to the development of mental illness. Cognitive deficits may hinder performance on intelligence tests, but such deficits may be attributed to psychological problems rather than intellectual abilities. Finally, the *common cause model* proposes that a common developmental factor underlies both cognitive ability and psychopathology. Koenen et al. (2009) argue that IQ may be serving as a proxy for genetic or environmental factors that exert a more direct causal influence on mental health.

In an explanatory study, [Mussel \(2013\)](#) describes a novel theoretical and comprehensive framework for the structure of personality traits related to intellectual achievements, the intellect framework for personality. According to this model, intellect is closely related to the openness factor of the Big Five ([Digman, 1990](#)). [Mussel \(2013\)](#) proposes a two-dimensional model of personality structure: The first dimension consists of two processes, *seek* and *conquer*. The second dimension of intellect consists of theories of cognitive abilities that comprise preferences in thinking, learning, and creating. Preferences in thinking reflect concepts of fluid intelligence, whereas preferences in learning correspond to crystallized intelligence ([Cattell, 1963](#)).

Results from confirmatory factor analyses, including a multigroup analysis, show that the two-dimensional intellect framework was confirmed. Criterion-related validities show that epistemic leisure activities and vocational interest, as well as life outcome (such as income), can be predicted by intellect. Furthermore, specific predictions for the operations of the intellect framework were confirmed, indicating that the subdimensions proposed are not only appropriate but also meaningful in a functional sense. Predictions were overall supported when controlled for the constructs *need for cognition*, *typical intellectual engagement*, *openness to ideas*, *curiosity*, *intrinsic motivation*, and *goal orientation*. Finally, exploratory analyses using multidimensional scaling and confirmatory analyses confirmed that these constructs could be meaningfully integrated into the framework.

Similar conceptualizations have been suggested by [Kashdan et al. \(2009\)](#), who proposed a two-factor model of personality; one factor is related to seeking out knowledge and new experiences, and the other is related to willingness to manage and deal with the tension that often arises when confronting novelty and uncertainty. A similar approach has been proposed by [Litman \(2005, 2008; Litman & Jimerson, 2004\)](#) that illustrates the difference between interest and deprivation-type curiosity.

The cognitive implications of personality and related models

[McClelland \(1951\)](#) was one of the first theorists to highlight that cognitive-processing tendencies may moderate the manner in which self-reported traits function. According to [Robinson and Wilkowski \(2015\)](#), each substantive trait can be modeled cognitively, thus leading to a better understanding of its functioning ([Table 9.1](#)). Studies of this type provide new perspectives of trait functioning, such as “an emergent idea that agreeable individuals self-regulate the influence of their activated hostile thoughts” (p. 132).

Studies have demonstrated that *cognitive errors* predict anxiety and distress independent of the self-reported trait of neuroticism ([Fetterman & Robinson, 2011](#)), and *behavioral facilitation* predicts positive emotional experiences independent of the self-reported trait of extraversion ([Robinson, 2007](#)). Self-reported traits are quite consequential in outcome prediction ([Ozer & Benet-Martinez, 2006](#)), but the same may be true for cognitive-processing tendencies ([Robinson & Neighbors, 2006](#)).

TABLE 9.1 Traits Predict Cognitive Tendencies: Summary of Some Key Findings

| Trait | Finding | References |
|---------------|---|---|
| Extraversion | Greater positive affective priming | Robinson, Moeller, and Ode (2010) |
| Neuroticism | Greater negative affective priming | Robinson, Ode, Moeller, and Goetz (2007) |
| | Perceptual avoidance | Liu, Ode, Moeller, and Robinson (2013) |
| | Cognitive instability | Robinson and Tamir (2005) |
| Agreeableness | Lesser reactivity to hostile thoughts | Meier and Robinson (2004) |
| | Recruitment of helpful thoughts | Meier, Robinson, and Wilkowski (2006) |
| Coldness | Perceptual egocentrism | Boyd, Bresin, Ode, and Robinson (2013) |
| | Poorer emotion perception | Moeller, Robinson, Wilkowski, and Hanson (2012) |
| Arrogance | The self is large relative to the other | Fetterman, Robinson, and Gilbertson (2014) |
| | Power incentives are favored | Fetterman, Robinson, and Ode (2015) |

Source: Reprinted from Robinson, M. D., & Wilkowski, B. M. (2015). Personality processes and processes as personality: a cognitive perspective. In M. Mikulincer, P. R. Shaver, M. L. Cooper, & R. J. Larsen (Eds.), *APA handbook of personality and social psychology: Vol. 4. Personality processes and individual differences* (pp. 129–145). Washington, DC: American Psychological Association, with permission. Copyright 2015 by American Psychological Association.

The social-cognitive approach, however, goes beyond mere situation-behavior relations by assuming that cognitive and affective processes serve as mediators of the impact of stimuli in generating distinctive complex behavioral patterns. Developments in this domain include a focus on the interplay between states and traits (Fleeson, 2007), conceptualizing personality processes and structure as two interrelated levels of analysis [e.g., *whole trait theory* (WTT); Fleeson, 2012], and have included explanations given by people in addition to the “if” (situation, S) “then” (behavior, B) “unit” (Yang et al., 2014).

A functional approach may be fundamental in assisting psychologists to describe the ways in which individuals differ, as well as the phylogenetic and ontogenetic factors that gave rise to those differences. One potential way in which functional and personality research could interact is by identifying the precursors and consequences that give rise to and maintain a specific behavior or set of behaviors (i.e., conduct a functional analysis of the phenomenon), and then identifying the known personality dimensions (e.g., Big Five) to which behavior is typically related to the functional level of analysis and using that knowledge to inform developments at the cognitive and structural level of analysis. Over the past several decades, the functional approach has expanded beyond its early roots and has become closely related to a phenomenon known as *arbitrarily applicable relational responding* (AARR) to personality and the development of a functional account of human language and cognition known as *relational frame theory* (RFT; Hughes & Barnes-Holmes, 2016). This modern functional-contextual tradition, and in particular the RFT approach, can provide a solid foundation and new insight into the nature and origins of personality (Hughes & Barnes-Holmes, 2016). Specifically, *network analysis* is an alternative statistical tool to factor analysis that corresponds well to a functional approach. It can be employed as a valuable tool to evaluate personality as a network of relations both among behaviors as well as between behaviors and contexts. Network analysis circumvents the need to hypothesize causal traits underlying specific behaviors (Costantini et al., 2015; Cramer et al., 2012). For example, conceiving depression as a network led to a better understanding of the aspects underlying the interaction of its symptoms (Bringmann, Lemmens, Huibers, Borsboom, & Tuerlinckx, 2015) and of the complex dynamics that lead to depressive episodes (van de Leemput et al., 2014). Similar network analyses could contribute to the systematic development of functional analyses of personality components.

The situation construal model

The situation construal model (SCM) aims to integrate the three building blocks of the *personality triad* (Funder, 2006): persons, situations, and behaviors. The model’s analysis begins with the observation that personality and situations both have direct effects on behavior. Personality’s direct effects stem from factors, such as *temperament, habit, and ability*. These individually distinctive influences affect nearly every behavior that a person performs and are not necessarily (or typically) mediated by conscious construal. The situation’s direct effects are derived from its objective structure, such as the motives it contains, the danger it potentiates, the rules that are enforced within it, and other aspects that could affect behavior (Funder, 2006).

Over and above these personality and situational processes, every individual also uniquely interprets or construes every situation that he or she confronts, and this construal is a joint product of his or her personality and the situation’s objective nature. This construal is important at both the individual and the cultural level. At the individual level, construal constitutes what Murray (1938) called beta press, the situation as perceived (as opposed to alpha press, the situation as it really is). Discrepancies between alpha and beta press produce individual differences in behavior and, when extreme, they may be indicative of psychopathology. At the level of the culture, “in spite of the many ways in which cultures differ, the proximal prediction of affective, behavioral, and cognitive responses will be subjective construal of the situation” (Oyserman, Kimmelmeier, & Coon, 2002, p. 116).

Over the last decades several efforts have been made to classify situations (Pervin, 1978). Other researchers have attempted to categorize situations in terms of psychological features. On the basis of factor analyzing participants’ descriptions of situations they had experienced and their feelings and behaviors in them, Pervin (1976) suggested four bipolar dimensions (friendly–unfriendly, tense–calm, interesting–dull, and constrained–free) as well as six types (family, peers, play, work, school, and alone). More recently, a taxonomy derived from a principal components analysis of undergraduates’ descriptions of situations they had experienced, using the Riverside Situational Q-sort (RSQ), resulted in seven situation types (e.g., social, recreating, unpleasant; Sherman, Nave, & Funder, 2010).

Fundamental motives theory (FMT) posits that human social motivation is based on seven universal, overarching social goals over the course of the life-span: *self-protection, disease avoidance, affiliation, kin care, mate seeking, mate retention, and status seeking* (Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Kenrick, Neuberg, Griskevicius, Becker, & Schaller, 2010). Other recently proposed taxonomies organize situations in terms of *motivation*. Bond (2013) organized situations in terms of the opportunities they afford for attaining relational and status goals; the four types of situations he proposed are *being alone, being with one other person in private, being with one other person in public, and being in a group*.

Trait Theories That Serve a Theoretical Framework for Situations

The *cognitive-affective processing system* (CAPS; Mischel, 1973; Mischel & Shoda, 1995, 2008) model posits that a variety of cognitive and affective units explain individual differences in situation-based behavioral contingencies. Essentially, a person's behavior is dependent upon how his or her personality system processes the situation characteristics that he or she is experiencing. Thus, personality is a mediator of the relationship between situation characteristics and behavior. On one hand, there is substantial evidence for the CAPS model—for example, if the patterns of behavior (i.e., situation-based contingencies) exhibit some stability across time (Fournier, Moskowitz, & Zuroff, 2008; Smith, Shoda, Cumming, & Smoll, 2009) and if they seem to be associated with cognitive structures (e.g., Pauletti, Cooper, & Perry, 2014). On the other hand, the utility of the CAPS model is curtailed by the fact that there is not as yet a general taxonomy of cognitive-affective processes that constitute the personality system.

Trait activation theory (TAT; Tett & Guterman, 2000) posits that “the behavioral expression of a trait requires arousal of that trait by trait-relevant situational cues” (Tett & Burnett, 2003, p. 398). In other words, TAT suggests that situation characteristics serve as moderators of the relationship between personality traits and behavior. For example, TAT predicts that “aggressive behavior is generally expected as a response to aggression-inducing stimuli, but people high in aggression will show a quicker or heightened response or greater sensitivity to weaker cues” (Tett & Guterman, 2000, p. 398). Thus, although TAT recognizes the existence of main effects of traits and situations on behavior, it posits that much of behavior is explained by the interaction (Lievens, De Koster, & Schollaert, 2008; Tett & Burnett, 2003). Alternatively, one could state that, like the CAPS model, TAT posits the existence of situation-based behavioral contingencies (i.e., situation effects). Moreover, like FFT, TAT argues that there are individual differences in overall levels of behavior. However, unlike the CAPS model or FFT, TAT also asserts that individual differences in situation-based contingencies can be predicted by personality traits (i.e., a Person X–situation interaction).

Whole trait theory (WTT; Fleeson, 2012; Fleeson & Jayawickreme, 2015) is an attempt to integrate trait perspectives on personality (e.g., Costa & McCrae, 1992; DeYoung, Quilty, & Peterson, 2007; John, Naumann, & Soto, 2008; Lee & Ashton, 2008) with social-cognitive perspectives (e.g., Kelly, 1963; Mischel & Shoda, 1995; Read et al., 2010; Rotter, 1966). Specifically, WTT claims that an individual's behavior (or other state expressions, such as affect or cognition) can be conceptualized and quantified by a density distribution.

In addition, the central tendency (mean) of such a density distribution, or one's average behavior across situations, corresponds roughly to one's trait level (as measured by personality tests). Last, behavioral deviations from one's central tendency can be explained by situation-based contingencies. Thus, WTT embraces the important role of cognitive-affective units in behavior, but at the same time also recognizes individual differences in typical state expressions (Fleeson, 2012; Fleeson & Jayawickreme, 2015).

The Riverside Situational Q-sort

One effort to rectify this problem led to the development of the Riverside Situational Q-sort (RSQ; Wagerman & Funder, 2009; Sherman et al., 2010). The RSQ (version 3.15; Funder, Guillaume, Kumagai, Kawamoto, & Sato, 2012) contains 89 situation characteristics and has been recognized as the most widely available measure of situations (Rauthmann et al., 2014).

Moreover, when the dimensional structure of the RSQ was examined in a sample of more than 1500 participants from 5 different countries, 8 robust dimensions of situation characteristics were identified. The situational eight DIAMONDS are duty (Does something need to be done?), intellect (Is deep thinking required or desired?), adversity (Are there external threats?), mating (Is the situation sexually and/or romantically charged?), positivity (Is the situation enjoyable?), negativity (Does the situation elicit unpleasant feelings?), deception (Is someone being untruthful or dishonest?), and sociality (Are social interaction and relationship formation possible, required, or desired?). A single-item measure for each of the DIAMONDS dimensions has also been developed (Rauthmann & Sherman, 2015). Rauthmann et al. (2014) showed that retrospective self-reports of DIAMONDS characteristics were related to aggregated, retrospective self-reports of behavior.

CAUSES AND EVALUATION MODELS OF PERSONALITY STABILITY AND CHANGE

Over the past decades, a growing body of research has demonstrated that personality traits can and do change for a variety of reasons. For example, as individuals age their personalities tend to mature, too. For example, McAdams and Olson (2010) postulate that “by middle-age, people appear to become more comfortable with themselves as adults, less inclined to moodiness and negative emotions, more responsible and caring, more focused on long-term tasks and plans and less susceptible to extreme risk-taking and the expression of unbridled internal impulse” (p. 520).

The stability and change of personality and well-being have been a controversial issue in personality psychology, just like the nature–nurture debate several years ago. The question nowadays is not whether genes or environment affect development but their degree of influence. With regard to stability and change of personality, research has revealed that personality characteristics are neither fixed nor rapidly changing (e.g., Ferguson, 2010; Terracciano, McCrae, & Costa, 2010).

Anusic and Schimmack (2015) argue that quantitative models would contribute to clarifying controversies about stability and change of personality. The focus on quantifying the degree of change in personality corresponds to demands in psychology to move from testing of the null hypothesis to parameter estimation (Cumming, 2013). These developmental changes have also been described as following the *maturity principle*. According to the *psychobiological model*, maturity refers to the characteristic configurations typical of middle-aged individuals. This characteristic structure is defined by high *self-directedness* and high *cooperativeness*. These normative patterns of change may be triggered by biological maturation processes (e.g., Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009) as well as by common life experiences that shape people in similar ways (e.g., Hudson, Roberts, & Lodi-Smith, 2012).

Beyond these normative patterns of maturation, there is evidence that experiences, and in particular social roles, may alter people's personality traits. For example, Hudson et al. (2012) found that as people invest more time and efforts in their work, they tend to simultaneously increase in conscientiousness. It appears that experiences and social roles facilitate trait change as they serve as consistent presses that stimulate new patterns of thoughts, feelings, and behaviors in and of themselves that eventually consolidate into enduring trait change (e.g., Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2012). Several studies supported these assumptions, by validating that cognitive, affective, and behavioral interventions—ranging from minor behavior alterations to therapy—are associated with changes in people's personality traits (De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006; Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012; Magidson et al., 2012).

In an original study, Hudson and Fraley (2015) examined another factor that could cause personality change: the *desire to change oneself*. Specifically, they investigated whether people can “improve” their personalities. To achieve their goal they conducted 2–16-week intensive longitudinal randomized experiments using self-report measures, such as the NEO PI-R and the International Personality Item Pool (IPIP-120). Across both studies, people who expressed the desire to improve some personality traits with respect to any Big Five personality trait during the first session tended to experience actual increases in their self-reports of that trait—as well as trait-relevant daily behavior—over the subsequent 16 weeks.

Stability and change are most commonly assessed through the application of retest correlations, but results can be misleading due to two methodological problems. First, retest correlations are constricted by random measurement error, and therefore they may underestimate stability and overestimate change. A second source of confusion is that the degree of change depends on the time interval of a few weeks. However, the likelihood of personality change increases with time (e.g., a pessimist is likely to stay a pessimist a month later, but may turn into an optimist 20 years later). Thus, a single retest correlation provides little information on the amount of stability or change of a trait.

Several models have been developed as efforts to account for these difficulties and to offer solutions in the measurement of stability and change. The first such model was Heise's (1969) *autoregressive state model* (ASM). The ASM, also known as the simplex model, is one of the most valuable approaches in the analysis of panel data. A key feature of this model is that when longitudinal data is applied, measures at later time points have a lower correlation with earlier measures as an increasing function of the time difference (Hox & Maas, 2004).

Conley (1984) made a first attempt to quantify stability and change of intelligence test, personality traits, and self-evaluations (self-esteem, life satisfaction). He conducted a meta-analysis of retest correlations and allotted them as a function of the retest interval. This led to a nonlinear decay function where retest correlations became smaller as retest intervals increased. He then fitted the ASM to the retest correlations and found that intelligence was more stable than personality traits (extraversion and neuroticism), which were more stable than self-evaluations (self-esteem and life satisfactions).

Conley's (1984) findings provided the first empirical evidence that some personality characteristics are more stable of individual differences over retest intervals longer than 2 decades; moreover the findings suggest that some factors that produce variations in personality across individuals are stable. Similar conclusions can be drawn from longitudinal behavioral genetics that have found substantial genetic influences on personality traits and well-being across the life-span (e.g., Briley & Tucker-Drob, 2014; Kandler, Riemann, Spinath, & Angleitner, 2010).

Kenny and Zautra (1995) introduced the *trait-state-error model* (TSE), a structural equation model, to evaluate the role of stable influences on personality. The state and error factors in the TSE model are equivalent to Conley's (1984) model, with state factor reflecting changing influences on personality. The major advantage of the TSE model is that it includes a stable trait factor. For example, if retest correlations over periods of 20 years no longer decrease but range around $r = .30$, the data suggest that 30% of between-person variance in a trait is influenced by a stable factor.

Thus, the existing evidence suggests that personality traits are more stable than self-concepts and self-evaluative judgments, such as judgments of self-esteem and life satisfaction. However, the evidence regarding the relative contribution of stable and changing influences on these constructs is inconclusive because previous studies have been limited by their design. The main limitation is that original studies often do not include all measures, sufficient measurement points, or a sufficient time period to observe significant change in individual differences.

Anusic and Schimmack (2015) developed the *meta-analytic stability and change* (MASC) model. MASC is based on trait-state models that can separate influences of stable and changing factors from unreliable variance (Kenny & Zautra, 1995). MASC can be perceived as an extension of Conley's meta-analytic model and as a meta-analytic version of Kenny and Zautra's (1995) TSE model for raw data. The authors employed MASC to evaluate the extent to which personality traits, such as life satisfaction, affect, and self-esteem, are influenced by these different factors. The results demonstrated that the majority of reliable variance in personality traits is attributable to stable differences. Changing factors had a greater influence on reliable variance in life satisfaction, self-esteem, and affect than in personality. In addition, changing influences on well-being were more stable than changing influences on personality traits, suggesting that different changing factors contribute to personality and well-being. Measures of affect were less reliable than measures of the other three constructs, reflecting influences of transient factors, such as mood on affective judgments. After accounting for differences in reliability, stability of affect did not differ from other well-being variables.

Stability and social personality models

Historically, researchers attempting to explain the increasing stability of personality have differentially highlighted *intrinsic maturation* and *socializing influences*. The intrinsic maturation perspective emphasizes the role of genetic effects in enhancing personality stability. The FFT (McCrae & Costa, 2008) strongly supports the intrinsic motivational perspective. According to this model, personality traits represent basic behavioral tendencies that are uniquely influenced by biological/genetic mechanisms that “result from direct effects of the environment” (McCrae & Costa, 2008, p. 164).

Social personality models (SPMs), also referred to as *neo-socioanalytic* (Roberts & Wood, 2006), highlight the significance of genetic influences in personality stability, and the causal role of environmental factors in personality development. For example, according to the *sociogenomic model* of personality, the environment plays a causal role in the function of genes, and the genome “is intrinsically dependent on the environment for activation and maintenance” (Roberts & Jackson, 2008, p. 1528). Proponents of SPMs have argued that mature personality profiles are needed for many adult social roles. They have presented evidence of increased personality stability among individuals with a personality profile characterized by agreeableness, conscientiousness, and emotional stability (Donnellan, Conger, & Burzette, 2007; Terracciano, McCrae, & Costa, 2010).

Briley and Tucker-Drob (2014) in a comprehensive empirical meta-analysis provide a review of longitudinal, behavioral genetic studies of personality development. The authors evaluated effect sizes that fall into three classes: (1) the levels of heritability and environmentality of traits at one point in time, (2) the test–retest stability of phenotypic traits and of genetic environmental affects, and (3) the contribution of genetic and environmental effects to test–retest stability. Genetic stability increased from moderate in infancy to near perfect by age 30 and remained near perfect across adulthood. In contrast, environmental stability displayed almost complete instability in childhood but increased to about half as stable as genetic influences by adolescence. Correcting for measurement error, environmental stability was low in early childhood, increased with age, and peaked at a level only slightly less than that of genetic stability. Moreover, it was found that genetic influences contributed to phenotypic stability at a relatively stable rate. In contrast, environmental contributions to stability changed substantially with age and accounted for the majority of increasing phenotypic stability in both the full and self-report analyses. By midlife, genetic and environmental effects were found to contribute almost equally to phenotypic stability. Effect sizes were very similar across different personality traits and measurement methods.

Continuity and stability of personality traits across the life-span

Personality stability is itself a complex notion because there are many different kinds of continuity and change (Caspi & Shiner, 2006). First, “*rank-order stability*” refers to the degree to which the relative ordering of individuals on a given trait is maintained over time. Rank-order stability is high if people in a group maintain their position on a trait relative to each other over time, even if the group as a whole increases or decreases on that trait over time. It is typically indexed by correlations between scores on the same trait measured across two points in time (i.e., test–retest correlations). *Differential continuity* describes the degree to which the relative differences among individuals remain invariant across time. *Mean-level stability* refers to the extent to which personality scores change over time. Investigations of mean-level change address

the question of whether people, on average, tend to increase or decrease on particular trait or symptom measures during different life periods.

To investigate *differential stability*, longitudinal designs are required, whereas *mean-age stability* can be examined through longitudinal data (Roberts, Walton, & Viechtbauer, 2006). In addition, mean traits scores from cross-sectional age cohorts can be employed for mean-level stability comparisons (McCrae et al., 2000). *Structural continuity* refers to the invariance of the covariance structure across time and is a prerequisite for the assessment of mean-level stability (Biesanz, West, & Kwok, 2003). *Individual-level change* refers to the magnitude of increase or decrease exhibited by a person on any given trait. *Ipsative stability* refers to the continuity of the configuration of traits within the individual and provides information on the stability of the patterning of traits within a person across time, hence facilitating a person-centered approach to personality development (Robins & Tracy, 2003).

De Fruyt et al. (2006a) examined these five types of personality stability (structural, mean-level, individual-level, differential, and ipsative) in a representative population of children and young adolescents ($N = 498$) and a twin and sibling sampling sample ($N = 548$) of children and adolescents. Parents described their children on two consecutive occasions with a 3-year interval using the Hierarchical Personality Inventory for Children (HiPIC; Mervielde & De Fruyt, 1999). The results confirmed structural continuity in the two samples, and personality appeared to be largely differentially stable. A large percentage of children had a stable trait profile indicative of ipsative stability, and mean-level personality changes were generally small in magnitude. Continuity findings were generally attributed to genetic and nonshared environmental factors. The evidence for different types of personality continuity supports and extends previous research revealing that the level of continuity in childhood and adolescence is higher than often expected (Roberts et al., 2006). A large number of empirical studies have examined the patterns of continuity and change in personality traits (e.g., Roberts et al., 2006) and their relation to well-being in adulthood. In recent years cross-sectional and longitudinal studies have demonstrated that agreeableness, conscientiousness, emotional stability, and social dominance (e.g., social self-confidence) increase from young adulthood to middle age (Lucas & Donnellan, 2011; McAdams & Olson, 2010).

In a study, Josefsson et al. (2013) examined the developmental patterns of the Temperament and Character Inventory (TCI) traits in a large population-based longitudinal study of Finnish men and women aged 20–45 years. Mean-level changes demonstrated qualitatively distinct developmental patterns for character (self-directedness, cooperativeness, and self-transcendence) and temperament (novelty seeking, harm avoidance, reward dependence, and persistence). Personality developed toward greater maturity, although self-transcendence decreased with age. However, self-transcendence was the strongest predictor of overall personality change. Cohort effects indicated lower level of self-transcendence and higher level of self-directedness and cooperativeness in younger birth cohorts. Regarding temperament, novelty seeking decreased and persistence increased slightly with age. Both high novelty seeking and high persistence predicted overall personality change. These findings suggest that temperament and character traits follow different developmental trajectories.

Although personality traits have traditionally been defined as enduring patterns of thinking, feeling, and behaving (Costa & McCrae, 1997), contemporary theories combine a dynamic perspective that conceptualizes traits as developmental constructs subject to change and adaptation throughout the life-span (e.g., Caspi, Roberts, & Shiner, 2005). Efforts to evaluate these processes (1) have focused on describing group-level change, (2) have focused on higher-order traits (rather than those at the facet level), and (3) were limited in their ability to determine nonlinear change (due to their analytic framework or use of only two or three waves of assessments).

It is important to distinguish between mean-level personality change, which evaluates how individuals develop over time on average, and rank-order change (i.e., change in the relative position of individuals on a trait over time) (Caspi et al., 2005b). Mean-level personality change combined with rank-order stability implies that the mean-level change is due to normative (i.e., norm-factoring) change in personality (Klimstra, Hale, Raaijmakers, Branje, & Meeus, 2009).

Theories of the process that could underlie personality developments could be improved by more accurate knowledge about the progress of mean-level changes with age (i.e., linear vs. nonlinear), their degree of consistency across different facets of higher-order traits, and the extent to which individuals deviate from mean-level trajectories at the population level. A meta-analysis of 14 studies with samples aged 10–20 years revealed that early adolescence was associated with decreases in conscientiousness, openness, extraversion, and emotional stability (Denissen, Aken, Penke, & Wood, 2013), supporting the findings of earlier studies (e.g., Harden & Tucker-Drob, 2011; Soto, John, Gosling, & Potter, 2011).

Second, findings regarding sex differences have been less consistent than those for general maturational trends. Some evidence suggests that the changes in higher-order traits in young adulthood are fairly uniform across genders (Blonigen, Carlson, Hicks, Krueger, & Iacono, 2008; Donnellan et al., 2007). During late adolescence and young adulthood, traits associated with behavioral constraint (e.g., conscientiousness) have been found to increase more rapidly in females than in males (Blonigen et al., 2008; Branje, Van Lieshout, & Gerris, 2007; Donnellan et al., 2007; Klimstra et al., 2009; Soto et al., 2011).

Third, most prospective studies of personality development in either adolescence or young adulthood have focused on changes at the higher-order level of the trait hierarchy—Big Five or Big Three domains (De Fruyt et al., 2006b; Hopwood et al., 2011; McCrae et al., 2002). However, in their cross-sectional study, Soto et al. (2011) observed different age trends for several facets from the same domain. Differences are most prevalent across facets of neuroticism/negative emotionality and conscientiousness/behavioral constraint (Jackson et al., 2009). Similarly, in an epidemiological sample of youths aged 12–24 years, Harden and Tucker-Drob (2011) reported divergent patterns of change for facets of behavioral constraint. Mean levels of impulsivity declined, whereas levels of sensation seeking exhibited a nonlinear pattern, increasing during early adolescence then gradually declining over late adolescence and young adulthood. Overall, these findings suggest that lower-order traits may reveal a more complex picture of the rate and timing of personality maturation.

In a study, Hicks et al. (2013) used data from large community epidemiological samples to explore trajectories of personality change between 11 and 30 years of age. Data were collected using the Multidimensional Personality Questionnaire (MPQ; Tellegen & Waller, 2008) through four waves of assessment. Data were analyzed using multilevel modeling to explore for nonlinear patterns of change, quantify change parameters at both the group and individual levels, and test for differences between genders.

For 9 of the 11 MPQ scales, models including quadratic and cubic terms provided significantly better fit than those including only linear terms. This finding highlights the importance of using multiple assessments (necessary for detecting nonlinear changes) and of considering a long period of developmental time.

Several developmental processes could potentially account for the patterns of deviation from maturation identified in adolescence. For example, early-adolescent personality development may be influenced by fluctuations in identity development processes of commitment versus explorations of different decisions and roles (Klimstra et al., 2010), or the experience of normative and nonnormative life events (Lüdtke, Roberts, Trautwein, & Nagy, 2011).

Intraindividual change in personality stability

Although the notion of stability is central to the definition of personality traits, which are generally considered as enduring tendencies or habitual patterns of behavior, thoughts, and emotions (McCrae & Costa, 2003), stability does not imply permanence. Under normal circumstances, adult traits are largely stable, as indicated by high correlation coefficients computed for a group assessed twice on the same trait. These coefficients represent the average stability for a sample, but individuals vary in terms of their intraindividual stability (IS) (within personality). Even at the group level, trait consistency may vary across age, with substantial increases from childhood to late adolescence (De Fruyt et al., 2006a; Roberts & DelVecchio, 2000).

Whether the relation between stability and age during adulthood may have clinical implications (Ardelt, 2000; Roberts & DelVecchio, 2000; Terracciano, Costa, & McCrae, 2006) is less clear. For example, in one of the largest studies to date (15,000 twins, which included about 6,600 adults of age >30), Viken, Rose, Kaprio, and Koskenvuo (1994) reported that rank-order stability coefficients among the adult cohorts were unrelated to age for extraversion but were slightly higher in older cohorts for neuroticism.

The question of whether personality trait stability is related to age is typically tested at the group level by comparing rank-order stability coefficients across samples that differ in age. Although differences across groups are attributed to age differences in these designs, many other variables may contribute to or reduce such differences. For example, scales differ in their degree of reliability, which strongly influences stability coefficients (Chmielewski & Watson, 2009). Comparing stability coefficients across studies that use different personality scales might introduce confounding factors (e.g., Roberts & DelVecchio, 2000).

In a study, Terracciano et al. (2010) calculated individual coefficients from three sequential assessments to evaluate intraindividual change in stability over time. The authors profited from the fact that the Baltimore Longitudinal Study of Aging (BLSA) participants have been tested multiple times over several decades, and focused on those individuals who completed the Guilford–Zimmerman Temperament Survey (GZTS) at least 3 times. For each individual, they compared IS between the first and second assessments with IS between the second and third assessments.

The authors also examined the influence of time interval, sex, ethnicity, education, and secular trends on intraindividual personality trait stability. Retest intervals vary across participants, and it is known that stability declines with longer intervals (Roberts & DelVecchio, 2000; Terracciano et al., 2006a), so adjusting for varying intervals is necessary. Because they used within-individual analyses, each subject is his or her own control. However, between-individual differences may moderate within-individual changes. For example, the authors explored whether patterns of trait stability differ for men and women across the life-span, and whether people with higher levels of education reach a stability plateau earlier in life.

Using an approach conceptually similar to multilevel modeling analyses (hierarchical linear modeling, mixed models, growth curve analyses; [Bleidorn et al., 2009](#); [Terracciano, McCrae, & Costa, 2006](#)), the authors moved beyond the average group-level stability coefficient to examine each individual trajectory over time, and relate the intraindividual trait stability (ΔIS) to other individual difference variables. Findings are consistent with earlier research that also failed to find moderators of differential stability in adults at the group level in self-reported or observer-rated personality traits ([McCrae, 1993](#)). The finding that differences in personality traits are unrelated to personality stability in the adult sample indicates that the *maturity-stability hypothesis* is probably linked to adolescence ([Donnellan et al., 2007](#); [Lönngqvist, Mäkinen, Paunonen, Henriksson, & Verkasalo, 2008](#)).

Subjective age and personality development

Empirical studies and theories of personality development have traditionally relied on chronological age as a key index of personality change. The subjective experience of age (or subjective age) is an alternative marker of the biomedical or psychosocial factors that contribute to individual differences in personality development. Adopting a younger subjective age may be one strategy individuals use to cope with the stress of aging (e.g., [Weiss & Lang, 2012](#)). Subjective age is involved in a range of psychological, cognitive, and health-related outcomes across adulthood and old age. For example, feeling younger than one's chronological age predicts greater well-being (e.g., [Keyes & Westerhof, 2012](#); [Mock & Eibach, 2011](#)), better perceived health (e.g., [Stephan, Caudroit, & Chalabaev, 2011](#)), and better physical and cognitive functioning ([Stephan, Chalabaev, Kotter-Grühn, & Jaconelli, 2013](#)). The distinction between subjective and chronological age emerges early in adulthood and evolves across the life-span (e.g., [Galambos, Turner, & Tilton-Weaver, 2005](#)).

Consistent with conceptualizations of a younger subjective age as a self-protective strategy ([Weiss & Freund, 2012](#); [Weiss & Lang, 2012](#)), it is likely that feeling younger than one's chronological age may help preserve stability. Individuals with a youthful subjective age possess characteristics that allow them to successfully deal with age-related changes ([Stephan et al., 2011](#)), resulting in better physical health ([Kotter-Grühn, Kleinspehn-Ammerlahn, Gerstorf, & Smith, 2009](#)), well-being ([Stephan et al., 2011](#)), cognitive functioning ([Stephan, Caudroit, Jaconelli, & Terracciano, 2014](#)), and efficient protection from negative aging stereotypes ([Eibach, Mock, & Courtney, 2010](#); [Mock & Eibach, 2011](#)). As such, individuals who feel younger than their age at baseline may be more qualified to cope with physical, cognitive, and social changes that challenge personality stability.

In a study, [Stephan, Sutin, and Terracciano \(2015\)](#) used data from the Midlife in the United States longitudinal survey (MIDUS; $N = 3617$) and explored the longitudinal implications between personality and subjective age over approximately 10 years. Taken together, results reveal that changes in the discrepancy between subjective and chronological age are associated with meaningful mean-level personality changes. A decrease in both extraversion and openness was observed among those who felt older between baseline and follow-up over a 10-year period. The decrease in neuroticism in individuals who felt increasingly younger corresponded to a one-third standard deviation decrease. These changes are larger than the age-related change generally observed during adulthood ([Terracciano, McCrae, Brant, & Costa, 2005](#)). In addition to mean-level change, subjective age and changes in subjective age were associated with a number of indexes of personality stability. In general, a younger baseline subjective age was associated with higher stability and greater profile consistency, independent of other factors, such as chronological age, education, disease, and ethnicity (e.g., [Terracciano et al., 2010](#)).

THE FIVE-FACTOR MODEL—A LANDMARK IN PERSONALITY TRAIT MODELS

Origins and descriptions of the FFM

Traits are dimensions of personality that influence in a particular way a person's thoughts, feelings, and behaviors ([Terracciano et al., 2006a, 2006b](#)) across situations and over time ([McAdams & Pals, 2006](#)). [McAdams and Pals \(2006\)](#) describe personality as an individual's unique variation on the general evolutionary design for human nature, expressed as a developing pattern of dispositional traits, characteristic adaptations, and integrative life stories complexly and differentially situated in cultures (p. 212).

A trait structure provides an organizational scheme for the basic units of personality and indicates how these relate to one another. A structure or taxonomy facilitates the study of personality disorder, as it helps researchers to use a common language in the study of traits (i.e., describing psychological constructs) and enables the integration of new findings within previous research.

A central principle in the attempts to organize personality traits is the lexical approach. According to this paradigm, all the terms used in describing personality have been encoded in the language of a culture. More specifically, the lexical

paradigm is guided by the premise that what is considered important, interesting, or meaningful regarding people will be encoded within the language. “Language can be understood as a sedimentary deposit of people’s observations over the thousands of years of the language’s growth and transformation” (Goldberg, 1993, p. 136).

Inspired by the work of Sir Francis Galton (1884), lexical studies were initially conducted on the English language. Subsequent similar studies on other languages continued, but the association between the lexical approach and psychology of individual differences was derived from the theory of Allport and Odbert (1936). These authors suggested that there were almost 18,000 words in the English language that could be applied to describing human personality. Various organizational structures based on an examination of the lexicon have guided the development of personality theories, including the *16 personality factors* (Cattell, 1943). Further analyses in the spirit of scientific reductionism and parsimony have supported the universal existence of a smaller number of broad domains or traits of personality (e.g., Eysenck, 1992; Uher, 2013), including the Big Five.

The FFM has evolved from lexicon studies as well as from explorations of temperament in children, and from other personality models (e.g., Cattell, 1963; Eysenck, 1987) developed for describing adult personality. McCrae and Costa’s (1985a, 1985b, 1985c, 1987) findings and cross-instrumental findings converged, showed that factor-analytic results from the lexical tradition converged well with those of the questionnaire tradition.

The labeling of the five factors has been a subject for discussions and controversies. One significant advantage of the traditional labels is that they are commonly known and used. One of the great assets of the Big Five taxonomy is that it can be captured at a broad level of abstraction, the commonalities among most of the existing systems of personality traits (Table 9.2). Consequently, the FFM provides an integrative model for research. Like most structural models, it provides an account of personality that is primarily descriptive rather than explanatory, emphasizes regularities in behavior rather than inferred dynamic and developmental processes, and focuses on variables rather than on individuals or types of individuals (John & Robins, 1998; Table 9.3).

Extraversion implies an energetic approach toward the social and material world, and includes traits, such as sociability, activity, assertiveness, and positive emotionality. *Agreeableness* contrasts a prosocial and communal orientation toward others with antagonism, and includes traits, such as altruism, tender-mindedness, trust, and modesty. *Conscientiousness* describes socially prescribed impulse control that facilitates task- and goal-directed behavior, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing, and prioritizing tasks. *Neuroticism* contrasts emotional stability and even-temperedness with negative emotionality, such as feeling anxious, nervous, sad, and tense. Finally, *openness to experience* describes the breadth, depth, originality, and complexity of an individual’s mental and experiential life.

TABLE 9.2 Dimensions of the Big Five

Big Five Dimensions

| | |
|---|--|
| N | Neuroticism versus emotional stability |
| E | Extraversion versus introversion |
| O | Openness versus closedness to experience |
| A | Agreeableness versus antagonism |
| C | Conscientiousness versus lack of direction |

TABLE 9.3 The Five-Factor Model Domains and Facets

Facets of the Big Five

| | |
|-------------------|--|
| Neuroticism | Anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability |
| Extraversion | Warmth, gregariousness, assertiveness, activity, excitement seeking, positive emotions |
| Openness | Fantasy, aesthetics, feelings, actions, ideas, values |
| Agreeableness | Trust, straightforwardness, altruism, compliance, modesty, tender-mindedness |
| Conscientiousness | Competence, order, dutifulness, achievement striving, self-discipline, deliberation |

Source: Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.

Moving to the facet level allows for a more precise, albeit limited, description of personality factors. For example, extraversion is a complex higher-order factor composed of a number of primary factors or facets. Thus it is quite common to find two persons with similar scores on extraversion but showing a somewhat different constellation of the facets that are subsumed by extraversion. This is a key issue in any hierarchical model, including intelligence; there is a large number of subscale combinations in cognitively complex tests that would all yield essentially the same full-scale IQ score. According to Widiger, Costa, and McCrae (2002), even adaptive facets when extreme can become problematic; that is, it is generally adaptive and beneficial to be trusting (high in trust) but not to the point of being naive or gullible. Similarly, it can also be adaptive and beneficial to be skeptical (low in trust) but not to the point of being constantly mistrustful or suspicious. Furthermore, Coker, Samuel, and Widiger (2002) stated that there are undesirable ways in which one could be extraverted (e.g., flaunty, showy, and extravagant), agreeable (e.g., ingratiating and dependent), conscientious (e.g., perfectionist, judgmental, and stringent), open (e.g., unconventional and original), and emotionally stable (e.g., apathetic).

Personality has never been studied in a hierarchically structured form until recently. The psychodynamic theorists conceptualized personality in terms of psychic components that reflected unconscious processes, such as Freud's id, ego, and superego or Jung's archetypes, the shadow, the self, the anima, and the animus. Perhaps the closest conception of personality as a hierarchical structure was Maslow's approach (Maslow, 1970). Maslow's Hierarchy of Needs is a model that attempted to capture levels of human motivation; that is, human behavior is activated by different factors at different times: biological drives, psychological needs, and higher goals. Higher needs do not appear unless lower needs are satisfied and fulfilled.

The latter part of the 20th century saw a rise of interest in trait framework of personality. The most widely used hierarchical personality structure is the FFM. The advent of the FFM (John et al., 2008) was the outcome of research that demonstrated the convergence of traits from other systems. Murray's needs (Costa & McCrae, 1988), Gough's folk concepts (McCrae, Costa, & Piedmont, 1993), Millon's personality disorders (Costa & McCrae, 1990), and Cloninger's temperament and character variables (McCrae, Herbst, & Costa, 2001) were shown to fit the framework of the FFM.

McAdams (1992) argued that the FFM might be a useful taxonomy of traits. Later, McAdams and Pals (2006) proposed five major principles for a new integrative science of personality. The principles (evolution and human nature, dispositional traits, characteristic adaptations, life narratives and the challenge of modern identity, and the differential role of culture) subsume the FFM of personality within a broader framework that incorporates findings from various fields of psychology, such as social, clinical, and cognitive neuroscience.

Cattell's (1943, 1946) pioneering research and the availability of a relatively short list of variables motivated other researchers to examine the dimensional structure of trait ratings. Fiske (1949) carried out simplified descriptions from 22 of Cattell's variables; the factor structures derived from self-ratings, ratings by peers, and ratings by psychologists were highly similar and resembled what would later become known as the Big Five.

This five-factor structure was replicated by Norman (1963), Borgatta (1964), and Digman and Takemoto-Chock (1981) in lists derived from Cattell's 35 variables. The factors were initially labeled (1) extraversion or surgency, (2) agreeableness, (3) conscientiousness, (4) emotional stability, and (5) culture. Eventually, these factors became known as the "Big Five," a name chosen by Goldberg (1990) to underline the broadness of these factors. Thus, these five dimensions represent personality at a high or very broad level of abstraction, and each of these dimensions encompasses a large number of distinct, more specific personality characteristics.

Research on personality increased dramatically during the mid-1980s. Goldberg (1990) used a list of personality descriptive terms to clarify the composition of the Big Five factors and to test their generalizability across methodologic variations and data sources. Goldberg (1990) constructed an inventory of 1710 trait adjectives and asked participants to rate their own personality. Conducting factor analyses on the self-rating data, he discovered that five factors represented the expected Big Five. These factors were replicated across a variety of different methods of factor extraction and rotation and remained virtually invariant even when more than five factors were rotated. Generally, it has been found that structures with fewer factors are more replicable than the others (Saucier, Georgiades, Tsaousis, & Goldberg, 2005). While the FFM appeared to be very robust, it was also observed that the broadness of these trait descriptions allowed some variability in their definitions. For example, the evidence suggests that the fifth factor—openness—appears more culturally sensitive than the others. For example, openness appears to express "intellect," "unconventionality," or "rebelliousness" (Saucier et al., 2005).

Several theories conceptualized the Big Five as relational constructs: the dyadic interactional perspective on the Big Five (Wiggins & Trapnell, 1996) emphasizes the individual in relationships. Second, because extraversion and agreeableness are the most explicit interpersonal dimensions in the Big Five, they receive conceptual priority in this model. Third, socioanalytic theory (Hogan, 1996) focused on the social functions of self and other perceptions. Hogan (1996) argued that trait concepts serve as the "linguistic tools of observers" (p. 172) used to encode and communicate reputations. According

to this approach, traits are socially constructed to serve interpersonal functions. The evolutionary perspective on the Big Five maintains that humans have evolved “difference-detecting mechanisms” to perceive individual differences that are relevant to survival and reproduction (Brown, Cruikshank, Pendleton, & Veeder, 1997; Buss, 1996). According to this perspective, personality is seen as an “adaptive landscape” where the Big Five traits represent the most salient and important dimensions of the individuals’ survival needs.

Progressively, cultural studies of the Big Five focused on a range of developmental issues that are associated to the Big Five: the antecedents of adult personality traits, how traits develop, and their stability or change through the life-span. The growing interest in personality traits has expanded into the study of traits in early life (De Pauw & Mervielde, 2010). Although the Big Five taxonomy has influenced research on adult development and aging, there has been much less research on personality structure in childhood. John et al. (2008) stated that the extension of the Big Five into childhood and adolescence would facilitate comparison across developmental periods. Longitudinal research is needed to delineate changes in the dimensional structure of personality and to discover how temperament characteristics observed in infancy and early childhood manifest themselves during adolescence and adulthood.

Researchers have demonstrated that personality traits resembling the Big Five can be measured in children (e.g., Halverson et al., 2003; Mervielde & De Fruyt, 1999). Robust empirical research confirms the stability of early traits, and highlights the importance of early traits in later personality developments and psychopathology (e.g., Shiner & Caspi, 2003; Hampson, 2008). With regard to the FFM, early signs of extraversion are evident in infancy in the form of positive emotions and later expand to include positive energy and activity, sociability, and assertiveness. Neuroticism is another emotion-based trait that appears in infancy and early childhood in the form of fearfulness, irritability, sadness, anxiety, insecurity, and negative emotional responses when faced with difficulties or challenges. Conscientiousness appears in infancy as attention span and persistence in carrying out an activity, in the early years in the form of self-regulation, and as self-controlled and goal-directed behavior during childhood. Agreeableness appears mainly in toddlerhood and reflects tendencies toward empathy and the inhibition of aggressive tendencies (self-control). Openness/intellect may be difficult to detect before the preschool years, but it may be reflected in motor and tactile behaviors. In preschool years (ages 3–5 years) it may be revealed in imagination or curiosity, while in adolescence it may be revealed as a wide range of interests or creativity. The most recently discovered of these are the links between temperamental perceptual sensitivity and Big Five openness.

In a large cross-cultural study of 3751 children from 5 countries (Tackett et al., 2012), the hierarchical structure of childhood personality was examined for 1-, 2-, 3-, 4-, and 5-factor models across each country (China, Canada, Greece, the USA, and Russia) on an age range of 3–14 years. Differences emerged both across development and across countries, with countries classified as individualistic (e.g., Canada and the United States) appearing more similar to one another than to the countries typically classified as collectivistic (e.g., China and Russia). Results revealed the emergence of a robust three-factor structure and the concept of “difficult temperament.” Further, results supported an FFM from early childhood through early adolescence that appears comparable to the FFM in adults.

There is by now convincing evidence that at least by 6 years, children’s personality traits share the same Big Five structure as adult traits. Taken together, these studies suggest that the Big Five model can be employed as an overarching taxonomy for both children and adult personality traits. This five-factor structure of children’s traits has been found in studies with both parent and teacher reporters as well as questionnaires and Q-sort measures (Caspi & Shiner, 2006; Tackett, Silberschmidt, Krueger, & Sponheim, 2009).

Criticisms of the Big Five

The Big Five model has often been challenged or criticized. Block (2010) questions the validity of the lexical paradigm as the sole source for conceptualizing the intricate nature of personality. He underlines that lay descriptions and folk concepts cannot substitute for clinical evaluation and expert knowledge. Another shortcoming of the Big Five, according to Block, concerns the factor-analytic approach as the sole method for the analysis of results.

According to the evolutionary psychologists (Sheldon & Hoon, 2007), traits cannot explain the causes or the motives of behavior. Second, trait concepts do not acknowledge or explain variations among persons around their own baselines that could be central for adaptation. According to this perspective, Big Five personality advocates typically view traits as stable across situations and over time, ignoring or minimizing variations away from the modal score (Sheldon, Ryan, Rawsthorne, & Ilardi, 1997). Third, traits do not describe or explain the uniqueness of each individual.

McAdams (1996) provides a useful distinction between three “tiers” of personality. More specifically, McAdams argues that people vary in their traits and dispositions, in their goals and motives, and in their identities and life stories. Whereas traits describe behavioral regularities seen “from the outside,” the goal/motive and self/identity tiers show us personality “from the inside,” as people actively organize and regulate their lives and experience.

A third type of criticism against the FFM is derived from Epstein's cognitive-experiential self-theory (CEST) of personality (Epstein, 2003). According to this perspective, the Big Five relies on descriptive attributes of personality and units of measurement, thus underestimating dynamic, process-oriented constructs, such as emotions, motives, or needs. Epstein (2003) highlights the importance of unconscious processes in an integrative approach to the understanding and analysis of personality. Epstein has constructed two self-report inventories that offer information on unconscious processing [the Rational Experiential Inventory (REI); Epstein, Pacini, Denes-Raj, & Heier, 1996], and the Constructive Thinking Inventory (CTI; Epstein, 2001). When compared to the Big Five personality traits, the REI revealed stronger correlations than the CTI. This finding implies that the Big Five scales are better measures of variables related to conscious than to unconscious processes.

Following from the widely held criticism regarding the lack of a theoretical background concerning the FFM (e.g., Block, 2010), McCrae and Costa (2008) reframed their model into a five-factor theory (FFT) that placed the FFM into the context of a functioning personality system. FFT views personality as a system situated between biological and social cultural inputs. Its major components are basic tendencies (especially the FFM) and characteristic adaptations (habits, attitudes, roles, etc.). Personality is operationalized through (1) the interaction of traits and environment to create characteristic adaptations and (2) characteristic adaptations that interact with the environment to produce behaviors and experiences.

Alternative personality trait models

Many scholars have attempted to challenge the FFM's theoretical background or its empirical effectiveness by developing alternative models, such as the Big 7, alternative five-factorial model (AFFM), HEXACO, the Questionnaire Big Six (QB6) scale, and the cybernetic Big Five theory (CB5T).

Big 7

Tellegen and Waller (1987; Waller & Zavala, 1993) conducted a new lexical dictionary study without the restrictive exclusionary criteria that characterized previous lexical personality studies (i.e., they permitted evaluative and mood-related terms into their pool of descriptors). They collected self-ratings on an inclusive set of 400 sampled dictionary descriptors, factor-analyzed the responses, and found evidence to support seven higher-order dimensions. Five of their so-called "Big 7" factors, labeled negative emotionality, positive emotionality, agreeableness, conscientiousness, and unconventionality, were quite similar with the broad domains of the Big Five. The final two factors, positive valence and negative valence, represented new dimensions reflecting extremely positive and extremely negative self-evaluations, respectively.

The authors argue that this model may be more sensitive than the Big Five in tapping personality pathology. More specifically, positive valence and negative valence appear to tap maladaptive and extreme personality characteristics that are missing in the Big Five (McCrae & Costa, 1995; Simms, 2007). Although there is no doubt that there is a genetic basis of behavior and mental functioning, human personality is too complicated, multifaceted, idiosyncratic, unpredictable, or eccentric to be interpreted solely through empirical methods that measure its overt manifestations. Lexical studies and the various report or self-report inventories measure traits that are consciously expressed as direct impressions or as self-descriptions. However, neither of these methods assesses latent traits or the preconscious/unconscious aspects of personality that should not be underestimated or rejected.

Alternative Five-Factorial Model

Zuckerman, Kuhlman, and Camac (1988) developed an alternative five-factorial model (AFFM), which was later renamed the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ) (Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993) based on a biological and developmental personality perspective. According to this model, there are five higher-order personality dimensions: impulsive sensation seeking (ImpSS), neuroticism-anxiety (N-Anx), aggression-hostility (Agg-Host), activity (Act), and sociability (Sy). Infrequency is a validity scale employed to eliminate subjects with possibly invalid records. The final form of the ZKPQ consists of 99 true/false items.

The ZKPQ has shown good construct validity in a number of different areas, including risky behaviors, such as smoking, drinking, drug abuse, sex, gambling, and sports (e.g., Zuckerman, 2002, 2007, 2008). Moderate to high correlations were found between the five ZKPQ scales and ratings by friends and relatives (Angleitner, Riemann, & Spinath, 2004) and spouses (Gomà-i-Freixanet, Wismeijer, & Valero, 2005). Good construct and discriminant validity was found for four of the five ZKPQ scales in comparisons with the Eysenck Personality Questionnaire (EPQ; Eysenck, 1947; Eysenck, Eysenck, & Barrett, 1985), NEO PI-R, and the Temperament and Character Inventory-Revised (TCI-R; Gutierrez-Zotes et al., 2004). The fifth scale, Activity, tended to load on extraversion rather than forming its own factor, probably due to the lack of

content representation in the EPQ and NEO PI-R. However, the ZKPQ Activity scale correlated with persistence and self-directedness of the TCI. The ZKPQ has also been correlated with measures of personality disorders in a general population (Aluja, Cuevas, García, & García, 2007; Aluja, García, Cuevas, & García, 2007).

Aluja, Kuhlman, and Zuckerman (2010) proposed a revision of the ZKPQ, the ZKA-PQ, highlighting a hierarchical structure whereby each dimension includes five facets. This revised model allows for the development of a more precise tool with higher predictive validity, especially in the fields of clinical and organizational psychology. The five dimensions of the ZKA-PQ are aggressiveness (AG), activity (AC), extraversion (EX), neuroticism (NE), and sensation seeking (SS).

HEXACO

Perhaps the best-established alternative to the FFM is the six-factor HEXACO model (Lee & Ashton, 2005). It consists of honesty-humility (H), emotionality (E), extraversion (X), agreeableness (A), conscientiousness (C), and openness to experience (O). Three of these factors (extraversion, agreeableness, and openness to experience) correspond closely to the Big Five dimensions. The HEXACO has been operationalized through the construction of the HEXACO Personality Inventory (HEXACO-PI; Lee & Ashton, 2004). According to the authors, a major advantage of the HEXACO is its derivation from cross-culturally replicated findings based on analyses of variable sets that are culturally indigenous and representative of the personality domain. Another advantage is that the six factors can be readily interpreted in terms of constructs from theoretical biology instead of some simple unifying concepts.

A 60-item version of the HEXACO Personality Inventory–Revised (HEXACO-PI-R; Ashton & Lee, 2008) is referred to as HEXACO-60. In constructing the HEXACO-60, the authors decided that each of the 6 scales should contain 10 items that cover a wide range of content, with at least two items representing each of the four facets of each scale in the longer HEXACO-PI-R.

The Questionnaire Big Six Scales

Saucier (2009) compared five-, six-, and seven-factor models from eight lexical studies that had used very broad variable selection criteria. Saucier (2009) argued that a Big Six model improves on the Big Five in terms of cross-cultural replicability and that Big Six scales predict important criteria (many related to psychopathology) better than the Big Five scales. The Big Six dimensions are conscientiousness, honesty/propriety, agreeableness (kindness and even temper), resiliency versus internalizing negative emotionality, extraversion (gregariousness and positive emotionality), and originality/talent.

The Big Six dimensions are quite close to those of HEXACO. As in the HEXACO, Big Six agreeableness contains some content that reflects Big Five's neuroticism (aggressiveness and irritability). With hostility and irritability relocated to agreeableness and a better-defined favorable pole, neuroticism is redefined as resiliency versus internalizing negative emotionality. This arrangement allows Big Six scales to associate better with temperament dimensions of neuroticism versus resiliency, and extraversion versus positive emotionality and disinhibition. These temperament dimensions are considered to precede both mental disorders and personality traits expressed in adults (Clark, 2005).

Cybernetic Big Five Theory

The cybernetic Big Five theory (CB5T) attempts to provide a comprehensive, synthetic, and mechanistic explanatory model of personality (DeYoung, 2015). The fundamental principle of CB5T is that any comprehensive personality theory should be based on cybernetics, the study of goal-directed, self-regulating systems (DeYoung, 2010; Van Egeren, 2009). A basic premise of CB5T is that personality traits and characteristic adaptations provide a full description of individual differences. Characteristic adaptations are relatively stable goals, interpretations, and strategies, specified in relation to an individual's particular life circumstances (DeYoung, 2010, p. 38). Personality traits are probabilistic descriptions of relatively stable patterns of emotion, motivation, cognition, and behavior in response to classes of stimuli that have been present in human cultures over evolutionary time (DeYoung, 2010, p. 35). The second important tenet of the CB5T is that traits are situationally specific and describe responses to specific classes of stimuli. The third important feature of traits is the stipulation that trait-relevant classes of stimuli have been present over evolutionary time (DeYoung, 2010).

The theory identifies mechanisms in which variation is responsible for traits in the top three levels of a hierarchical trait taxonomy based on the Big Five, and describes the causal dynamics between traits and characteristic adaptations. Furthermore, CB5T links function and dysfunction in traits and characteristic adaptations to psychopathology and well-being.

The most highly correlated items were then used to construct a questionnaire, the Big Five Aspect Scales (BFAS; DeYoung et al., 2007). In addition to providing scores for the 10 aspects, the BFAS provides scores for the Big Five as the mean of aspect pairs. Its measurement of the Big Five converges well with other Big Five measures, and it has been used in over 75 studies since its publication. Psychometrically, the aspects are important because they form an empiri-

cally derived substructure for the Big Five that is lacking at the facet level. The two aspects in each of the Big Five dimensions are likely to reflect the most important distinction for discriminant validity within each of the five broader dimensions (e.g., DeYoung, Grazioplene, & Peterson, 2012; DeYoung, Weisberg, Quilty, & Peterson, 2013; Hirsh, DeYoung, Xu, & Peterson, 2010).

PERSONALITY AND CULTURE

For, after surveying the field of Chinese literature and philosophy, I come to the conclusion that the highest ideal of Chinese culture has always been a man with a sense of detachment (takuan) toward life based on a sense of wise disenchantment. From this detachment comes high-mindedness (k'uanghuai), a high-mindedness which enables one to go through life with tolerant irony and escape the temptations of fame and wealth and achievement, and eventually makes him take what comes. And from this detachment arise also his sense of freedom, his love of vagabondage and his pride and nonchalance. It is only with this sense of freedom and nonchalance that one eventually arrives at the keen and intense joy of living... ..It is truism to say that the culture of any nation is the product of its mind. Consequently, where there is a national mind so racially different and historically isolated from the Western cultural world, we have the right to expect new answers to the problems of life, or what is better, new methods of approach, or still better a new posing of the problems themselves (Yutang, 2008, pp. 1–3).

A comprehensive conception of personality would incorporate dispositional traits, characteristic adaptations, and life narratives considered within an evolutionary framework and cultural contexts (McAdams & Pals, 2006).

Moreover, culture may influence how dispositional traits are elaborated or reinforced during development and manifested across situations (Church, 2010). Cultural psychologists posit that culture may affect conceptions of personality and self, implicit or lay beliefs about the importance and role of dispositional traits, and other self-processes (e.g., self-enhancement or self-regulation), all of which can be conceptualized as characteristic adaptations.

Conversely, dispositional traits and characteristic adaptations can influence the extent to which individuals internalize or conform to various aspects of their culture. Sample topics for research in this area include: (1) conceptual and empirical work on how best to measure dimensions of culture; (2) behavioral manifestations of dispositional traits across cultures; (3) implicit theories, or lay beliefs, about the traitedness or contextuality of behavior; (4) the impact of cultural dimensions (e.g., tightness–looseness, dialecticism) on the consistency or expression of traits across situations; (5) how dispositional traits impact culture; and (6) how particular traits constrain or channel the influence of culture on different individuals (Church, 2010).

Although some personality psychologists expressed an early interest in culture (e.g., Kluckhohn & Murray, 1948), interest waned during the 1970s and 1980s. However, during the past 20 years, there has been a growing interest in the interaction between personality and culture. Church (2010) proposes several factors that stimulated this interest: first, the rejuvenation of the trait concept, which had become controversial in the 1960s; second, the emergence of the FFM (McCrae & Costa, 1996) as a hierarchical model of personality traits; third, the classification of cultural dimensions, such as individualism–collectivism, that could link ecology, culture, and personality; fourth, the gradual expansion of research on culture and self; fifth, the emergence of indigenous psychologies; and sixth, the increasing globalization of scientific research.

A number of evolutionary psychological perspectives on personality posit that the FFM reflects universal kinds of individual variation (e.g., Ellis, Simpson, & Campbell, 2002). The study of the cross-cultural generalizability of the Big Five is one of the most ambitious efforts to investigate the universal traits of the personality. Early cross-cultural comparisons of the factor structure of the Big Five revealed considerable similarity in the structure of personality across diverse cultures (e.g., Bond, Nakazato, & Shiraishi, 1975; Bond, 1979). According to Henrich et al. (2005), universality would be stronger if convergent evidence derived from studies of developing and small-scale societies.

A significant issue that arises is whether the Big Five personality dimensions emerge regardless of what traits one considers or they reflect the substructure of personality traits found in the English literature (Heine & Buchtel, 2009). For example, Cheung et al. (1996) attempted to determine what kinds of personality dimension would arise if they factor-analyzed indigenous Chinese personality traits rather than relying on translations of English traits. The researchers first explored the kinds of personality traits that were common in Chinese by examining Chinese novels, Chinese proverbs, people's personality descriptions, and the Chinese psychology literature. These efforts revealed 26 unique personality constructs (as well as another 12 clinical constructs). The constructs were then put into a personality questionnaire (the Chinese Personality Assessment Inventory), which was completed by Chinese participants. The resultant factor structure was not the same as the Big Five; rather, four factors emerged that were captured by the following labels: *dependability* (reflecting responsibility, optimism, and trustworthiness), *interpersonal relatedness* (reflecting harmony, thrift, relational orientation, and tradition), *social potency* (reflecting leadership, adventurousness, and extraversion), and *individualism* (reflecting logical orientation, defensiveness, and self-orientation).

Further analyses included the Chinese Personality Assessment Inventory together with a measure of the Big Five (Cheung, Cheung, Leung, Ward, & Leong, 2003). That analysis revealed that there was substantial overlap between three of the factors; namely, neuroticism correlated with dependability, extraversion correlated with social potency, and individualism correlated with agreeableness. Openness to experience did not correlate with any of the Chinese factors, and interpersonal relatedness was not correlated with any of the Big Five factors. Perhaps, then, interpersonal relatedness may be a sixth personality factor that is especially salient in Chinese culture. Whether interpersonal relatedness is a reliable sixth factor in Western samples has yet to be demonstrated. Similar studies have been conducted in other cultures (e.g., Church, Reyes, Katigbak, & Grimm, 1997; Benet-Martínez & Waller, 1995, 1997; Saucier et al., 2005).

Cross-cultural variability in levels of personality traits

Researchers have begun to compare mean levels of personality traits across large samples of cultures (e.g., McCrae, 2002; McCrae & Terracciano, 2005; Schmitt, Allik, McCrae, & Benet-Martínez, 2007). Some of the most thorough multinational comparisons that have been conducted in psychology have compared Big Five traits across cultures. As of this writing, aggregate personality means from the NEO PI-R (Costa & McCrae, 1992) have been reported for self-ratings from 36 cultures (McCrae, 2002) and for peer ratings from 51 cultures (McCrae & Terracciano, 2005), and a modified Big Five measure was used to collect people's perceptions of their compatriots in 49 cultures (Terracciano et al., 2005). Another popular measure, the Big Five Inventory (BFI; Benet-Martínez & John, 1998), has been used to collect self-ratings in 56 nations (Schmitt et al., 2007). This wealth of data has attracted much interest and sparked further research (e.g., McCrae & Allik, 2002). It has shown, for example, that according to the self-report means, the most neurotic people on the planet are Spaniards, the most extraverted are Norwegians, the least conscientious are Japanese, the most open to new experiences are Austrian, and the most agreeable are Malaysian (McCrae, 2002). The investigators argued that the findings provided strong evidence that common perceptions of national character in fact have little to no connection with reality; people's views of their compatriots do not appear to contain "even a kernel of truth" (McCrae & Terracciano, 2006, p. 160).

The literature on cross-cultural methodology cautions against drawing conclusions from direct comparisons of mean levels of personality traits across cultures. For example, there are questions of whether items are interpreted in the same way by people from all cultures (e.g., Poortinga, van de Vijver, & Van Hemert, 2002), whether people respond to items in the same way (Hamamura, Heine, & Paulhus, 2008; Poortinga et al., 2002), and whether individuals in different cultures compare themselves to different standards when scoring (e.g., Heine, Lehman, Peng, & Greenholtz, 2002; Heine, Buchtel, & Norenzayan, 2008; Peng, Nisbett, & Wong, 1997). Nevertheless, some personality researchers have optimistically maintained that most of these potential biases can be controlled for (e.g., the acquiescence bias; McCrae, 2001; McCrae & Terracciano, 2005), or that these differences still yield largely interpretable results (McCrae & Terracciano, 2005; Schmitt et al., 2007). The difficulties in comparing mean scores on subjective Likert scales across cultures means that researchers must seriously consider what kinds of data could actually validate such cross-cultural comparisons.

A large number of studies have used symptom scales, such as the Child Behavior Checklist (CBCL) and Strengths and Difficulties Questionnaire (SDQ), to assess dimensional psychopathology in children and adolescents in a variety of countries (Achenbach et al., 2008). By using the same instrument and comparable study methods, differences that are detected across studies and countries can be interpreted as resulting from geographic, social, and/or cultural aspects. Culture in general may influence the identification and interpretation of symptoms and the meaning attributed to them not only by parents and teachers, but also by health professionals (Egan, 2008; Miller, 2010; Olfson, Blanco, Wang, Laje, & Correll, 2014; Schwarz & Cohen, 2013). Moreover, culture and related factors that are more proximal to childhood development (e.g., parental style) influence the emergence of emotional and behavioral problems (Canino & Alegria, 2008; James et al., 2014; Visser et al., 2014). Nevertheless, studies assessing community samples around the world (most of them nonrepresentative of the populations) with dimensional measures found more similarities than differences in terms of the psychopathology and correlates between them, with slight differences in the rate of symptoms (Crijnen, Achenbach, & Verhulst, 1997; Rescorla et al., 2011, 2012).

Cultural issues regarding relatedness and self-definitions

It is important to bear in mind that these findings are based on research in Western samples and that cultures differ in the extent to which they emphasize and value *relatedness* and *self-definition*. These differences may have a profound impact on the meaning and consequences of these dimensions across cultures (Soenens, Park, Vansteenkiste, & Mouratidis, 2012). It is often hypothesized that relatedness is emphasized in collectivistic or interdependent cultures, while individualistic or independent cultures emphasize self-definition (Kagitcibasi, 2005; Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997;

Triandis, 2001). Research has indeed provided evidence for mean-level differences across cultures in emphasis on issues of relatedness and self-definition (Matsumoto & van de Vijver, 2011), as well as in maladaptive expressions of these dimensions. For example, Asian Americans have consistently been found to have higher levels of maladaptive perfectionism—an expression of intense preoccupation with self-definition—on self-report questionnaires, compared with Caucasian Americans (DiBartolo & Rendón, 2012). These differences probably result from complex interactions among sociocultural factors, such as levels of individualism versus collectivism in the social context, which may influence parenting styles (Ahmad & Soenens, 2010; Chang & Asakawa, 2003; Kitayama et al., 1997). For example, because of the relative emphasis on collectivism in interdependent cultures, parents may place greater emphasis on relatedness than do parents in more individualistic cultures.

However, research has shown that characterizing Asian cultures as collectivist is an overly simplified classification because individualistic and collectivistic values often cooccur within the same culture (Ahmad & Soenens, 2010). For example, studies suggest that the strong emphasis on education and achievement by Asian American parents often coocurs with parental concern and involvement (e.g., the Chinese concept of *guan*—to love and care for in addition to govern; DiBartolo & Rendón, 2012; Soenens et al., 2012).

Thus, both dimensions, relatedness and self-definition, need to be evaluated simultaneously (DiBartolo & Rendón, 2012). Two-polarities models offer new options for the study of the balance and interplay between relatedness and self-definition across cultures. For example, the emphasis on interdependency in many so-called collectivist cultures is gradually shifting toward a strong focus on achievement and independence, which has been related to an increase in internalizing problem behaviors and disorders in these cultures (Im et al., 2011; Kwon, Chun, & Cho, 2009).

While universalist positions in this context argue that high levels of dependency are maladaptive regardless of cultural context, a relativistic or “cultural congruence” perspective argues that this may depend on the cultural context (Soenens et al., 2012). For example, high levels of interdependency are often seen as less maladaptive, or even as adaptive, in collectivistic cultures, whereas the emphasis on self-definition and personal achievement is often considered normative and adaptive in individualistic cultures. Findings such as these thus suggest both universal and culture-specific origins, a source of concern with expressions of self-definition. Concerning relatedness, studies have similarly reported factorial invariance of measures of relatedness and similar patterns of relationships with other variables in different cultures (e.g., high levels of dependency are associated with maladjustment regardless of culture; Ahmad & Soenens, 2010; Otani et al., 2012; Soenens et al., 2012) but also some important differences (e.g., in the distribution of preoccupied attachment) across cultures (van Ijzendoorn & Sagi-Schwartz, 2008). More research is necessary on the identification and investigation of subgroups within cultures. Religious factors can also be important in this context, as they may differentially emphasize relatedness and self-definition and reinforce or weaken cultural patterns (Cohen & Hill, 2007). Cross-cultural studies have mostly relied on Asian American and African American samples (Ahmad & Soenens, 2010; DiBartolo & Rendón, 2012).

Etic and emic approaches

The need to understand both the local and the universal features of human behavior is calibrated in the distinction between *etic* and *emic* approaches. These terms were coined by Pike (1967) in analogy with phonetics and phonemics. Phonemics is the study of the sounds used in a particular language. Berry (1969, 1989) has summarized Pike’s development of the emic–etic distinction, and applied it to the field of cross-cultural psychology. The etic–emic distinction in cross-cultural psychology partly parallels the distinction between nomothetic and idiographic orientation in personality research, although a culture rather than an individual is the unit of analysis (Berry, Poortinga, Segall, & Dasen, 1992, p. 233; Helfrich, 1993, p. 85). While the nomothetic approach attempts to identify general laws and causal explanations, the idiographic approach emphasizes the uniqueness of each individual.

In the emic approach to cross-cultural studies, researchers attempt to look at phenomena through the perspective of individuals of the particular cultural context, and thus researchers should avoid using concepts and measures from other cultures. In adopting an etic approach, researchers impose a set of universal values onto that culture. One major risk in employing this approach is that the concepts may not be compatible with the behavior under study. In this case researchers are working with *imposed etics* (Berry, 1969). According to Berry (2013) *derived etics* should gradually replace imposed etics. Derived etics are valid cross-culturally and may result in establishing some general principles of human behavior. Berry (2013) argues that a global psychology may result from an initial use of imposed etics (i.e., the use of Western psychology in other cultures) followed by an emic search for local phenomena and finally the use of derived etics to create a global psychology that is valid for that particular concept or topic.

The etic approach demands a descriptive system that is equally valid for all cultures and permits the representation of similarities as well as differences between individual cultures. *Culture* is conceptualized as a factor of influence that should

be able to explain differences in cognition, learning, and behavior. Etic cultural comparison also serves to test the degree to which psychological results can be generalized from one cultural context to another. The main strengths of the etic approach are the large empirical database that has been built up and the sound methodological basis for its studies. *Equivalence* (or invariance) is the pivotal concept in comparative studies, and it deals with the question of whether the imported instrument measures the same construct across the cultures studied. Equivalence refers to the level of comparability of constructs or scores in a multigroup comparison (Meredith, 1993; Poortinga, 1989; Vandenberg, 2002; van de Vijver & Leung, 1997).

According to the emic approach, “culture” is not an external factor whose effects on the individual must be examined, but rather an integral part of human behavior (e.g., Gergen, 1985). Human acts cannot be separated from their cultural context.

Indigenous psychology began as a reaction to the increasing supremacy and dominance of Western models, which did not provide adequate models for understanding human behavior in non-Western contexts (Cheung, 2004; Cheung, Cheung, Wada, & Zhang, 2003; Kim, Yang, & Hwang, 2006). Researchers have found that personality tests developed and applied in Western cultures do not reflect their latent constructs in non-Western cultures. As a result, they have developed methodologies and strategies to describe and understand local construct models with different measures.

Many of the early attempts to develop multidimensional personality measures adapted and modified imported Western measures to accommodate the emic constructs (Cheung et al., 2003a, 2003b). There have been a number of attempts to develop multidimensional personality measures using the bottom-up inductive approach to collect emic constructs in the Philippines and in China (Church, Katigbak, & Reyes, 1996; Yang, 2006). Cheung et al. (2003a, 2003b) also noted that the early attempts to develop emic multidimensional personality measures failed to sustain the rigorous research program needed to build reliable and valid instruments for assessment, and few have standardized the measures on representative norm samples. Cross-cultural psychologists have further posed theoretical challenges to the indigenous approach in personality assessment. Church (2001) argued that in attempting to distinguish human universals and cultural differences, many indigenous measures identified culture-specific constructs that could also be subsumed under the universal models of personality.

There are two methodological limitations of the etic approach, more specifically of the use of *equivalence tests* for assessing universality. The first is that there are more sources of cross-cultural bias (i.e., sources of systematic measurement problems) than can be identified by prevailing equivalence procedures. Bias can arise from three sources: *constructs*, *methods*, and *items*. An empirical example of construct bias can be found in Ho’s (1996) work on *filial piety* (characteristics associated with being “a good son or daughter”). The Chinese concept, which includes the expectation that children should assume the role of caregiver of their elderly parents, is broader than the corresponding Western conception, which focuses more on love and respect toward parents. Method bias is due to systematic distortions in measurement-related aspects, such as differential response styles. Harzing (2006) found consistent cross-cultural differences in acquiescence and extremity responding across 26 countries.

The second methodological limitation of the etic approach is attributed to the gap between substantive theories of cross-cultural differences and models of equivalence. Extant models of cross-cultural differences are fairly elementary and focus on mean score differences (e.g., between independent and interdependent cultures). However, these models hardly ever address cross-cultural differences or similarities (1) in the relations between items and their underlying constructs, (2) in correlations between factors, and (3) in error variances. Thus, the high level of detail in equivalence testing does not correspond to an equally detailed level of theorizing about constructs and their cross-cultural similarities and differences.

Combined Emic–Etic Approaches to Personality Assessment

Cheung, van de Vijver, and Leung (2011) argue that a combined perspective is needed to expand our understanding of universal personality constructs. To paraphrase Kluckhohn and Murray (1948), personality in a certain culture is like personality in all other cultures, in some other cultures, and in no other culture. A comprehensive theory of personality should encompass all these elements (Church, 2009). This view implies that cross-cultural and indigenous studies of personality are complementary because they address different aspects. To make conceptual advances, the field of personality should elucidate both the universal and the culture-specific aspects of personality.

Cheung (2012) argues that a combined emic–etic approach to developing indigenous personality measures may bridge the polarity between mainstream and indigenous psychology and provide a comprehensive framework in which to understand universal and culturally variable personality dimensions. A defining characteristic of this approach is the combined use of emic and etic measures (or stages in a study) to capture a richer and more integrated and balanced view of the universal and culture-specific aspects of a target construct or theory.

The combined approach can take on various forms and could comprise (1) the use of a combination of etic and emic measurement, (2) studies in which universal and culture-specific aspects are delineated in an iterative process of data

collections with continually adapted instruments, and (3) the use of mixed methods (e.g., the use of an etic measure combined with interviews for collecting information about culture-specific features not covered by the etic instrument).

WHEN PERSONALITY GOES ASTRAY: FROM PERSONALITY TO PERSONALITY DISORDERS

Sometimes the line between what is “normal” and what is pathological is thin. Characteristically, Reiss (2008) states: “When I was a student eminent psychodynamic theorists taught me that suspiciousness is a mild form of paranoia, orderliness is a mild form of obsessive-Compulsive Disorder; unhappiness is a mild form of depression” (p. 2). Indeed, how far do the borders of personality extend, and where do the borders of psychopathology begin?

There is a growing interest in the interplay between personality and psychopathology (Widiger, 2011). Personality is the characteristic manner in which one thinks, feels, behaves, and relates to others. It refers to a more normative sets of behaviors, whereas psychopathology is conceptualized as an extreme set of behaviors that lead to functional impairment of the individual (Lahey, 2004). Studies on personality development have suggested that it is quite consistent over time (Roberts & DelVecchio, 2000) and apparent in early childhood (Caspi et al., 2003) but not set until early adulthood, although development continues across the life-span. On the other hand, personality disorders (e.g., antisocial personality) may not be permanent.

According to Widiger (2011), personality and psychopathology may relate to one another in various ways: They can influence each other for better or for worse; they can share a common, latent structure, referred to as a *spectrum relationship*; they can have a causal role in the development or etiology of one another. Psychopathology and personality are interchangeably affected, as psychopathology is expressed in various ways (depending upon a person’s premorbid personality traits) and personality can be altered by psychopathology. This alteration to personality due to mental malfunctioning may initiate the development of novel personality traits, such as dependency, anxiety, social withdrawal, negative self-concept, self-shame, helplessness, and self-centeredness.

The disentangling of psychopathology from personality can be confusing, as they are not clearly distinct. All personality disorders may in fact be maladaptive variants of general personality traits, and some personality disorders may be variants of other mental disorders. There is a considerable body of research on how general personality traits, such as neuroticism and low conscientiousness, can contribute to the etiology of anxiety, mood, substance abuse, and other mental disorders (e.g., Widiger & Smith, 2008).

There is also evidence that personality disorders are readily understood as maladaptive variants of the FFM personality structure. Premorbid personality traits can make people susceptible (or resilient) to stress and help to understand the way people cope with life’s stresses or adversities. Neuroticism is a reliable predictor of future psychopathology in response to life’s stresses (Lahey, 2009; Widiger, 2009). Dependent personality traits have also been shown to play a major role in the etiology of depression. This relationship can be both reactive and evocative. Dependent individuals will react to loss and rejection with strong feelings of helplessness or despair. On the other hand, the dependent traits of clinging, fear of loss, or the need for continuous reassurance can evoke a disengagement and rejection by others (Bornstein, 2005).

From a functional perspective, behavior is evaluated primarily by its impact on the person, other people, and the broader environment (Tseng, 1997, 2001, 2003; Tseng & Streltzer, 2008). With regard to mental disorders, “whether the condition provides (healthy) function or (unhealthy) dysfunction for the individual is the basis for the judgment of normality versus pathology” (Tseng & Streltzer, 2008, p. 45). For example, openly hostile and aggressive behavior that frequently disturbs the family, neighbors, or wider society is considered “dysfunctional” and is invariably perceived as pathological (Tseng & McDermott, 1981).

The simplest distinction between normal and disordered personality is quantitative—personality disorder represents an extreme position on a trait dimension; that is, it involves either too much or too little of a given characteristic (Eysenck, 1987; Wiggins & Pincus, 1989). The justification for this approach is that extremeness is assumed to indicate inflexibility in interpersonal behavior, and many conceptions of personality disorder, including that adopted by the *DSM-IV*, consider inflexibility to be a hallmark of personality disorder. Unfortunately, this idea confuses extreme scores on a personality trait with disordered functioning (Parker & Barrett, 2000). As Wakefield (1992) pointed out, statistical deviance alone is neither a necessary nor sufficient criterion for disorder. With personality disorder, it is difficult to see how an extreme score on dimensions, such as conscientiousness, extraversion, or agreeableness, is necessarily pathological. Some additional factor needs be present to justify the diagnosis. The *DSM* suggests two characteristics—*inflexibility* and *subjective distress*.

Allport’s (1937) notion that “personality is something and personality does something” draws attention to how personality psychology (and psychiatric nosology) has focused largely on what personality is—that is, on the description of individual differences in normal and disordered personality. Cantor (1990) described the functions of personality in terms of the personal tasks that individuals face and set for themselves; the schemata used to construe these tasks, the self, and life situations; and

the strategies used to achieve personal tasks. This functional analysis provides the beginnings of a definition of personality disorder. The functions described, however, involve mechanisms that differ in breadth and scope. Some involve dysfunctions in specific adaptive mechanisms. Although a description of these dysfunctions would contribute to our understanding of psychopathology, the concept of personality disorder implies something more profound than simply dysfunction.

Livesley (1998) suggests that personality disorder occurs when “the structure of personality prevents the person from achieving adaptive solutions to *universal* life tasks” (p. 141). Personality disorder is defined as the failure to achieve one or more of the following: (1) stable and integrated representations of self and others; (2) the capacity for intimacy, to function adaptively as an attachment figure, and/or to establish affiliative relationships; and (3) adaptive functioning in the social group as indicated by the failure to develop the capacity for prosocial behavior and/or cooperative relationships. To differentiate personality disorder from other mental disorders, one or more of these failures should be enduring and traceable to adolescence or at least early adulthood, and they should be attributed to extreme personality manifestations rather than a mental disorder.

From an evolutionary perspective, failure to achieve adaptive solutions to these tasks is considered as maladaptive. A cohesive sense of self or identity would help to ensure the adaptive social behavior needed to gain access to the resources necessary for reproduction and survival. It would also contribute to the establishment and attainment of the longer-term goals that are part of effective adaptation. The ability to function effectively in close familial relationships would contribute to effective reproduction and child rearing that would warrant that genes were passed on. Finally, cooperative and prosocial behavior would facilitate access to resources and the protection of the social group. These tasks are probably equally applicable to effective adaptation in the contemporary situation. In a constantly changing world, a coherent sense of self provides a stable frame of reference that contributes to stable relationships, provides direction and purposeful actions, and contributes to self-regulation.

MODELS OF PSYCHOPATHOLOGY AND PERSONALITY TRAITS

Some questions regarding higher-order models of psychopathology and personality traits remain unanswered. First, the relationship between the higher-order factors and personality has been explored only at the Big Five or Big Three levels. In other words, an analysis of the relationships at the lower-order facet level may provide a more detailed description of the personality correlates of the higher-order psychopathology factors. In addition, a facet-level analysis may provide the necessary specificity to explain previously ambiguous relationships, such as the relationship between openness to experience and psychopathology (Chmielewski, Bagby, Markon, Ring, & Ryder, 2014; Samuel & Widiger, 2008; Tackett, Krueger, Iacono, & McGue, 2008; Widiger, 1998). Second, extant studies generally have relied on self-report data, usually in the form of self-report questionnaires. The inclusion of informant-report data is desirable for at least three reasons. First, single-method measurement results in method variance being inextricably confounded with trait variance (e.g., Campbell & Fiske, 1959). Thus, the inclusion of multimethod indicators in these models brings the estimation of relationships among latent variables close to “truth” through the reduction of error variance. Second, self-report assessment is vulnerable to biases in participant self-perception and in examiners’ objective attitudes. Whereas most people have difficulty viewing themselves in an objective manner, this may be especially difficult for individuals with personality disorders (Grove & Tellegen, 1991; Zimmerman, 1994). Moreover, several studies have documented the incremental validity of including informant reports (Miller, Pilkonis, & Clifton, 2005; Oltmanns & Turkheimer, 2006). Finally, we are able to examine the structure of psychopathology separately for data that does and does not include informant reports. Concurrence in results increases confidence in findings, while discrepancies indicate potential areas of bias and further investigation.

In a study Uliaszek, Alden, and Zinbarg (2014) investigated the hierarchical nature of personality using the Bass Ackward approach. The authors examined the contributions of different levels of the personality hierarchy through a large ($N = 930$) patient population. The central aim of this study was to examine the associations between personality (as assessed by the FFM) and understudied forms of psychopathology, such as bipolar disorder, somatoform disorder, posttraumatic stress disorder, psychotic disorder, and pathological gambling.

Results demonstrated the ability to examine the NEO PI-R as a higher-order structure with top levels representing broad personality dimensions while the lowest levels represented the FFM. Post hoc analyses revealed significant differences in personality traits among many of the different disorders, with characteristic patterns. For example, somatoform disorders and posttraumatic stress disorder exhibited similar patterns throughout the levels of the hierarchy, with both disorders characterized by low levels of Openness (O) and Extraversion (E) and high levels of Agreeableness (A) and Conscientiousness (C). This may point to etiological or dimensional elements that are common to both disorders, even though they are categorized separately in the *DSM-5*. However, the cross-sectional nature of these data does not allow us to explore this hypothesis further.

Hierarchical models of personality and psychopathology

Hierarchical models have become increasingly important in understanding normal and abnormal personality structure, as well as their interrelations. Hierarchy has emerged as an important feature of normal-range personality structure (Costa & McCrae, 1995; Hogan & Roberts, 1996). Meta-analyses have revealed replicable, structured superordinate relationships among Big Five measures (Digman, 1997). Issues of hierarchy are also critical in the study of differential validity of personality measures (e.g., Jang, McCrae, Angleitner, Riemann, & Livesley, 1998; Saucier & Ostendorf, 1999). Finally, hierarchy has proven to be important in understanding relationships between “normal” and aberrant personality variables (e.g., Ben-Porath & Waller, 1992). For example, subordinate factors of the FFM have demonstrated higher predictive validity with regard to aberrant personality and other forms of psychopathology than the Big Five factors themselves (Reynolds & Clark, 2001).

Hierarchical models of “normal” personality and common psychopathology may be particularly important in understanding the development of specific patterns of psychiatric problems; for example, they may exemplify such clinical phenomena as *comorbidity* (Krueger & Markon, 2006) or *heterotypic continuity* (when the type of disorder changes with age). Identifying specific constellations of personality traits and problematic behaviors across levels of the hierarchy may help to clarify the role of individual risk and protective factors and to explain why some children are more vulnerable than others in developing psychiatric disorders.

Perhaps one of the major points of consensus is that there is a continuum between “normal” and aberrant personality. Personality measures often discriminate well between various personality disorders and other forms of psychiatric disorders (e.g., Krueger, Caspi, Moffitt, Silva, & McGee, 1996). Joint factor analysis between measures of “normal” and aberrant personality point to common factors underlying responses to measures. Such findings indicate that “normal” and “aberrant” personality traits may be modeled by a single structure model. There is increasing evidence that the FFM is promising as a potential integrating framework.

Markon, Krueger, and Watson (2005) employed a constructive replication approach to delineate an integrative hierarchical account of the structure of “normal” and aberrant personality. To do that, these authors conducted two studies: a meta-analysis and an empirical study. In the meta-analytic study, correlations from multiple studies were integrated into a single meta-analytic correlation matrix. In the empirical study, the authors replicated the meta-analytic findings in a single sample using a second set of measures.

A growing body of research indicates that both higher- and lower-order psychopathological characteristics are relatively stable and can be reliably identified beginning in early childhood (Egger & Angold, 2006). A study examining the hierarchical structure of childhood personality showed that Big Five traits and their relationships mapped onto established patterns for adults and were largely consistent across five different cultures (Canada, China, Greece, Russia, and the USA) and four age groups (from early childhood to early adolescence) (Tackett et al., 2012).

The FFM was easily recognizable as the Big Five even in the youngest age group (3–5 years old), whereas the two-factor model clearly resembled Digman’s (1997) higher-order factors derived from meta-analysis of different measures of the Big Five, based on teacher, peer, and self-reports of children, adolescents, and adults: alpha comprising agreeableness, conscientiousness, and neuroticism (reversed), and beta comprising extraversion and openness—which have subsequently been replicated (e.g., DeYoung, 2006).

Slobodskaya’s (2014) study aimed to examine the hierarchical structure of two child-specific measures of normal personality and common psychopathology, a short version of the Inventory of Child Individual Differences (ICID-S; Deal, Halverson, Martin, Victor, & Baker, 2007) and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001). The sample consisted of a community sample of 1926 subjects aged 2–18 years from Novorsibisk. The authors used parent-report questionnaires, such as the ICID-S and the Strengths and Difficulties Questionnaire (SDQ). The hierarchical framework generally was consistent with the Big Five models found in other studies (Markon et al., 2005; Tackett, 2006; Tackett et al., 2008, 2012; De Pauw, Mervielde, & Van Leeuwen, 2009; Soto & John, 2014). A joint factor analysis of the ICID-S and SDQ suggested that together the two instruments are best modeled by four orthogonal factors termed organization, behavior problems, positive, and internalizing. The four-factor model presented here is highly similar to four-factor models reported in the literature, including conscientiousness, agreeableness, and neuroticism of the Big Five and a broader dimension of positive emotionality comprising extraversion and openness. It is relevant that both child studies and studies of abnormal personality in adults revealed a four-factor structure (De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006; Krueger & Tackett, 2003), possibly because openness develops at later ages and is not related to psychopathology or personality disorders (Caspi & Shiner, 2006; Kotov, Gamez, Schmidt, & Watson, 2010). The trait of openness to experience loaded on the positive factor whereas the trait of intelligence loaded on the organization factor. It is also notable that at the four-factor level all problem scales were involved, with higher loadings on three of the four factors.

A hierarchical model of variation in personality and psychopathology, reflecting the empirical organization of personality and psychopathology, has been developed. This hierarchical model was first delineated by Wright et al. (2012) using data from the structure of the Personality Inventory for DSM-5 (PID-5), which includes 25 primary trait scales. Wright et al. (2012) used Goldberg's (2006) method for estimating the components of a hierarchical factor structure, a series of factor models with an increasing number of factors. The factor scores across levels are then correlated to estimate the paths between levels of the hierarchy. Specifically, Wright et al. (2012) conducted a one-factor exploratory factor analysis, followed by a series of Varimax rotated exploratory factor analyses with two to five factors; regression-based factor scores were estimated for each solution. One to five factors were specified, as five factors represent the upper bound associated with models in consideration leading up to the development of the DSM-5, as well as the maximum number of meaningful factors in the Wright et al. data.

In the resulting hierarchical structure, constructs are arranged in levels of descending order, with broader constructs at the top level and more specific constructs at lower levels. For example, internalizing and externalizing are subcomponents of the broadest construct (i.e., personality psychopathology). The hierarchy can be viewed as the joint structure of personality and psychopathology because the two-, three-, and four-factor levels of the hierarchy closely approximate to existing models of common mental disorders, temperament, and personality pathology, respectively. That is, the two-factor level closely resembles the frequently replicated internalizing and externalizing dimensions of psychopathology (e.g., Kendler, Prescott, Myers, & Neale, 2003; Krueger, 1999); the three-factor level (detachment, negative affect, externalizing) closely resembles the “Big Three” of the temperament literature (e.g., Clark & Watson, 2008; Eysenck, 1994); and the four-factor level (detachment, negative affect, antagonism, disinhibition) closely resembles pathological variants of the “consensus big four” (e.g., Livesley, Jang, & Vernon, 1998; Widiger & Simonsen, 2005).

As a result of these complexities, Wright et al. (2012) proposed a *dynamic multivariate set point model* that accounts for gene–environment interplay, trait malleability, differential emotional sensitivity, and multitrait set points. In the dynamic multivariate model, the set point represents a maladaptive configuration of traits rather than a single trait. Various emotions associated with these dispositions differentially fluctuate around their set point. Over time, numerous biological and environmental factors interact to determine the set point, which, although malleable early in life, gradually grows stable with age. Normothetic data, such as *normative biological changes*, *developmental milestones*, and *cultural proceedings*, generally show traits becoming more mature (i.e., lower negative affect, detachment, antagonism, and disinhibition; Caspi et al., 2005a).

The general factor of personality

A higher-order general factor of personality (GFP) was identified by Musek (2007). A GFP has been extracted from more than 24 different personality inventories, including several sets of the Big Five, the California Psychological Inventory (CPI), the Comrey Personality Scales (CPS), the Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP-BQ), the EAS Temperament Scales (EAS), the Guilford–Zimmerman Temperament Survey (GZTS), the HEXACO Personality Inventory (HEXACO), the Hogan Personality Inventory (HPI), the Jackson Personality Inventory (JPI), the Millon Clinical Multiaxial Inventory–III (MCMI-III), the Minnesota Multiphasic Personality Inventory–2 (MMPI-2), the Multidimensional Personality Questionnaire (MPQ), the Personality Assessment Inventory (PAI), the Personality Research Form (PRF), the Temperament and Character Inventory (TCI), and the Trait Emotional Intelligence Questionnaire (TEIQue).

A GFP emerged regardless of whether the inventory covered the domain of normal personality (the NEO PI, FFI) or the domain of the personality disorders (the DAPP-BQ, MMPI-2, PAI, MCMI-III). A GFP emerged regardless of whether the inventory was based on theoretical criteria (the PRF, PAI) or aimed to be eclectic (the CPI, JPI). It emerged regardless of whether the inventory distinguished between scales of “temperament” and “personality” (the TCI) or between those of “personality disorders,” “social conditions,” and “attitudes toward therapy” (the PAI). A GFP also emerged regardless of whether the inventory used an *empirical* approach to scale construction and selected items based on the frequency of endorsement by criterion groups (the CPI, MMPI), an *inductive* approach and selected items based on their relation to each other (the PAI), or a *rational* approach based on writing items to fit traits defined in advance (the DAPP-BQ). A GFP similarly emerged when the inventory was constructed to minimize the effects of social desirability by selecting neutral items (the JPI, PRF).

Etiological models of personality and psychopathology

Most studies exploring associations between personality and psychopathology frame their findings within a list of theoretical models that describe potential causes of overlap between personality and depressive disorders (Klein, Wonderlich, &

Shea, 1993; Clark & Watson, 1995). The best-known models are the *spectrum*, *precursor*, *predisposition*, *common cause*, *concomitants*, *scar*, and *pathoplasty* models.

De Bolle, Beyers, De Clercq, and De Fruyt (2012) and Tackett (2006) provided a detailed and comprehensive overview of the evidence in support of the proposed etiological models that exist on the trait–psychopathology association in preadulthood. They concluded that various studies empirically underscored each of these models, supporting the idea that these etiological models are not mutually exclusive, and that different models perhaps explain different types of psychopathology (Dolan-Sewell, Krueger, & Shea, 2001). From a more rigorous perspective, De Bolle et al. (2012) showed that the effects of the continuity model predominate the general trait–psychopathology relation in childhood and reported more focused evidence for the pathoplasty and complication models, depending on the particular personality–psychopathology association under consideration. More specifically, they found continuity associations between internalizing and externalizing psychopathology, on the one hand, and each of the personality dimensions, on the other hand. In addition to these continuity associations, they reported complication effects from internalizing problems on emotional instability and conscientiousness, and from externalizing problems on extraversion, benevolence, and conscientiousness. Pathoplasty effects were found on both internalizing and externalizing problem behavior and for extraversion on externalizing problem behavior. These findings highlight the dimensional nature of traits and psychopathology, suggesting that they should be conceptualized as continuous and related constructs.

Given the evidence that supports the similar dimensional nature of personality and psychopathology (Krueger, 2005), it may be interesting to see whether similar etiological relations with constructs of psychopathology exist across the spectrum of general and pathological trait variance. In a study, De Clercq, De Fruyt, and Widiger (2009) illustrated that childhood maladaptive traits and broad dimensions of internalizing and externalizing psychopathology reveal similar longitudinal patterns in terms of shape and change over time in a community-based childhood sample, which served as evidence. In another study, De Clercq, Van Leeuwen, De Fruyt, Van Hiel, and Mervielde (2008) examined the associations between childhood maladaptive traits and psychopathology. They found robust correlations between internalizing problems and emotional instability and introversion and between externalizing problems and disagreeableness, even after controlling for item overlap between the constructs of maladaptive personality and psychopathology. Given the cross-sectional design of this study, however, no conclusions could be drawn on the nature (e.g., continuity association, pathoplasty associations, or complication associations) of these personality–psychopathology associations.

The *spectrum* or *continuity* model conceptualizes traits and disorders as describing the same phenomena. Symptoms lie on the extreme end of the same dimension as the trait; extreme trait levels resemble (and in some cases, overlap with) symptoms. Behaviors, cognitions, and motivations that define the trait and those that are characterized as symptoms are presumed to be caused by individual differences in the same underlying psychological dimension. This view contrasts with Cramer et al.'s (2012) network model of personality, which postulates that some phenomena are more central to particular traits by virtue of their stronger interconnections to other expressions of the trait.

Under the *precursor/prodrome* model, expressions of a trait represent early points along the trajectory toward the disorder; the phenomenology of the trait is a weaker or initial version of the disorder's symptoms. Both the precursor and spectrum model imply that the disorder represents a more severe variant of an underlying phenomenon. However, in the precursor model a person must “pass through” a period of exhibiting extreme trait levels prior to expressing symptoms. One finding consistent with the precursor model is when high trait levels predict more rapid onset of symptoms (Fanous, Neale, Aggen, & Kendler, 2007).

The *common cause* model differs from the previous two models, as it distinguishes disorders from traits. This model postulates that the two constructs do not have any direct causal relationship with each other after accounting for their shared etiology. The common cause model is consistent with evidence for overlapping genetic contributions to negative emotionality (NE) and depression (Kendler, Gatz, Gardner, & Pedersen, 2006) and externalizing disorders and low constraint (CN) (Krueger et al., 2002), although these data are also consistent with many of the other theoretical models, as well.

The *predisposition*, *pathoplasty*, *concomitants*, and *scar* models all suggest causal relationships between distinct traits and disorders. Under the *predisposition* model, individual differences in the trait (which emerge from one set of processes) increase risk for the disorder via a separate set of processes, and trait-relevant processes are only one source among many processes potentially implicated in the disorder. The trait and the disorder need not share any surface phenomenological features (unlike in the spectrum model). Central to this model is the proposition that trait–disorder links are causal; thus, to test it, at minimum a prospective design should be employed, ideally one with study elements that support causal inferences, such as the use of genetically informative designs or experimental manipulations of predisposing processes.

In the *pathoplasty* or *exacerbation* model, the trait influences disorder manifestations (the pattern or severity of symptoms, course, or treatment response). For example, NE predicts poorer course and treatment response among those with depression (Quilty et al., 2008; Tang et al., 2009). However, such evidence alone is hardly conclusive.

Under the *concomitant* or *state* model, associations between traits and disorders are confounds of measurement or temporary artifacts of the impacts of symptoms on trait-relevant behaviors. For example, acute depression is associated with more negative self-perceptions that may bias self-reports of negatively evaluative traits. In fact, within-subjects analyses show that NE is elevated when people are depressed compared to when they are not (e.g., Ormel, Oldehinkel, & Vollebergh, 2004; Kendler, Neale, Kessler, Heath, & Eaves, 1993).

In the *scar/complication* model, the direction of causality is reversed. For example, an existing Axis I disorder is presumed to “complicate” or “scar” an individual’s personality, such as chronic, recurring major depression, or may modify personality at the trait level, such as increased neuroticism or negative emotionality (Krueger & Tackett, 2003).

Two-polarities models of personality development

Influenced by Livesley’s (2008) seminal work and by two-polarities models (Bender, Morey, & Skodol, 2011), the DSM-5 Personality and Personality Disorders work group (Skodol & Bender, 2009) has highlighted the significance of interpersonal relatedness and self-definition in understanding and classifying personality disorders (Skodol & Bender, 2009). According to Skodol (2011), personality disorders are “associated with distorted thinking about self and others and that maladaptive patterns of mentally representing the self and others, serve as substrates for personality pathology” (p. 99).

Maladaptive expressions of *relatedness* and *self-definition* (such as dependency and self-critical perfectionism) can best be conceptualized as transdiagnostic vulnerability factors and may partly explain the high comorbidity among “symptom” and “personality” disorders and the longitudinal relationships among both types of disorders (Blatt & Luyten, 2010; Egan, Wade, & Shafran, 2011; Fig. 9.1).

In contrast to a more static symptom- or disorder-centered approach, two-polarities models suggest that psychopathology reflects attempts to achieve some stability or equilibrium in response to developmental disruptions by becoming preoccupied in exaggerated and distorted ways at different developmental levels of interpersonal relatedness and self-definition (Blatt, 2008; Luyten, Fonagy, Lemma, & Target, 2012). Two-polarities models have helped to exemplify the extensive comorbidity between *internalizing* and *externalizing* disorders in childhood and adolescence (e.g., Krueger, Markon, Patrick, Benning, & Kramer, 2007) and their links to two types of depression (dependent and self-critical) in adolescence. Excessive concern with issues concerning self-definition, in turn, has been associated to the development of externalizing problems (e.g., Leadbeater, Kuperminc, Blatt, & Hertzog, 1999).

Studies based on two-polarities models have also elucidated the intergenerational transmission of vulnerabilities for psychopathology. Attachment research, for example, has found considerable evidence for the role of early attachment

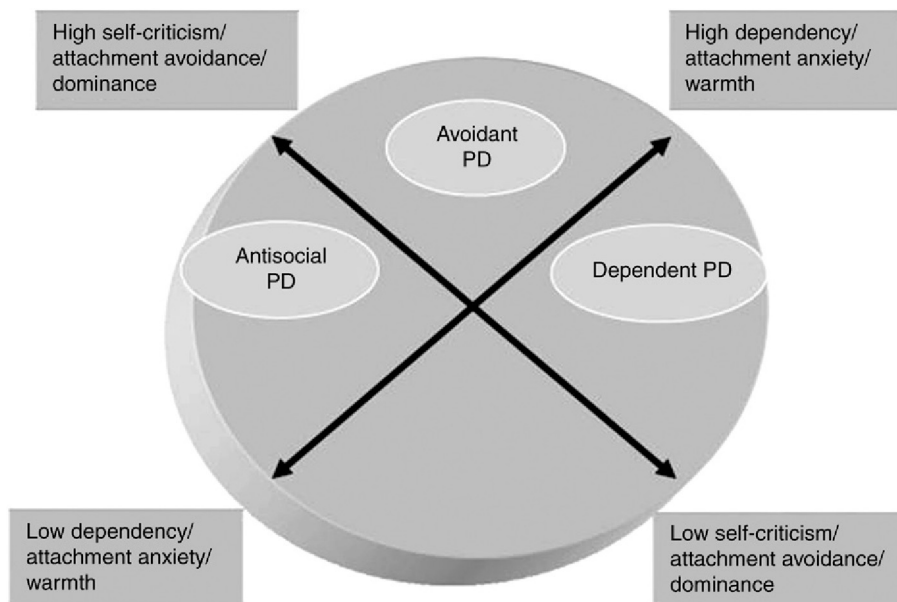


FIGURE 9.1 A prototype approach to personality disorder (PD) based on two-polarities models. This approach is based on the work of Luyten and Blatt (2011), Pincus (2005), Meyer and Pilkonis (2005), and Horowitz et al. (2006). (Reprinted from Luyten, P., & Blatt, S. J. (2013). *Interpersonal relatedness and self-definition in normal and disrupted personality development: retrospect and prospect*. *American Psychologist*, 68(3), 172–183, with permission. Copyright 2013 by American Psychological Association.)

disruptions in explaining vulnerability for psychopathology across the life-span (Cassidy & Shaver, 2008; Gunnar & Quevedo, 2007; Sroufe, Carlson, Levy, & Egeland, 1999). Studies in this context suggest that secure attachment involves a balance between relatedness and self-definition that contributes to the development of mature levels of interpersonal relatedness and positive sense of self and identity (Beebe et al., 2007; Blatt & Luyten, 2009). In contrast, attachment disruptions seem to result in an overemphasis on issues of either relatedness or self-definition, expressed in anxious resistant (or enmeshed/preoccupied) or dismissing avoidant attachment patterns, respectively. These patterns were first identified in research employing the Strange Situation procedure in children (Ainsworth, Blehar, Waters, & Wall, 1978) and were later replicated in adolescents and adults using the Adult Attachment Interview (George et al., 1985) and self-report measures (Mikulincer & Shaver, 2007). Studies demonstrate that two-polarities models facilitate a more detailed analysis of psychological processes involved in the intergenerational transmission of vulnerability for psychopathology from infancy and during the life course. Moreover, these studies imply that relatedness and self-definition are influenced by gender and sociocultural issues.

PERSONALITY AND RESILIENCE

Also known as resiliency, the concept of personality and resilience has been applied across the life-span using a multidisciplinary perspective, and has recently been defined as the “process of effectively negotiating, adapting to, or managing significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and ‘bouncing back’ in the face of adversity” (Windle, 2011, p. 153).

Sometimes researchers describe particular personality traits or personality types as being “resilient personalities”; this name is problematic if it suggests that resilience is a stable characteristic of a person. In other words, the same trait could function to enhance vulnerability in the context of adversity, but in a benign environment or in an intervention context it could function to enhance positive adaptation (Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Ellis & Boyce, 2011).

Children’s personality traits are likely to shape the development of resilience in a number of ways. Dozens of studies now document that children’s temperament and personality traits shape their competence and maladaptation over time (Caspi et al., 2005b; Caspi & Shiner, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Rothbart & Bates, 2006; Zentner & Shiner, 2012). Children with high levels of positive affect engage in less solitary activity and have more positive interactions with peers than do children low on positive affect, as long as the positive emotions are accompanied by adequate self-regulation (Coplan & Bullock, 2012); these behaviors seem to be likely mediators between positive affect and stronger friendships and popularity with peers. Thus, children’s traits may have a direct impact on resilience by directly shaping their capacity for competent functioning in the face of adversity. Children’s traits are likely to have *indirect* effects on eventual competence and resilience as well, because traits shape environmental effects (Caspi & Shiner, 2006; Lengua & Wachs, 2012). First, children’s traits elicit different reactions from the environment and influence others’ reactions, beginning in the first few months of life. For example, there is some limited evidence that more emotionally positive children evoke more support and acceptance from adults, especially parents (Bates, Schermerhorn, & Petersen, 2014).

Children’s early tendencies toward negative emotionality interact with their negative life experiences to predict a negative attributional style for explaining life events (Mezulis, Hyde, & Abramson, 2006). A child lower in negative emotionality may therefore tend to develop a more protective way of interpreting adverse life experiences. Traits shape children’s capacities for coping with daily stress. A meta-analysis explored the relations between personality traits and particular coping styles in youths and adults and found that traits were more strongly related to coping strategies in younger samples than in older ones (Connor-Smith & Flachsbart, 2007). For example, the highly effective coping strategy of problem solving is associated positively with agreeableness, openness to experience, and conscientiousness, and is associated negatively with neuroticism.

Dispositional optimism, the tendency for an individual to expect good things to happen, has been shown to have a strong negative association with many indexes of psychopathology, as well as positive correlations with superior life adjustment and physical health (Alarcon, Bowling, & Khazon, 2013). *High self-esteem*, an explicit or implicit sense of one’s personal worth, is found to contribute to emotional stability and protect against negative emotionality (Buhrmester, Blanton, & Swann, 2011), while also encouraging more adaptive interpersonal behavior. *Mastery*, the extent to which individuals view their lives as under their control, has been shown to positively associate with quality of life, and may be related to successful recovery from illness (Angst et al., 2014). *Altruism*, the tendency to promote others’ well-being without regard for self-interest, is considered a capacity that resilience naturally encourages in people, along with self-actualization—the progressive achievement of one’s potential (Richardson, 2002).

Finally, *sense of humor* can be viewed as one of the important facets of personality resiliency that an individual can draw upon when attempting to deal with high levels of adversity, trauma, or other stressful circumstances.

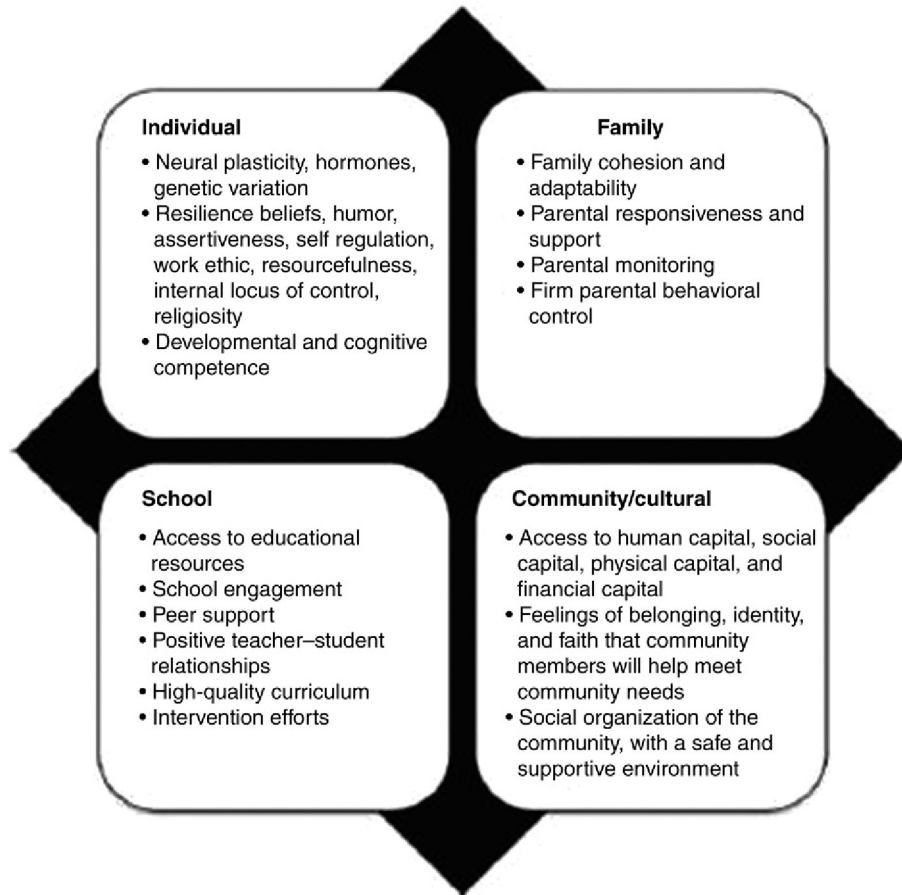


FIGURE 9.2 Key protective factors emerging from a review of international research. (Reprinted from Noltemeyer, A. L., & Bush, K. R. (2013). *Adversity and resilience: a synthesis of international research*. *School Psychology International*, 34(5), 474–487, with permission. Copyright 2013 by Sage Publications.)

An article by [Noltemeyer and Bush \(2013\)](#) defined and described concepts central to resilience, combining important international research findings on protective mechanisms across four ecological levels (i.e., individual, family, school, and community/cultural). [Fig. 9.2](#) captures some of the central themes revealed throughout this analysis. Resilience is also strongly influenced by culture and context ([Theron & Donald, 2013](#); [Ungar, 2008](#)).

There has been increasing interest among mental health professionals in attending to both the strengths and the weaknesses of their clients ([McCrae, 2001](#)). Many studies have been conducted around the world to explore the relationship between positive personal traits and health ([Duan, Ho, Siu, Li, & Zhang, 2015](#); [Wood et al., 2011](#)). The results have revealed that different strengths can be clearly identified, perpetuated, and strengthened through regular application in daily life ([Duan et al., 2012](#); [Duan, Ho, Tang, Li, & Zhang, 2014](#); [Seligman, Ernst, Gillham, Reivich, & Linkins, 2009](#)). A meta-analysis of 51 studies with a total of 4266 individuals also concluded that these positive psychological interventions significantly decreased depressive symptoms and improved happiness ([Sin & Lyubomirsky, 2009](#)). Furthermore, a 10-year cohort study demonstrated that, apart from negative personality traits, the absence of positive factors, such as self-acceptance, autonomy, purpose in life, and positive relations, was an important risk factor to become depressed 10 years later ([Wood & Joseph, 2010](#)). These findings suggest that both the presence of negative factors and the absence of positive ones are important in the conceptualization of psychopathology.

Accordingly, theoretical models and instruments for assessing strengths have been developed, including the Values in Action Inventory of Strengths (VIA-IS; [Peterson & Seligman, 2004](#)) and the Gallup Strengths Framework ([Clifton & Harter, 2003](#)). Positive traits are also included and assessed in several other theories or scales—for example, personality-like traits (stress tolerance, optimism, flexibility, empathy, and social responsibility) in emotional intelligence theory ([Mayer, Salovey, Caruso, & Sitarenios, 2003](#)); personality components (e.g., imagination, generosity, joyfulness, and self-control) in the FFM ([Norman, 1963](#)); and autonomy and self-acceptance in the Psychological Well-Being Scale ([Ryff, 1989](#)).

Measures of resilience

The Connor–Davidson Resilience Scale

The Connor–Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) is a 25-item measure that investigates self-efficacy, optimism, sense of humor, patience, and faith in coping with stress or adversity. Conceived to address the paucity of suitable resilience measures at that time, the CD-RISC explores elements purported to capture the fundamentals of resilience (Jowkar, Friberg, & Hjemdal, 2010). It has been utilized across a diverse range of samples, including the general population, students, patients with generalized anxiety, posttraumatic stress disorder, primary care patients, psychiatric outpatients, and sporting environments (Vaishnavi, Connor, & Davidson, 2007; Connor, 2006; Burns & Anstey, 2010; Gucciardi, Jackson, Coulter, & Mallett, 2011). Applied to children, adult, and elderly cohorts (Campbell-Sills, Cohan, & Stein, 2006; Connor, 2006; Campbell-Sills & Stein, 2007; Connor & Davidson, 2003; Lamond et al., 2008; Gucciardi et al., 2011), three large-scale studies have also been conducted within the adult general population (Lamond et al., 2008; Burns, Anstey, & Windsor, 2011; Burns & Anstey, 2010).

Good reliability has been demonstrated in the CD-RISC in the original study (Connor & Davidson, 2003). Good reliability and validity in adolescent populations have also been evidenced (Yu, Lau, Mak, Zhang, & Lui, 2011). Convergent and discriminant validity have been supported (Campbell-Sills et al., 2006). Further, good internal consistency and test–retest reliability have been established in clinical and community samples (Connor & Davidson, 2003). Though the CD-RISC has shown promise as a measure of resilience in individuals, further study is required (Campbell-Sills et al., 2006; Connor & Davidson, 2003).

The CD-RISC originally consisted of a five-factor structure (Connor & Davidson, 2003). These were internal and external factors that assist effective coping, with another focused on belief systems (Connor & Davidson, 2003; Yu et al., 2011). Reflected within these five factors were the idea of personal competence, high standards, and tenacity; trust in one's instincts, tolerance of negative affect, and strengthening effects of stress; positive acceptance of chance, secure relationships; control; and spirituality (Connor & Davidson, 2003). More recently, however, the CD-RISC has been reported to consist of a unidimensional factor structure, whether in its original 25-item format (Burns & Anstey, 2010; Yu et al., 2011; Burns et al., 2011) or a 10-item format (Campbell-Sills & Stein, 2007). Evidence is limited regarding CD-RISC factorial invariance, where the latent variable is considered equivalent or comparable across groups, and factor loadings are constrained to be equal (Bontempo, Hofer, & Lawrence, 2007).

The Strengths and Difficulties Questionnaire

The Strengths and Difficulties Questionnaire (SDQ) is a brief questionnaire that can be administered to the parents and teachers of 4–16-year-olds and to 11–16-year-olds themselves (Goodman, 1997, 1999; Goodman, Meltzer, & Bailey, 2003). Besides covering common areas of emotional and behavioral difficulties, it also inquires whether the informant thinks that the child has a problem in these areas and, if so, asks about resultant distress and social impairment. Computerized algorithms exist for predicting psychiatric disorders by bringing together information on symptoms and impact from SDQs completed by multiple informants (Goodman, Renfrew, & Mullick, 2000). The algorithm makes separate predictions for three groups of disorders, namely conduct-oppositional disorders, hyperactivity-inattention disorders, and anxiety-depressive disorders. Each is predicted to be unlikely, possible, or probable. Predictions of these three groups of disorders are combined to generate an overall prediction about the presence or absence of any psychiatric disorder.

The SDQ contains 25 items, selected on the basis of both contemporary diagnostic criteria and factor analysis, divided equally among 5 scales such that subscale scores are generated for emotional symptoms, conduct problems, hyperactivity-inattention, peer problems, and prosocial behavior. Ten items are worded to reflect strengths of the child (with 5 being reverse-scored as problems), 14 reflect difficulties, and 1 is neutral but scored as a difficulty on the Peer Problems subscale. The inclusion of positively worded items aims to emphasize desirable traits rather than to focus solely on deficits, thereby increasing the acceptability of the SDQ to parents and other informants (Goodman, 1999). An extended SDQ also exists, which assesses the impact of symptoms on social and educational function, distress, and burden on others (Goodman, 1999).

The SDQ instrument offers several advantages over conceptually similar yet more established measures, such as the Rutter (1967) and Achenbach (1991) questionnaires. These include a more balanced focus on strengths as well as difficulties; better coverage of inattention, peer problems, and prosocial behavior; a shorter, more acceptable format focusing on positive as well as negative child attributes; and a single form for parents and teachers to increase parent–teacher concurrence (Goodman et al., 2003). The SDQ's brevity and its coverage of both strengths and difficulties make it well suited for conducting epidemiological research and for screening low-risk children in the general population, in which the majority of children are healthy.

Numerous studies from diverse countries have yielded favorable results regarding the SDQ's construct validity and clinical utility (Marzocchi et al., 2004; Obel et al., 2004; Woerner et al., 2004). It has been shown to correlate substantially with more established indexes of childhood psychopathology, such as the Rutter (1967) and Achenbach (1991) questionnaires (Goodman, 1997, 1999), to discriminate well between children with and without psychopathology (Goodman, 1997, 2001; Goodman et al., 2003), to be effective in screening for disorders in community samples (Goodman, Ford, Simmons, Gatward, & Meltzer, 2000), and to demonstrate sensitivity as a clinical outcome measure (Mathai, Anderson, & Bourne, 2003).

THE ROLE OF HUMOR IN COPING AND ADAPTATION

In addition to coping effectively with stress, humor could also contribute significantly to the enhancement of positive life experiences and events. Consistent with a resiliency approach, a good sense of humor can enrich one's life—for example, enhanced enjoyment of positive life experiences, greater positive emotions, a more positive self-concept, and better psychological well-being and quality of life (e.g., Peterson, Ruch, Beermann, Park, & Seligman, 2007). Humor use is also considered to be an antecedent-focused cognitive-change strategy that leads to more positive reappraisals of a negative experience or situation, helping the individual to distance him- or herself from the stressor or trauma. Humor can be thought of as one of these positive emotional regulation strategies, as it provides the basis for generating positive affect, either as part of humorous reinterpretation of a traumatic event or as part of the humorous savoring and enjoyment of a positive event (Kuiper, 2012).

Martin, Puhlik-Doris, Larsen, Gray, and Weir (2003) have conceptualized sense of humor as a multifaceted individual difference characteristic involving four main styles, namely *affiliative*, *self-enhancing*, *aggressive*, and *self-defeating*. Both the affiliative and self-enhancing humor styles generally capture the positive or adaptive aspects of sense of humor, whereas the aggressive and self-defeating styles generally generate the negative or maladaptive aspects of this personal characteristic (Kuiper, Kirsh, & Leite, 2010; Martin, 2007). In the humor styles approach, affiliative humor is a warm and benevolent style involving funny, nonhostile jokes and spontaneous witty banter that serves to amuse others, but in a respectful way. Affiliative humor is used to enhance social relationships, reduce conflict, and increase group morale. Lighthearted jokes and funny banter maintain group cohesiveness and decrease interpersonal tensions, thereby facilitating interpersonal relationships in a manner that is accepting and affirming of both self and others.

Self-enhancing humor is also described in the humor styles model as being adaptive, self-accepting, and nondetrimental to others. Self-enhancing humor involves the ability to take and maintain a humorous perspective on life, and is used to deal with personal stress by reducing negative emotional and cognitive responses to adversities.

In contrast to these two adaptive humor styles, the maladaptive humor styles tend to be detrimental to either the self (self-defeating humor) or others (aggressive humor). Individuals with an aggressive humor style employ teasing, sarcasm, ridicule, and disparagement without consideration of the impact on others. Aggressive humor has a strong negative effect on interpersonal relationships, as it is specifically intended to put down and insult others.

These four styles of humor are typically assessed via the Humor Styles Questionnaire (HSQ; Kuiper, Grimshaw, Leite, & Kirsh, 2004; Martin et al., 2003). The HSQ has now been used in a large number of studies to assess sense of humor in both adults and adolescents (Kuiper, 2010; Martin, 2007). This 32-item self-report scale has eight items per humor style, with a sample item for each subscale being as follows: (1) affiliative humor, "I laugh and joke a lot with my close friends"; (2) self-enhancing humor, "Even when I'm by myself, I am often amused by the absurdities of life"; (3) aggressive humor, "If someone makes a mistake, I will often tease them about it"; and, finally, (4) self-defeating humor, "I will often get carried away in putting myself down if it makes my family or friends laugh." Researchers have reported very good psychometric properties for the HSQ, including different forms of reliability and validity. As one example, Martin et al. (2003) found that affiliative humor was related to the tendency to joke with others, and subsequently to constructs, such as extraversion, cheerfulness, and psychological well-being. Conversely, aggressive humor was related to the tendency to criticize and manipulate others, and to constructs, such as hostility and sarcasm. Evidence demonstrates that the four scales of the HSQ are distinct from one another, with intercorrelations being in the low to modest range and subsequent factor-analytic work typically showing the expected four factors. A number of studies now provide evidence for the existence of these four styles across European, North American, Middle Eastern, and Eastern cultures (Kuiper, 2010; Kuiper, Kazarian, Sine, & Bassil, 2010; Martin, 2007).

The four humor styles are differentially associated with relationship satisfaction, which can also have a strong impact on well-being. For example, Campbell, Martin, and Ward (2008) found that individuals whose dating partners used more affiliative and less aggressive humor were more satisfied with this relationship. Moreover, these individuals reported increased perceived closeness with their partners, and better problem-solving resolutions following a discussion of a conflict. Finally,

Cann and Etzel (2008) found that greater use of self-enhancing humor was associated with higher levels of happiness, hope, and optimism, whereas greater use of self-defeating humor was related to low levels of these personal qualities.

SUMMARY

The chapter began by introducing a number of models that attempt to explain the relationship between intelligence and psychopathology or between intelligence and personality. Some of the most salient models are relational frame theory (RFT), the situation construal model, the cognitive affective processing systems, trait activation theory, and the whole trait theory.

The chapter discusses models that attempt to explain the causal relationship between personality stability and change. The FFM and the presentation of other alternative models that follow the principles of the FFM have been designed. Further, the chapter evaluates the relationship between personality and culture.

The transition from normality to psychopathology is examined, and this assumption is supported by a number of hierarchical and etiological models. The chapter concludes with the presentation of resilient strategies that enhance defenses against vulnerability. Measures of resilience are introduced.

REFERENCES

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Achenbach, T. M., Becker, A., Döpfner, M., Heiervang, E., Roessner, V., Steinhausen, H. C., & Rothenberger, A. (2008). Multicultural assessment of child and adolescent psychopathology with ASEBA and SDQ instruments: research findings, applications, and future directions. *Journal of Child Psychology and Psychiatry*, 49(3), 251–275.
- Ahmad, I., & Soenens, B. (2010). Perceived maternal parenting as a mediator of the intergenerational similarity of dependency and self-criticism: a study with Arab Jordanian adolescents and their mothers. *Journal of Family Psychology*, 24(6), 756–765.
- Ainsworth, M., Blehar, M., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Lawrence Erlbaum.
- Alarcon, G. M., Bowling, N. A., & Khazon, S. (2013). Great expectations: a meta-analytic examination of optimism and hope. *Personality and Individual Differences*, 54(7), 821–827.
- Allport, G. W. (1937). *Personality*. New York, NY: Holt.
- Allport, G. W., & Odbert, H. S. (1936). Trait-names: a psycho-lexical study. *Psychological Monographs*, 47(1), 1–171.
- Aluja, A., Cuevas, L., García, L. F., & García, O. (2007a). Zuckerman's personality model predicts MCMI-III personality disorders. *Personality and Individual Differences*, 42(7), 1311–1321.
- Aluja, A., García, L. F., Cuevas, L., & García, O. (2007b). The MCMI-III personality disorders scores predicted by the NEO-FFI-R and the ZKPQ-50-CC: a comparative study. *Journal of Personality Disorders*, 21(1), 58–71.
- Aluja, A., Kuhlman, M., & Zuckerman, M. (2010). Development of the Zuckerman-Kuhlman-Aluja personality questionnaire (ZKA-PQ): a factor/facet version of the Zuckerman-Kuhlman personality questionnaire (ZKPQ). *Journal of Personality Assessment*, 92(5), 416–431.
- Angleitner, A., Riemann, R., & Spinath, F. M. (2004). Investigating the ZKPQ-III-R: psychometric properties, relations to the Five-Factor Model and genetic and environmental influences on its scales and facets. In R. M. Stelmack (Ed.), *On the psychobiology of personality: Essays in honor of Marvin Zuckerman* (pp. 89–105). Ottawa, Canada: Elsevier.
- Angst, J., Hengartner, M. P., Rogers, J., Schnyder, U., Steinhausen, H. C., Ajdacic-Gross, V., & Rössler, W. (2014). Suicidality in the prospective Zurich study: prevalence, risk factors and gender. *European Archives of Psychiatry and Clinical Neuroscience*, 264(7), 557–565.
- Anusic, I., & Schimmack, U. (2015). Stability and change of personality traits, self-esteem, and well-being: introducing the meta-analytic stability and change model of retest correlations. *Journal of Personality and Social Psychology*, 110(5), 766–781.
- Ardelt, M. (2000). Still stable after all these years? Personality stability theory revisited. *Social Psychology Quarterly*, 63(4), 392–405.
- Ashton, M. C., & Lee, K. (2008). The prediction of Honesty-Humility-related criteria by the HEXACO and Five-Factor Models of personality. *Journal of Research in Personality*, 42(5), 1216–1228.
- Austin, E. J., Boyle, G. J., Groth-Marnat, G., Matthews, G., Saklofske, D. H., Schwean, V. L., & Zeidner, M. (2011). Integrating intelligence and personality. In T. M. Harwood, L. E. Beutler, & G. Groth-Marnat (Eds.), *Integrative assessment of adult personality* (pp. 110–151). New York, NY: Guilford Press.
- Bates, J. E., Schermerhorn, A. C., & Petersen, I. T. (2014). Temperament concepts in developmental psychopathology. In M. Lewis, & K. Rudolph (Eds.), *Handbook of developmental psychopathology* (pp. 311–329). New York, NY: Springer.
- Beebe, B., Jaffe, J., Buck, K., Chen, H., Cohen, P., Blatt, S., & Andrews, H. (2007). Six-week postpartum maternal self criticism and dependency and four-month mother-infant self- and interactive contingencies. *Developmental Psychology*, 43(6), 1360–1376.
- Belsky, J., Bakermans-Kranenburg, M. J., & van Ijzendoorn, M. H. (2007). For better and for worse: differential susceptibility to environmental influences. *Current Directions in Psychological Science*, 16(6), 300–304.
- Bender, D. S., Morey, L. C., & Skodol, A. E. (2011). Toward a model for assessing level of personality functioning in DSM-5, part I: a review of theory and methods. *Journal of Personality Assessment*, 93(4), 332–346.
- Benet-Martínez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: multitrait-multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology*, 75(3), 729–750.

- Benet-Martínez, V., & Waller, N. G. (1995). The Big Seven factor model of personality description: evidence for its cross-cultural generality in a Spanish sample. *Journal of Personality and Social Psychology, 69*(4), 701.
- Benet-Martínez, V., & Waller, N. G. (1997). Further evidence for the cross-cultural generality of the Big Seven factor model: indigenous and imported Spanish personality constructs. *Journal of Personality, 65*(3), 567–598.
- Ben-Porath, Y. S., & Waller, N. G. (1992). “Normal” personality inventories in clinical assessment: general requirements and the potential for using the NEO Personality Inventory. *Psychological Assessment, 4*(1), 14.
- Berry, J. W. (1969). On cross-cultural comparability. *International Journal of Psychology, 4*(2), 119–128.
- Berry, J. W. (1989). Imposed etics-emics-derived etics: the operationalization of a compelling idea. *International Journal of Psychology, 24*(6), 721–735.
- Berry, J. W. (2013). Achieving a global psychology. *Canadian Psychology/Psychologie Canadienne, 54*(1), 55.
- Berry, J. W., Poortinga, Y. H., Segall, M. H., & Dasen, P. R. (1992). *Cross-cultural psychology*. Cambridge, MA: Cambridge University Press.
- Biesanz, J. C., West, S. G., & Kwok, O. M. (2003). Personality over time: methodological approaches to the study of short-term and long-term development and change. *Journal of Personality, 71*(6), 905–942.
- Blatt, S. J. (2008). *Polarities of experience: Relatedness and self-definition in personality development, psychopathology, and the therapeutic process*. Washington, DC: American Psychological Association.
- Blatt, S. J., & Luyten, P. (2009). A structural-developmental psychodynamic approach to psychopathology: two polarities of experience across the life span. *Development and Psychopathology, 21*(3), 793–814.
- Blatt, S. J., & Luyten, P. (2010). Reactivating the psychodynamic approach to classify psychopathology. In T. Millon, R. F. Krueger, & E. Simonsen (Eds.), *Contemporary directions in psychopathology: Scientific foundations of the DSM-V and ICD-11* (pp. 483–514). New York, NY: Guilford Press.
- Bleidorn, W., Kandler, C., Riemann, R., Angleitner, A., & Spinath, F. M. (2009). Patterns and sources of adult personality development: growth curve analyses of the NEO PI-R scales in a longitudinal twin study. *Journal of Personality and Social Psychology, 97*(1), 142.
- Block, J. (2010). The five-factor framing of personality and beyond: some ruminations. *Psychological Inquiry, 21*(1), 2–25.
- Blonigen, D. M., Carlson, M. D., Hicks, B. M., Krueger, R. F., & Iacono, W. G. (2008). Stability and change in personality traits from late adolescence to early adulthood: a longitudinal twin study. *Journal of Personality, 76*(2), 229–266.
- Bond, M. H. (1979). Dimensions used in perceiving peers: cross-cultural comparisons of Hong Kong, Japanese, American and Filipino university students. *International Journal of Psychology, 14*(1–4), 47–56.
- Bond, M. H. (2013). Refining Lewin’s formula: a general model for explaining situational influence on individual social behavior. *Asian Journal of Social Psychology, 16*(1), 1–15.
- Bond, M. H., Nakazato, H., & Shiraishi, D. (1975). Universality and distinctiveness in dimensions of Japanese person perception. *Journal of Cross-Cultural Psychology, 6*(3), 346–357.
- Bontempo, D. E., Hofer, S. M., & Lawrence, F. (2007). Assessing factorial invariance in cross-sectional and longitudinal studies. In A. D. Ong, & M. H. M. van Dulmen (Eds.), *Oxford handbook of methods in positive psychology* (pp. 153–175). New York, NY: Oxford University Press.
- Borgatta, E. F. (1964). The structure of personality characteristics. *Behavioral Science, 9*(1), 8–17.
- Bornstein, R. F. (2005). The dependent patient: diagnosis, assessment, and treatment. *Professional Psychology: Research and Practice, 36*(1), 82.
- Boyd, R. L., Bresin, K., Ode, S., & Robinson, M. D. (2013). Cognitive egocentrism differentiates warm and cold people. *Journal of Research in Personality, 47*(1), 90–96.
- Branje, S. J., Van Lieshout, C. F., & Gerris, J. R. (2007). Big Five personality development in adolescence and adulthood. *European Journal of Personality, 21*(1), 45–62.
- Briley, D. A., & Tucker-Drob, E. M. (2014). Genetic and environmental continuity in personality development: a meta-analysis. *Psychological Bulletin, 140*(5), 1303–1331.
- Bringmann, L. F., Lemmens, L. H., Huibers, M. J., Borsboom, D., & Tuerlinckx, F. (2015). Revealing the dynamic network structure of the Beck Depression Inventory-II. *Psychological Medicine, 45*(04), 747–757.
- Brown, R. H., Cruikshank, D. P., Pendleton, Y., & Veeder, G. J. (1997). Surface composition of Kuiper belt object 1993SC. *Science, 276*(5314), 937–939.
- Buhrmester, M. D., Blanton, H., & Swann, W. B., Jr. (2011). Implicit self-esteem: nature, measurement, and a new way forward. *Journal of Personality and Social Psychology, 100*(2), 365–385.
- Burns, R. A., & Anstey, K. J. (2010). The Connor-Davidson resilience scale (CD-RISC): testing the invariance of a uni-dimensional resilience measure that is independent of positive and negative affect. *Personality and Individual Differences, 48*(5), 527–531.
- Burns, R. A., Anstey, K. J., & Windsor, T. D. (2011). Subjective well-being mediates the effects of resilience and mastery on depression and anxiety in a large community sample of young and middle-aged adults. *Australian and New Zealand Journal of Psychiatry, 45*, 240–248.
- Buss, D. M. (1996). Paternity uncertainty and the complex repertoire of human mating strategies. *American Psychologist, 51*(2), 161–162.
- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*(2), 81–105.
- Campbell, L., Martin, R. A., & Ward, J. R. (2008). An observational study of humor use while resolving conflict in dating couples. *Personal Relationships, 15*(1), 41–55.
- Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behaviour Research and Therapy, 44*, 585–599.
- Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor-Davidson resilience scale (CD-RISC): validation of a 10-item measure of resilience. *Journal of Traumatic Stress, 20*(6), 1019–1028.
- Canino, G., & Alegria, M. (2008). Psychiatric diagnosis—is it universal or relative to culture? *Journal of Child Psychology and Psychiatry, 49*(3), 237–250.

- Cann, A., & Etzel, K. C. (2008). Remembering and anticipating stressors: positive personality mediates the relationship with sense of humor. *Humor—International Journal of Humor Research*, 21(2), 157–178.
- Cantor, N. (1990). From thought to behavior: “having” and “doing” in the study of personality and cognition. *American Psychologist*, 45(6), 735–750.
- Caspi, A., Harrington, H., Milne, B., Amell, J. W., Theodore, R. F., & Moffitt, T. E. (2003). Children’s behavioral styles at age 3 are linked to their adult personality traits at age 26. *Journal of Personality*, 71(4), 495–514.
- Caspi, A., Moffitt, T. E., Cannon, M., McClay, J., Murray, R., Harrington, H., & Poulton, R. (2005a). Moderation of the effect of adolescent-onset cannabis use on adult psychosis by a functional polymorphism in the catechol-O-methyltransferase gene: longitudinal evidence of a gene X environment interaction. *Biological Psychiatry*, 57(10), 1117–1127.
- Caspi, A., Roberts, B. W., & Shiner, R. L. (2005b). Personality development: stability and change. *Annual Review of Psychology*, 56, 453–484.
- Caspi, A., & Shiner, R. L. (2006). Personality development. In R. M. Lerner, & W. Damon (Eds.), *Handbook of child psychology*. Hoboken, NJ: Wiley Online Library.
- Cassidy, J., & Shaver, P. (Eds.). (2008). *Handbook of attachment: Theory, research, and clinical applications* (2nd ed.). New York, NY: Guilford Press.
- Cattell, R. B. (1943). The description of personality: basic traits resolved into clusters. *Journal of Abnormal and Social Psychology*, 38(4), 476–506.
- Cattell, R. B. (1946). *Description and measurement of personality*. Oxford, England: World Book Company.
- Cattell, R. B. (1963). Theory of fluid and crystallized intelligence: a critical experiment. *Journal of Educational Psychology*, 54(1), 1–22.
- Chang, E. C., & Asakawa, K. (2003). Cultural variations on optimistic and pessimistic bias for self versus a sibling: is there evidence for self-enhancement in the West and for self-criticism in the East when the referent group is specified? *Journal of Personality and Social Psychology*, 84(3), 569–581.
- Cheung, F. M. (2004). Use of Western and indigenously developed personality tests in Asia. *Applied Psychology: An International Review*, 53, 173–191.
- Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., & Leong, F. (2003a). The English version of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology*, 34(4), 433–452.
- Cheung, F. M., Cheung, S. F., Wada, S., & Zhang, J. X. (2003b). Indigenous measures of personality assessment in Asian countries: a review. *Psychological Assessment*, 15, 280–289.
- Cheung, F. M., Leung, K., Fan, R. M., Song, W. Z., Zhang, J. X., & Zhang, J. P. (1996). Development of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology*, 27(2), 181–199.
- Cheung, F. M., van de Vijver, F. J., & Leong, F. T. (2011). Toward a new approach to the study of personality in culture. *American Psychologist*, 66(7), 593–603.
- Chmielewski, M., Bagby, R. M., Markon, K., Ring, A. J., & Ryder, A. G. (2014). Openness to experience, intellect, schizotypal personality disorder, and psychoticism: resolving the controversy. *Journal of Personality Disorders*, 28(4), 483.
- Chmielewski, M., & Watson, D. (2009). What is being assessed and why it matters: the impact of transient error on trait research. *Journal of Personality and Social Psychology*, 97(1), 186–202.
- Church, A. T. (2001). Personality measurement in cross-cultural perspective. *Journal of Personality*, 69, 979–1006.
- Church, A. T. (2009). Prospects for an integrated trait and cultural psychology. *European Journal of Personality*, 23, 153–182.
- Church, A. T. (2010). Current perspectives in the study of personality across cultures. *Perspectives on Psychological Science*, 5(4), 441–449.
- Church, A. T., Katigbak, M. S., & Reyes, J. A. S. (1996). Toward a taxonomy of trait adjectives in Filipino: comparing personality lexicons across cultures. *European Journal of Personality*, 10, 3–24.
- Church, A. T., Reyes, J. A. S., Katigbak, M. S., & Grimm, S. D. (1997). Filipino personality structure and the Big Five model: a lexical approach. *Journal of Personality*, 65(3), 477–528.
- Claridge, G. (2009). Personality and psychosis. In R. Hogan, J. Johnson, & S. Briggs (Eds.), *Handbook of personality*. Cambridge, England: Cambridge University Press.
- Clark, L. A. (2005). Temperament as a unifying basis for personality and psychopathology. *Journal of Abnormal Psychology*, 114(4), 505.
- Clark, L. A., & Watson, D. (1995). Constructing validity: basic issues in objective scale development. *Psychological Assessment*, 7(3), 309.
- Clark, L. A., & Watson, D. (2008). Temperament: an organizing paradigm for trait psychology. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 265–286). New York, NY: Guilford Press.
- Clifton, D. O., & Harter, J. K. (2003). Investing in strengths. In A. K. S. Cameron, B. J. E. Dutton, & C. R. E. Quinn (Eds.), *Positive organizational scholarship: Foundations of a new discipline* (pp. 111–121). San Francisco, CA: Berrett-Koehler.
- Cohen, A. B., & Hill, P. C. (2007). Religion as culture: religious individualism and collectivism among American Catholics, Jews, and Protestants. *Journal of Personality*, 75(4), 709–742.
- Coker, L. A., Samuel, D. B., & Widiger, T. A. (2002). Maladaptive personality functioning within the Big Five and the Five-Factor Model. *Journal of Personality Disorders*, 16(5), 385–401.
- Conley, J. J. (1984). The hierarchy of consistency: a review and model of longitudinal findings on adult individual differences in intelligence, personality and self-opinion. *Personality and Individual Differences*, 5(1), 11–25.
- Connor, K. M. (2006). Assessment of resilience in the aftermath of trauma. *Journal of Clinical Psychiatry*, 67(2), 46–49.
- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: the Connor-Davidson resilience scale (CD-RISC). *Depression and Anxiety*, 18(2), 76–82.
- Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: a meta-analysis. *Journal of Personality and Social Psychology*, 93(6), 1080–1107.
- Coplan, R. J., & Bullock, A. (2012). Temperament and peer relationships. In R. L. Shiner, & M. Zentner (Eds.), *Handbook of temperament* (pp. 442–461). New York, NY: Guilford Press.

- Costa, P. T., Jr., & McCrae, R. R. (1988). From catalog to classification: Murray's needs and the five-factor model. *Journal of Personality and Social Psychology*, 55(2), 258–265.
- Costa, P. T., Jr., & McCrae, R. R. (1990). Personality disorders and the five-factor model of personality. *Journal of Personality Disorders*, 4(4), 362–371.
- Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr., & McCrae, R. R. (1995). Domains and facets: hierarchical personality assessment using the Revised NEO Personality Inventory. *Journal of Personality Assessment*, 64(1), 21–50.
- Costa, P. T., Jr., & McCrae, R. R. (1997). Longitudinal stability of adult personality. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 269–290). San Diego, CA: Academic Press.
- Costantini, G., Epskamp, S., Borsboom, D., Perugini, M., Mõttus, R., Waldorp, L. J., & Cramer, A. O. (2015). State of the aRt personality research: a tutorial on network analysis of personality data in R. *Journal of Research in Personality*, 54, 13–29.
- Cramer, A. O. J., van der Sluis, S., Noordhof, A., Wichers, M., Geschwind, N., Aggen, S. H., & Borsboom, D. (2012). Dimensions of normal personality as networks in search of equilibrium: you can't like parties if you don't like people. *European Journal of Personality*, 26(4), 414–431.
- Crijnen, A. A., Achenbach, T. M., & Verhulst, F. C. (1997). Comparisons of problems reported by parents of children in 12 cultures: total problems, externalizing, and internalizing. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36(9), 1269–1277.
- Cumming, G. (2013). The new statistics why and how. *Psychological Science*, 25(1), 7–29.
- De Bolle, M., Beyers, W., De Clercq, B., & De Fruyt, F. (2012). General personality and psychopathology in referred and nonreferred children and adolescents: an investigation of continuity, pathoplasty, and complication models. *Journal of Abnormal Psychology*, 121(4), 958–970.
- De Clercq, B., De Fruyt, F., Van Leeuwen, K., & Mervielde, I. (2006). The structure of maladaptive personality traits in childhood: a step toward an integrative developmental perspective for DSM-V. *Journal of Abnormal Psychology*, 115(4), 639–657.
- De Clercq, B., De Fruyt, F., & Widiger, T. A. (2009). Integrating a developmental perspective in dimensional models of personality disorders. *Clinical Psychology Review*, 29(2), 154–162.
- De Clercq, B., Van Leeuwen, K., De Fruyt, F., Van Hiel, A., & Mervielde, I. (2008). Maladaptive personality traits and psychopathology in childhood and adolescence: the moderating effect of parenting. *Journal of Personality*, 76(2), 357–383.
- De Fruyt, F., Bartels, M., Van Leeuwen, K. G., De Clercq, B., Decuyper, M., & Mervielde, I. (2006a). Five types of personality continuity in childhood and adolescence. *Journal of Personality and Social Psychology*, 91(3), 538–552.
- De Fruyt, F., Van Leeuwen, K., Bagby, R. M., Rolland, J. P., & Rouillon, F. (2006b). Assessing and interpreting personality change and continuity in patients treated for major depression. *Psychological Assessment*, 18(1), 71.
- De Pauw, S. S. W., & Mervielde, I. (2010). Temperament, personality and developmental psychopathology: a review based on the conceptual dimensions underlying childhood traits. *Child Psychiatry and Human Development*, 41, 313–329.
- De Pauw, S. S., Mervielde, I., & Van Leeuwen, K. G. (2009). How are traits related to problem behavior in preschoolers? Similarities and contrasts between temperament and personality. *Journal of Abnormal Child Psychology*, 37(3), 309–325.
- Deal, J. E., Halverson, C. F., Jr., Martin, R. P., Victor, J., & Baker, S. (2007). The Inventory of Children's Individual Differences: development and validation of a short version. *Journal of Personality Assessment*, 89(2), 162–166.
- Dempster, F. N., & Corkill, A. J. (1999). Interference and inhibition in cognition and behavior: unifying themes for educational psychology. *Educational Psychology Review*, 11(1), 1–88.
- Denissen, J. J., Aken, M. A., Penke, L., & Wood, D. (2013). Self-regulation underlies temperament and personality: an integrative developmental framework. *Child Development Perspectives*, 7(4), 255–260.
- DeYoung, C. G. (2006). Higher-order factors of the Big Five in a multi-informant sample. *Journal of Personality and Social Psychology*, 91(6), 1138–1151.
- DeYoung, C. G. (2010). Toward a theory of the Big Five. *Psychological Inquiry*, 21(1), 26–33.
- DeYoung, C. G. (2015). Cybernetic Big Five theory. *Journal of Research in Personality*, 56, 33–58.
- DeYoung, C. G., Grazioplene, R. G., & Peterson, J. B. (2012). From madness to genius: the openness/intellect trait domain as a paradoxical simplex. *Journal of Research in Personality*, 46(1), 63–78.
- DeYoung, C. G., Quilty, L. C., & Peterson, J. B. (2007). Between facets and domains: 10 aspects of the Big Five. *Journal of Personality and Social Psychology*, 93(5), 880–896.
- DeYoung, C. G., Weisberg, Y. J., Quilty, L. C., & Peterson, J. B. (2013). Unifying the aspects of the Big Five, the interpersonal circumplex, and trait affiliation. *Journal of Personality*, 81(5), 465–475.
- DiBartolo, P. M., & Rendón, M. J. (2012). A critical examination of the construct of perfectionism and its relationship to mental health in Asian and African Americans using a cross-cultural framework. *Clinical Psychology Review*, 32(3), 139–152.
- Digman, J. M. (1990). Personality structure: emergence of the five-factor model. *Annual Review of Psychology*, 41(1), 417–440.
- Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology*, 73(6), 1246.
- Digman, J. M., & Takemoto-Chock, N. K. (1981). Factors in the natural language of personality: re-analysis, comparison, and interpretation of six major studies. *Multivariate Behavioral Research*, 16(2), 149–170.
- Dolan-Sewell, R. T., Krueger, R. F., & Shea, M. T. (2001). Co-occurrence with syndrome disorders. In W. J. Livesley (Ed.), *Handbook of personality disorders: Theory, research, and treatment* (pp. 84–104). New York, NY: Guilford Press.
- Donnellan, M. B., Conger, R. D., & Burzette, R. G. (2007). Personality development from late adolescence to young adulthood: differential stability, normative maturity, and evidence for the maturity-stability hypothesis. *Journal of Personality*, 75(2), 237–264.
- Duan, W., Bai, Y., Tang, X. Q., Siu, P. Y., Chan, R. K. H., & Ho, S. M. (2012). Virtues and positive mental health. *Mental Health*, 38(2), 1–8.
- Duan, W., Ho, S. M., Siu, B. P., Li, T., & Zhang, Y. (2015). Role of virtues and perceived life stress in affecting psychological symptoms among Chinese college students. *Journal of American College Health*, 63(1), 32–39.

- Duan, W., Ho, S. M., Tang, X., Li, T., & Zhang, Y. (2014). Character strength-based intervention to promote satisfaction with life in the Chinese university context. *Journal of Happiness Studies, 15*(6), 1347–1361.
- Ebner-Priemer, U. W., & Trull, T. (2011). Measuring temporal (in) stability and variability. In M. R. Matthias, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 423–439). New York, NY: Guilford Press.
- Egan, J. (2008, September 12). The bipolar puzzle—what does it mean to be a manic-depressive child? *New York Times Magazine*.
- Egan, S., Wade, T., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: a clinical review. *Clinical Psychology Review, 31*(2), 203–212.
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry, 47*(3–4), 313–337.
- Eibach, R. P., Mock, S. E., & Courtney, E. A. (2010). Having a “senior moment”: induced aging phenomenology, subjective age, and susceptibility to ageist stereotypes. *Journal of Experimental Social Psychology, 46*(4), 643–649.
- Ellis, B. J., & Boyce, W. T. (2011). Differential susceptibility to the environment: toward an understanding of sensitivity to developmental experiences and context. *Development and Psychopathology, 23*(01), 1–5.
- Ellis, B. J., Simpson, J. A., & Campbell, L. (2002). Trait-specific dependence in romantic relationships. *Journal of Personality, 70*(5), 611–660.
- Epstein, S. (2001). *CTI: Constructive thinking inventory*. Lutz, FL: Psychological Assessment Resources.
- Epstein, S. (2003). Cognitive-experiential self-theory of personality. In T. Millon, & M. J. Lerner (Eds.), *Handbook of psychology: Personality and social psychology* (pp. 159–184). Hoboken, NJ: Wiley.
- Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive-experiential and analytical-rational thinking styles. *Journal of Personality and Social Psychology, 71*(2), 390–405.
- Eysenck, H. J. (1947). Student selection by means of psychological tests—a critical survey. *British Journal of Educational Psychology, 17*(1), 20–39.
- Eysenck, H. J. (1987). The definition of personality disorders and the criteria appropriate for their description. *Journal of Personality Disorders, 1*(3), 211.
- Eysenck, H. J. (1992). Four ways five factors are not basic. *Personality and Individual Differences, 13*(6), 667–673.
- Eysenck, H. J. (1994). Normality-abnormality and the three-factor model of personality. In S. Strack, & M. Lorr (Eds.), *Differentiating normal and abnormal personality* (pp. 3–25). New York, NY: Springer.
- Eysenck, S. B., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*(1), 21–29.
- Fanous, A. H., Neale, M. C., Aggen, S. H., & Kendler, K. S. (2007). A longitudinal study of personality and major depression in a population-based sample of male twins. *Psychological Medicine, 37*(08), 1163–1172.
- Fergusson, C. J. (2010). Genetic contributions to antisocial personality and behavior: a meta-analytic review from an evolutionary perspective. *Journal of Social Psychology, 150*(2), 160–180.
- Fetterman, A. K., & Robinson, M. D. (2011). Routine cognitive errors: a trait-like predictor of individual differences in anxiety and distress. *Cognition and Emotion, 25*(2), 244–264.
- Fetterman, A. K., Robinson, M. D., & Gilbertson, E. P. (2014). Implicit self-importance in an interpersonal pronoun categorization task. *Current Psychology, 33*(2), 185–198.
- Fetterman, A. K., Robinson, M. D., & Ode, S. (2015). Interpersonal arrogance and the incentive salience of power versus affiliation cues. *European Journal of Personality, 29*(1), 28–41.
- Fiske, D. W. (1949). Consistency of the factorial structures of personality ratings from different sources. *Journal of Abnormal and Social Psychology, 44*(3), 329–344.
- Fleeson, W. (2007). Situation-based contingencies underlying trait-content manifestation in behavior. *Journal of Personality, 75*(4), 825–862.
- Fleeson, W. (2012). Perspectives on the person: rapid growth and opportunities for integration. In K. Deaux, & M. Snyder (Eds.), *The Oxford handbook of personality and social psychology* (pp. 33–63). New York, NY: Oxford University Press.
- Fleeson, W., & Jayawickreme, E. (2015). Whole trait theory. *Journal of Research in Personality, 56*, 82–92.
- Fournier, M. A., Moskowitz, D. S., & Zuroff, D. C. (2008). Integrating dispositions, signatures, and the interpersonal domain. *Journal of Personality and Social Psychology, 94*(3), 531–545.
- Funder, D. C. (2006). Towards a resolution of the personality triad: persons, situations, and behaviors. *Journal of Research in Personality, 40*(1), 21–34.
- Funder, D. C., Guillaume, E., Kumagai, S., Kawamoto, S., & Sato, T. (2012). The person-situation debate and the assessment of situations. *Japanese Journal of Personality, 21*, 1–11.
- Galambos, N. L., Turner, P. K., & Tilton-Weaver, L. C. (2005). Chronological and subjective age in emerging adulthood: the crossover effect. *Journal of Adolescent Research, 20*(5), 538–556.
- Galton, F. (1884). Measurement of character. *Fortnightly Review, 36*, 179–185.
- George, C., Kaplan, N., & Main, M. (1985). *Adult Attachment Interview protocol*. Berkeley, CA: University of California.
- Gergen, K. J. (1985). Social constructionist inquiry: context and implications. In K. J. Gergen, & K. E. Davis (Eds.), *The social construction of the person* (pp. 3–18). New York, NY: Springer.
- Cheung, F. M. (2012). Mainstreaming culture in psychology. *American Psychologist, 67*(8), 721.
- Goldberg, L. R. (1990). An alternative “description of personality”: the Big-Five factor structure. *Journal of Personality and Social Psychology, 59*(6), 1216–1229.
- Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48*(1), 26–34.
- Goldberg, L. R. (2006). Doing it all bass-ackwards: the development of hierarchical factor structures from the top down. *Journal of Research in Personality, 40*(4), 347–358.
- Gomà-i-Freixanet, M., Wismeijer, A. A., & Valero, S. (2005). Consensual validity parameters of the Zuckerman-Kuhlman personality questionnaire: evidence from self-reports and spouse reports. *Journal of Personality Assessment, 84*(3), 279–286.

- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of Child Psychology and Psychiatry*, 38(5), 581–586.
- Goodman, R. (1999). The extended version of the Strengths and Difficulties Questionnaire as a guide to child psychiatric caseness and consequent burden. *Journal of Child Psychology and Psychiatry*, 40(05), 791–799.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(11), 1337–1345.
- Goodman, R., Ford, T., Simmons, H., Gatward, R., & Meltzer, H. (2000a). Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *British Journal of Psychiatry*, 177(6), 534–539.
- Goodman, R., Meltzer, H., & Bailey, V. (2003). The Strengths and Difficulties Questionnaire: a pilot study on the validity of the self-report version. *International Review of Psychiatry*, 15(1–2), 173–177.
- Goodman, R., Renfrew, D., & Mullick, M. (2000b). Predicting type of psychiatric disorder from Strengths and Difficulties Questionnaire (SDQ) scores in child mental health clinics in London and Dhaka. *European Child & Adolescent Psychiatry*, 9(2), 129–134.
- Grove, W. M., & Tellegen, A. (1991). Problems in the classification of personality disorders. *Journal of Personality Disorders*, 5(1), 31–41.
- Gucciardi, D. F., Jackson, B., Coulter, T. J., & Mallett, C. J. (2011). The Connor-Davidson resilience scale (CD-RISC): dimensionality and age-related measurement invariance with Australian cricketers. *Psychology of Sport and Exercise*, 12(4), 423–433.
- Gunnar, M., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology*, 58, 145–173.
- Gutierrez-Zotes, J. A., Bayon, C., Montserrat, C., Valero, J., Labad, A., Cloninger, C. R., & Fernandez-Aranda, F. (2004). Temperament and Character Inventory-Revised (TCI-R). Standardization and normative data in a general population sample. *Actas Españolas de Psiquiatría*, 32(1), 8–15.
- Halverson, C. F., Havill, V. L., Deal, J., Baker, S. R., Victor, J. B., Pavlopoulos, V., & Wen, L. (2003). Personality structure as derived from parental ratings of free descriptions of children: the Inventory of Child Individual Differences. *Journal of Personality*, 71(6), 995–1026.
- Hamamura, T., Heine, S. J., & Paulhus, D. L. (2008). Cultural differences in response styles: the role of dialectical thinking. *Personality and Individual Differences*, 44(4), 932–942.
- Hampson, S. E. (2008). Mechanisms by which childhood personality traits influence adult well-being. *Current Directions in Psychological Science*, 17(4), 264–268.
- Harden, K. P., & Tucker-Drob, E. M. (2011). Individual differences in the development of sensation seeking and impulsivity during adolescence: further evidence for a dual systems model. *Developmental Psychology*, 47(3), 739–746.
- Harzing, A. (2006). Response styles in cross-national survey research: a 26-country study. *International Journal of Cross Cultural Management*, 6, 243–266.
- Heine, S. J., & Buchtel, E. E. (2009). Personality: the universal and the culturally specific. *Annual Review of Psychology*, 60, 369–394.
- Heine, S. J., Buchtel, E. E., & Norenzayan, A. (2008). What do cross-national comparisons of personality traits tell us? The case of conscientiousness. *Psychological Science*, 19(4), 309–313.
- Heine, S. J., Lehman, D. R., Peng, K., & Greenholtz, J. (2002). What's wrong with cross-cultural comparisons of subjective Likert scales? The reference-group effect. *Journal of Personality and Social Psychology*, 82(6), 903–918.
- Heise, D. R. (1969). Separating reliability and stability in test-retest correlation. *American Sociological Review*, 34(1), 93–101.
- Helfrich, H. (1993). Methodologie kulturvergleichender psychologischer Forschung. In *Kulturvergleichende Psychologie* (pp. 81–102). Göttingen, Germany: Hogrefe.
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., & Henrich, N. S. (2005). “Economic man” in cross-cultural perspective: behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, 28(06), 795–815.
- Hicks, B. M., Johnson, W., Durbin, C. E., Blonigen, D. M., Iacono, W. G., & McGue, M. (2013). Gene-environment correlation in the development of adolescent substance abuse: selection effects of child personality and mediation via contextual risk factors. *Development and Psychopathology*, 25(01), 119–132.
- Hirsh, J. B., DeYoung, C. G., Xu, X., & Peterson, J. B. (2010). Compassionate liberals and polite conservatives: associations of agreeableness with political ideology and moral values. *Personality and Social Psychology Bulletin*, 36(5), 655–664.
- Ho, D. Y. F. (1996). Filial piety and its psychological consequences. In M. H. Bond (Ed.), *Handbook of Chinese psychology* (pp. 155–165). Hong Kong, China: Oxford University Press.
- Horowitz, L. M., Wilson, K. R., Turan, B., Zolotsev, P., Constantino, M. J., & Henderson, L. (2006). How interpersonal motives clarify the meaning of interpersonal behavior: a revised Circumplex model. *Personality and Social Psychology Review*, 10(1), 67–86.
- Hogan, R. (1996). A socioanalytic perspective. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 188–207). New York, NY: Guilford Press.
- Hogan, J., & Roberts, B. W. (1996). Issues and non-issues in the fidelity-bandwidth trade-off. *Journal of Organizational Behavior*, 17(6), 627–637.
- Hopwood, C. J., Malone, J. C., Ansell, E. B., Sanislow, C. A., Grilo, C. M., McGlashan, T. H., & Gunderson, J. G. (2011). Personality assessment in DSM-5: empirical support for rating severity, style, and traits. *Journal of Personality Disorders*, 25(3), 305–320.
- Hox, J., & Maas, C. (2004). Multilevel structural equation models: the limited information approach and the multivariate multilevel approach. In K. van Montfort, J. Oud, & A. Satorra (Eds.), *Recent developments on structural equation models* (pp. 135–149). Dordrecht, The Netherlands: Springer.
- Hudson, N. W., & Fraley, R. C. (2015). Volitional personality trait change: can people choose to change their personality traits? *Journal of Personality and Social Psychology*, 109(3), 490.
- Hudson, N. W., Roberts, B. W., & Lodi-Smith, J. (2012). Personality trait development and social investment in work. *Journal of Research in Personality*, 46(3), 334–344.
- Hughes, S., & Barnes-Holmes, D. (2016). Relational frame theory: implications for the study of human language and cognition. In S. Hayes, D. Barnes-Holmes, R. Zettle, & T. Biglan (Eds.), *Handbook of contextual behavioral science*. New York, NY: Wiley-Blackwell.

- Im, J. S., Choi, S. H., Hong, D., Seo, H. J., Park, S., & Hong, J. P. (2011). Proximal risk factors and suicide methods among suicide completers from national suicide mortality data 2004–2006 in Korea. *Comprehensive Psychiatry*, *52*(3), 231–237.
- Jackson, J. J., Bogg, T., Walton, K. E., Wood, D., Harms, P. D., Lodi-Smith, J., & Roberts, B. W. (2009). Not all conscientiousness scales change alike: a multimethod, multisample study of age differences in the facets of conscientiousness. *Journal of Personality and Social Psychology*, *96*(2), 446–459.
- Jackson, J. J., Hill, P. L., Payne, B. R., Roberts, B. W., & Stine-Morrow, E. A. (2012). Can an old dog learn (and want to experience) new tricks? Cognitive training increases openness to experience in older adults. *Psychology and Aging*, *27*(2), 286.
- James, P. A., Oparil, S., Carter, B. L., Cushman, W. C., Dennison-Himmelfarb, C., Handler, J., & Smith, S. C. (2014). 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA*, *311*(5), 507–520.
- Jang, K. L., McCrae, R. R., Angleitner, A., Riemann, R., & Livesley, W. J. (1998). Heritability of facet-level traits in a cross-cultural twin sample: support for a hierarchical model of personality. *Journal of Personality and Social Psychology*, *74*(6), 1556.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). (Vol. 3). New York, NY: Guilford Press.
- John, O. P., & Robins, R. W. (1998). Recent trends in Big Five research: development, predictive validity, and personality types. In J. Bermudez, B. de Raad, A. M. Perez, A. Sanchez-Elvira, & G. Van Heck (Eds.), *Recent developments in personality psychology in Europe* (pp. 6–16). Tilburg, The Netherlands: Tilburg University Press.
- Josefsson, K., Jokela, M., Cloninger, C. R., Hintsanen, M., Salo, J., Hints, T., & Keltikangas-Järvinen, L. (2013). Maturity and change in personality: developmental trends of temperament and character in adulthood. *Development and Psychopathology*, *25*(03), 713–727.
- Jowkar, B., Friberg, O., & Hjemdal, O. (2010). Cross-cultural validation of the Resilience Scale for Adults (RSA) in Iran. *Scandinavian Journal of Psychology*, *51*(5), 418–425.
- Kagitcibasi, C. (2005). Autonomy and relatedness in cultural context implications for self and family. *Journal of Cross-Cultural Psychology*, *36*(4), 403–422.
- Kandler, C., Riemann, R., Spinath, F. M., & Angleitner, A. (2010). Sources of variance in personality facets: a multiple-rater twin study of self-peer, peer-peer, and self-self (dis)agreement. *Journal of Personality*, *78*(5), 1565–1594.
- Kandler, C., Zimmermann, J., & McAdams, D. P. (2014). Core and surface characteristics for the description and theory of personality differences and development. *European Journal of Personality*, *28*(3), 231–243.
- Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., & Steger, M. F. (2009). The Curiosity and Exploration Inventory-II: development, factor structure, and psychometrics. *Journal of Research in Personality*, *43*(6), 987–998.
- Kelly, G. A. (1963). *A theory of personality: The psychology of personal constructs*. Oxford, England: Norton.
- Kendler, K. S., Gatz, M., Gardner, C. O., & Pedersen, N. L. (2006). Personality and major depression: a Swedish longitudinal, population-based twin study. *Archives of General Psychiatry*, *63*(10), 1113–1120.
- Kendler, K. S., Neale, M. C., Kessler, R. C., Heath, A. C., & Eaves, L. J. (1993). A longitudinal twin study of personality and major depression in women. *Archives of General Psychiatry*, *50*(11), 853–862.
- Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003). The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of General Psychiatry*, *60*(9), 929–937.
- Kenny, D. A., & Zautra, A. (1995). The trait-state-error model for multiwave data. *Journal of Consulting and Clinical Psychology*, *63*(1), 52–59.
- Kenrick, D. T., Griskevicius, V., Neuberg, S. L., & Schaller, M. (2010a). Renovating the pyramid of needs: contemporary extensions built upon ancient foundations. *Perspectives on Psychological Science*, *5*(3), 292–314.
- Kenrick, D. T., Neuberg, S. L., Griskevicius, V., Becker, D. V., & Schaller, M. (2010b). Goal-driven cognition and functional behavior the fundamental-motives framework. *Current Directions in Psychological Science*, *19*(1), 63–67.
- Kernberg, O. (2016). What is personality? *Journal of Personality Disorders*, *30*(2), 145–156.
- Kernberg, O. F., & Caligor, E. (2005). A psychoanalytic theory of personality disorders. In J. F. Clarkin, & M. F. Lenzenweger (Eds.), *Major theories of personality disorder* (2nd ed., pp. 114–156). New York, NY: Guilford Press.
- Keyes, C. L., & Westerhof, G. J. (2012). Chronological and subjective age differences in flourishing mental health and major depressive episode. *Aging & Mental Health*, *16*(1), 67–74.
- Kim, U., Yang, K. -S., & Hwang, K. -K. (2006). *Indigenous and cultural psychology: Understanding people in context*. New York, NY: Springer.
- Kitayama, S., Markus, H. R., Matsumoto, H., & Norasakkunkit, V. (1997). Individual and collective processes in the construction of the self: self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology*, *72*(6), 1245–1267.
- Klein, M. H., Wonderlich, S., & Shea, M. T. (1993). Models of relationships between personality and depression: toward a framework for theory and research. In M. Klein, D. Kupfer, & M. T. Shea (Eds.), *Personality and depression: A current view* (pp. 1–54). New York, NY: Guilford Press.
- Klimstra, T. A., Hale, W. W., III, Raaijmakers, Q. A., Branje, S. J., & Meeus, W. H. (2009). Maturation of personality in adolescence. *Journal of Personality and Social Psychology*, *96*(4), 898–912.
- Klimstra, T. A., Luyckx, K., Hale, W. A., III, Frijns, T., Van Lier, P. A., & Meeus, W. H. (2010). Short-term fluctuations in identity: introducing a micro-level approach to identity formation. *Journal of Personality and Social Psychology*, *99*(1), 191–202.
- Kluckhohn, C., & Murray, H. A. (1948). *Personality in nature, society, and culture*. New York, NY: Knopf.
- Koenen, K. C., Moffitt, T. E., Roberts, A. L., Martin, L. T., Kubzansky, L., Harrington, H., & Caspi, A. (2009). Childhood IQ and adult mental disorders: a test of the cognitive reserve hypothesis. *American Journal of Psychiatry*, *166*(1), 50–57.
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “big” personality traits to anxiety, depressive, and substance use disorders: a meta-analysis. *Psychological Bulletin*, *136*(5), 768–821.

- Kotter-Grühn, D., Kleinspehn-Ammerlahn, A., Gerstorf, D., & Smith, J. (2009). Self-perceptions of aging predict mortality and change with approaching death: 16-year longitudinal results from the Berlin Aging Study. *Psychology and Aging, 24*(3), 654–667.
- Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry, 56*(10), 921–926.
- Krueger, R. F. (2005). Continuity of Axes I and II: toward a unified model of personality, personality disorders, and clinical disorders. *Journal of Personality Disorders, 19*(3), 233–261.
- Krueger, R. F., Caspi, A., Moffitt, T. E., Silva, P. A., & McGee, R. (1996). Personality traits are differentially linked to mental disorders: a multitrait-multidiagnosis study of an adolescent birth cohort. *Journal of Abnormal Psychology, 105*(3), 299–312.
- Krueger, R. F., Hicks, B. M., Patrick, C. J., Carlson, S. R., Iacono, W. G., & McGue, M. (2002). Etiologic connections among substance dependence, antisocial behavior and personality: modeling the externalizing spectrum. *Journal of Abnormal Psychology, 111*(3), 411–424.
- Krueger, R. F., & Markon, K. E. (2006). Reinterpreting comorbidity: a model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology, 2*, 111–133.
- Krueger, R. F., Markon, K. E., Patrick, C. J., Benning, S. D., & Kramer, M. D. (2007). Linking antisocial behavior, substance use, and personality: an integrative quantitative model of the adult externalizing spectrum. *Journal of Abnormal Psychology, 116*(4), 645–666.
- Krueger, R. F., & Tackett, J. L. (2003). Personality and psychopathology: working toward the bigger picture. *Journal of Personality Disorders, 17*(2), 109–128.
- Kuiper, N. A. (2010). Introductory comments: special issue of *EJOP* (August 2010) on humor research in personality and social psychology. *Europe's Journal of Psychology, 6*(3), 1–8.
- Kuiper, N. A. (2012). Humor and resiliency: towards a process model of coping and growth. *Europe's Journal of Psychology, 8*(3), 475–491.
- Kuiper, N. A., Grimshaw, M., Leite, C., & Kirsh, G. (2004). Humor is not always the best medicine: specific components of sense of humor and psychological well-being. *Humor, 17*(1/2), 135–168.
- Kuiper, N. A., Kazarian, S. S., Sine, J., & Bassil, M. (2010a). The impact of humor in North American versus Middle East cultures. *Europe's Journal of Psychology, 6*(3), 149–173.
- Kuiper, N. A., Kirsh, G. A., & Leite, C. (2010b). Reactions to humorous comments and implicit theories of humor styles. *Europe's Journal of Psychology, 6*(3), 236–266.
- Kwon, J. W., Chun, H., & Cho, S. I. (2009). A closer look at the increase in suicide rates in South Korea from 1986–2005. *BMC Public Health, 9*(1), 72.
- Lahey, B. B. (2004). Commentary: role of temperament in developmental models of psychopathology. *Journal of Clinical Child and Adolescent Psychology, 33*(1), 88–93.
- Lahey, B. B. (2009). Public health significance of neuroticism. *American Psychologist, 64*(4), 241.
- Lamond, A. J., Depp, C. A., Allison, M., Langer, R., Reichstadt, J., Moore, D. J., & Jeste, D. V. (2008). Measurement and predictors of resilience among community-dwelling older women. *Journal of Psychiatric Research, 43*(2), 148–154.
- Leadbeater, B. J., Kuperminc, G. P., Blatt, S. J., & Hertzog, C. (1999). A multivariate mode of gender differences in adolescents' internalizing and externalizing problems. *Developmental Psychology, 35*(5), 1268–1282.
- Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO Personality Inventory. *Multivariate Behavioral Research, 39*(2), 329–358.
- Lee, K., & Ashton, M. C. (2005). Psychopathy, Machiavellianism, and narcissism in the Five-Factor Model and the HEXACO model of personality structure. *Personality and Individual Differences, 38*(7), 1571–1582.
- Lee, K., & Ashton, M. C. (2008). The HEXACO personality factors in the indigenous personality lexicons of English and 11 other languages. *Journal of Personality, 76*, 1001–1053.
- Lengua, L. J., & Wachs, T. D. (2012). Temperament and risk: resilient and vulnerable responses to adversity. In R. L. Shiner, & M. Zentner (Eds.), *Handbook of temperament* (pp. 519–540). New York, NY: Guilford Press.
- Lievens, F., De Koster, L., & Schollaert, E. (2008). Current theory and practice of assessment centers: the importance of trait activation. *Oxford Handbook of Personnel Psychology, 215–233*.
- Litman, J. (2005). Curiosity and the pleasures of learning: wanting and liking new information. *Cognition & Emotion, 19*(6), 793–814.
- Litman, J. A. (2008). Interest and deprivation factors of epistemic curiosity. *Personality and Individual Differences, 44*(7), 1585–1595.
- Litman, J. A., & Jimerson, T. L. (2004). The measurement of curiosity as a feeling of deprivation. *Journal of Personality Assessment, 82*(2), 147–157.
- Livesley, W. J. (1998). Suggestions for a framework for an empirically based classification of personality disorder. *Canadian Journal of Psychiatry, 43*(2), 137–147.
- Livesley, J. (2008). Toward a genetically-informed model of borderline personality disorder. *Journal of Personality Disorders, 22*(1), 42–71.
- Livesley, W. J., Jang, K. L., & Vernon, P. A. (1998). Phenotypic and genetic structure of traits delineating personality disorder. *Archives of General Psychiatry, 55*(10), 941–948.
- Liu, T., Ode, S., Moeller, S. K., & Robinson, M. D. (2013). Neuroticism as distancing: perceptual sources of evidence. *Journal of Personality and Social Psychology, 104*(5), 907–920.
- Lönnqvist, J. E., Mäkinen, S., Paunonen, S. V., Henriksson, M., & Verkasalo, M. (2008). Psychosocial functioning in young men predicts their personality stability over 15 years. *Journal of Research in Personality, 42*(3), 599–621.
- Lucas, R. E., & Donnellan, M. B. (2011). Personality development across the life span: longitudinal analyses with a national sample from Germany. *Journal of Personality and Social Psychology, 101*(4), 847–861.
- Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down university avenue: life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology, 101*(3), 620–637.
- Luyten, P., & Blatt, S. J. (2011). Integrating theory-driven and empirically-derived models of personality development and psychopathology: a proposal for DSM V. *Clinical Psychology Review, 31*(1), 52–68.

- Luyten, P., Fonagy, P., Lemma, A., & Target, M. (2012). Depression. In A. Bateman, & P. Fonagy (Eds.), *Handbook of mentalizing in mental health practice* (pp. 385–417). Washington, DC: American Psychiatric Association.
- Magidson, J. F., Roberts, B. W., Collado-Rodriguez, A., & Lejuez, C. W. (2012). Theory-driven intervention for changing personality: expectancy value theory, behavioral activation, and conscientiousness. *Developmental Psychology, 50*(5), 1442–1450.
- Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: an integrative hierarchical approach. *Journal of Personality and Social Psychology, 88*(1), 139–157.
- Martin, R. A. (2007). *The psychology of humor: An integrative approach*. New York, NY: Academic Press.
- Martin, R. A., Puhlik-Doris, P., Larsen, G., Gray, J., & Weir, K. (2003). Individual differences in uses of humor and their relation to psychological well-being: development of the Humor Styles Questionnaire. *Journal of Research in Personality, 37*(1), 48–75.
- Marzocchi, G. M., Capron, C., Di Pietro, M., Tauleria, E. D., Duyme, M., Frigerio, A., & Théron, C. (2004). The use of the Strengths and Difficulties Questionnaire (SDQ) in Southern European countries. *European Child & Adolescent Psychiatry, 13*(2), ii40–ii46.
- Maslow, A. H. (2016). *El hombre autorrealizado: hacia una psicología del ser*. United States: Editorial Kairós.
- Maslow, A. H. (1970). *Motivation and personality*. New York, NY: Harper & Row.
- Mathai, J., Anderson, P., & Bourne, A. (2003). Use of the Strengths and Difficulties Questionnaire as an outcome measure in a child and adolescent mental health service. *Australasian Psychiatry, 11*(3), 334–337.
- Matsumoto, D., & van de Vijver, F. J. (2011). *Cross-cultural research methods in psychology*. New York, NY: Cambridge University Press.
- Mayer, J. D., Salovey, P., Caruso, D. R., & Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT V2.0. *Emotion, 3*(1), 97–105.
- McAdams, D. P. (1992). The five factor model in personality: a critical appraisal. *Journal of Personality, 60*, 329–361.
- McAdams, D. P. (1996). Personality, modernity, and the storied self: a contemporary framework for studying persons. *Psychological Inquiry, 7*(4), 295–321.
- McAdams, D. P., & Olson, B. D. (2010). Personality development: continuity and change over the life course. *Annual Review of Psychology, 61*, 517–542.
- McAdams, D. P., & Pals, J. L. (2006). A new Big Five: fundamental principles for an integrative science of personality. *American Psychologist, 61*(3), 204–217.
- McClelland, D. C. (1951). *Personality*. New York, NY: William Sloane Associates.
- McCrae, R. R. (1993). Moderated analyses of longitudinal personality stability. *Journal of Personality and Social Psychology, 65*(3), 577–585.
- McCrae, R. R. (2001). Trait psychology and culture: exploring intercultural comparisons. *Journal of Personality, 69*(6), 819–846.
- McCrae, R. R. (2002). NEO-PI-R data from 36 cultures: further intercultural comparisons. In R. R. McCrae, & J. Allik (Eds.), *The five-factor model of personality across cultures* (pp. 105–125). New York, NY: Kluwer Academic/Plenum.
- McCrae, R. R., & Allik, I. U. (2002). *The five-factor model of personality across cultures*. New York, NY: Springer Science & Business Media.
- McCrae, R. R., & Costa, P. T. (1985a). Comparison of EPI and psychoticism scales with measures of the five-factor model of personality. *Personality and Individual Differences, 6*(5), 587–597.
- McCrae, R. R., & Costa, P. T. (1985b). Openness to experience. In R. Hogan, & W. H. Jones (Eds.), *Perspectives in personality* (pp. 145–172). (Vol. 1). Greenwich, CT: JAI Press.
- McCrae, R. R., & Costa, P. T. (1985c). Updating Norman's "adequacy taxonomy": intelligence and personality dimensions in natural language and in questionnaires. *Journal of Personality and Social Psychology, 49*(3), 710–721.
- McCrae, R. R., & Costa, P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology, 52*(1), 81–90.
- McCrae, R. R., & Costa, P. T., Jr. (1995). Positive and negative valence within the five-factor model. *Journal of Research in Personality, 29*, 443–460.
- McCrae, R. R., & Costa, P. T. (1996). Toward a new generation of personality theories: theoretical contexts for the five-factor model. In J. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51–87). New York, NY: Guilford Press.
- McCrae, R. R., & Costa, P. T. (2003). *Personality in adulthood: A five-factor theory perspective*. New York, NY: Guilford Press.
- McCrae, R. R., & Costa, P. T. (2008). Empirical and theoretical status of the five-factor model of personality traits. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment* (pp. 273–294). (Vol. 1). London, England: Sage.
- McCrae, R. R., Costa, P. T., Jr., & Piedmont, R. L. (1993). Folk concepts, natural language, and psychological constructs: the California Psychological Inventory and the Five-Factor Model. *Journal of Personality, 61*(1), 1–26.
- McCrae, R. R., Costa, P. T., Jr., Ostendorf, F., Angleitner, A., Hřebíčková, M., Avia, M. D., & Saunders, P. R. (2000). Nature over nurture: temperament, personality, and life span development. *Journal of Personality and Social Psychology, 78*(1), 173–186.
- McCrae, R. R., Costa, P. T., Jr., Terracciano, A., Parker, W. D., Mills, C. J., De Fruyt, F., & Mervielde, I. (2002). Personality trait development from age 12 to age 18: longitudinal, cross-sectional and cross-cultural analyses. *Journal of Personality and Social Psychology, 83*(6), 1456–1468.
- McCrae, R. R., Herbst, J. H., & Costa, P. T., Jr. (2001). Effects of acquiescence on personality factor structures. *Personality and Temperament: Genetics, Evolution, and Structure, 217–231*.
- McCrae, R. R., & Terracciano, A. (2005). Personality profiles of cultures: aggregate personality traits. *Journal of Personality and Social Psychology, 89*(3), 407–425.
- McCrae, R. R., & Terracciano, A. (2006). National character and personality. *Current Directions in Psychological Science, 15*(4), 156–161.
- Meier, B. P., & Robinson, M. D. (2004). Does quick to blame mean quick to anger? The role of agreeableness in dissociating blame and anger. *Personality and Social Psychology Bulletin, 30*, 856–867.
- Meier, B. P., Robinson, M. D., & Wilkowski, B. M. (2006). Turning the other cheek agreeableness and the regulation of aggression-related primes. *Psychological Science, 17*(2), 136–142.
- Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika, 58*, 525–543.

- Mervielde, I., & De Fruyt, F. (1999). Construction of the Hierarchical Personality Inventory for Children (HiPIC). In I. D. Mervielde, F. De Fruyt, & F. Ostendorf (Eds.), *Personality psychology in Europe. Proceedings of the Eight European Conference on Personality Psychology/I* (pp. 107–127). Tilburg, The Netherlands: Tilburg University Press.
- Mezulis, A. H., Hyde, J. S., & Abramson, L. Y. (2006). The developmental origins of cognitive vulnerability to depression: temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology, 42*(6), 1012.
- Meyer, B., & Pilkonis, P. A. (2005). An attachment model of personality disorder. In M. F. Lenzenweger, & J. F. Clarkin (Eds.), *Major theories of personality disorder* (pp. 231–281). New York, NY: Guilford Press.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood*. New York, NY: Guilford Press.
- Miller, G. (2010). Psychiatry. Anything but child's play. *Science, 327*, 1192–1193.
- Miller, J. D., Pilkonis, P. A., & Clifton, A. (2005). Self- and other-reports of traits from the five-factor model: relations to personality disorder. *Journal of Personality Disorders, 19*(4), 400–419.
- Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review, 80*(4), 252–283.
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review, 102*, 246–268.
- Mischel, W., & Shoda, Y. (2008). Toward a unified theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 208–241). New York, NY: Guilford Press.
- Mock, S. E., & Eibach, R. P. (2011). Aging attitudes moderate the effect of subjective age on psychological well-being: evidence from a 10-year longitudinal study. *Psychology and Aging, 26*(4), 979–986.
- Moeller, S. K., Robinson, M. D., Wilkowski, B. M., & Hanson, D. M. (2012). The big chill: interpersonal coldness and emotion-labeling skills. *Journal of Personality, 80*(3), 703–724.
- Murray, H. A. (1938). *Explorations in personality*. New York, NY: Oxford University Press.
- Musek, J. (2007). A general factor of personality: evidence for the Big One in the five-factor model. *Journal of Research in Personality, 41*(6), 1213–1233.
- Mussel, P. (2013). Intellect: a theoretical framework for personality traits related to intellectual achievements. *Journal of Personality and Social Psychology, 104*(5), 885.
- Noltmeyer, A. L., & Bush, K. R. (2013). Adversity and resilience: a synthesis of international research. *School Psychology International, 34*(5), 474–487.
- Norman, W. T. (1963). Toward an adequate taxonomy of personality attributes: replicated factor structure in peer nomination personality ratings. *Journal of Abnormal and Social Psychology, 66*(6), 574–583.
- Obel, C., Heiervang, E., Rodriguez, A., Heyerdahl, S., Smedje, H., Sourander, A., & Mathiesen, K. S. (2004). The Strengths and Difficulties Questionnaire in the Nordic countries. *European Child & Adolescent Psychiatry, 13*(2), ii32–ii39.
- Olfson, M., Blanco, C., Wang, S., Laje, G., & Correll, C. U. (2014). National trends in the mental health care of children, adolescents, and adults by office-based physicians. *JAMA Psychiatry, 71*(1), 81–90.
- Oltmanns, T. F., & Turkheimer, E. (2006). Perceptions of self and others regarding pathological personality traits. In R. F. Krueger, & J. L. Tackett (Eds.), *Personality and psychopathology* (pp. 71–111). New York, NY: Guilford Press.
- Ormel, J., Oldehinkel, A. J., & Vollebergh, W. (2004). Vulnerability before, during, and after a major depressive episode: a 3-wave population-based study. *Archives of General Psychiatry, 61*(10), 990–996.
- Otani, K., Suzuki, A., Kamata, M., Matsumoto, Y., Shibuya, N., Sadahiro, R., & Enokido, M. (2012). Parental overprotection increases sociotropy with gender specificity in parents and recipients. *Journal of Affective Disorders, 136*(3), 824–827.
- Oyserman, D., Kimmelmeier, M., & Coon, H. M. (2002). Cultural psychology, a new look: reply to Bond (2002), Fiske (2002), Kitayama (2002), and Miller (2002). *Psychological Bulletin, 128*, 110–117.
- Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology, 57*, 401–421.
- Parker, G., & Barrett, E. (2000). Personality and personality disorder: current issues and directions. *Psychological Medicine, 30*(1), 1–9.
- Pauletti, R. E., Cooper, P. J., & Perry, D. G. (2014). Influences in gender identity on children's maltreatment of gender-nonconforming peers: a person × target analysis of aggression. *Journal of Personality and Social Psychology, 106*(5), 843–866.
- Peng, K., Nisbett, R. E., & Wong, N. Y. (1997). Validity problems comparing values across cultures and possible solutions. *Psychological Methods, 2*(4), 329–344.
- Pervin, L. A. (1976). A free-response description approach to the analysis of person-situation interaction. *Journal of Personality and Social Psychology, 34*, 465–474.
- Pervin, L. A. (1978). Definitions, measurements, and classifications of stimuli, situations, and environments. *Human Ecology, 6*(1), 71–105.
- Peterson, C., Ruch, W., Beermann, U., Park, N., & Seligman, M. E. (2007). Strengths of character, orientations to happiness, and life satisfaction. *Journal of Positive Psychology, 2*(3), 149–156.
- Peterson, C., & Seligman, M. E. (2004). *Character strengths and virtues: A handbook and classification*. New York, NY: Oxford University Press.
- Pike, K. L. (1967). *Language in relation to a unified theory of the structure of human behavior* (2nd rev. ed.). The Hague, The Netherlands: Mouton.
- Pincus, A. L. (2005). A contemporary integrative interpersonal theory of personality disorders. In M. F. Lenzenweger, & J. F. Clarkin (Eds.), *Major theories of personality disorder* (2nd ed., pp. 282–331). New York, NY: Guilford Press.
- Poortinga, Y. H. (1989). Equivalence of cross-cultural data: an overview of basic issues. *International Journal of Psychology, 24*, 737–756.
- Poortinga, Y. H., van de Vijver, F. J., & Van Hemert, D. A. (2002). Cross-cultural equivalence of the Big Five. In R. R. McCrae, & J. Allik (Eds.), *The five-factor model of personality across cultures* (pp. 281–302). New York, NY: Springer.
- Posner, M. I., Rothbart, M. K., Vizueta, N., Thomas, K. M., Levy, K. N., Fossella, J., & Kernberg, O. (2003). An approach to the psychobiology of personality disorders. *Development and Psychopathology, 15*(04), 1093–1106.

- Quilty, L. C., De Fruyt, F., Rolland, J. P., Kennedy, S. H., Rouillon, P. F., & Bagby, R. M. (2008). Dimensional personality traits and treatment outcome in patients with major depressive disorder. *Journal of Affective Disorders, 108*(3), 241–250.
- Rauthmann, J. F., Gallardo-Pujol, D., Guillaume, E. M., Todd, E., Nave, C. S., Sherman, R. A., & Funder, D. C. (2014). The situational eight DIAMONDS: a taxonomy of major dimensions of situation characteristics. *Journal of Personality and Social Psychology, 107*(4), 677–718.
- Rauthmann, J. F., & Sherman, R. A. (2015). Measuring the situational eight DIAMONDS characteristics of situations: an optimization of the RSQ-8 to the S8*. *European Journal of Psychological Assessment, 32*(2), 155–164.
- Read, S. J., Monroe, B. M., Brownstein, A. L., Yang, Y., Chopra, G., & Miller, L. C. (2010). A neural network model of the structure and dynamics of human personality. *Psychological Review, 117*, 61–92.
- Reiss, S. (2008). *The normal personality: A new way of thinking about people*. New York, NY: Cambridge University Press.
- Rescorla, L. A., Achenbach, T. M., Ivanova, M. Y., Harder, V. S., Otten, L., Bilenberg, N., & Dobrea, A. (2011). International comparisons of behavioral and emotional problems in preschool children: parents' reports from 24 societies. *Journal of Clinical Child & Adolescent Psychology, 40*(3), 456–467.
- Rescorla, L., Ivanova, M. Y., Achenbach, T. M., Begovac, I., Chahed, M., Drugli, M. B., & Hewitt, N. (2012). International epidemiology of child and adolescent psychopathology II: integration and applications of dimensional findings from 44 societies. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(12), 1273–1283.
- Reynolds, S. K., & Clark, L. A. (2001). Predicting dimensions of personality disorder from domains and facets of the five factor model. *Journal of Personality, 69*(2), 199–222.
- Richardson, G. E. (2002). The metatheory of resilience and resiliency. *Journal of Clinical Psychology, 58*(3), 307–321.
- Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: a quantitative review of longitudinal studies. *Psychological Bulletin, 126*(1), 3–25.
- Roberts, B. W., & Jackson, J. J. (2008). Sociogenomic personality psychology. *Journal of Personality, 76*(6), 1523–1544.
- Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The power of personality: the comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science, 2*(4), 313–345.
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: a meta-analysis of longitudinal studies. *Psychological Bulletin, 132*(1), 1–25.
- Roberts, B. W., & Wood, D. (2006). Personality development in the context of the neo-socioanalytic model of personality. In D. K. Mroczek, & T. Little (Eds.), *Handbook of personality development* (pp. 11–39). Mahwah, NJ: Lawrence Erlbaum.
- Robins, R. W., & Tracy, J. L. (2003). Setting an agenda for a person-centered approach to personality development. *Monographs of the Society for Research in Child Development, 68*(1), 110–122.
- Robinson, M. D. (2007). Lives lived in milliseconds: using cognitive methods in personality research. In R. W. Robins, R. C. Fraley, & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 345–359). New York, NY: Guilford Press.
- Robinson, M. D., Moeller, S. K., & Ode, S. (2010). Extraversion and reward-related processing: probing incentive motivation in affective priming tasks. *Emotion, 10*(5), 615–626.
- Robinson, M. D., & Neighbors, C. (2006). Catching the mind in action: implicit methods in personality research and assessment. In M. Eid, & E. Diener (Eds.), *Handbook of multimethod measurement in psychology* (pp. 115–125). Washington, DC: American Psychological Association.
- Robinson, M. D., Ode, S., Moeller, S. K., & Goetz, P. W. (2007). Neuroticism and affective priming: evidence for a neuroticism-linked negative schema. *Personality and Individual Differences, 42*(7), 1221–1231.
- Robinson, M. D., & Tamir, M. (2005). Neuroticism as mental noise: a relation between neuroticism and reaction time standard deviations. *Journal of Personality and Social Psychology, 89*(1), 107–114.
- Robinson, M. D., & Wilkowski, B. M. (2015). Personality processes and processes as personality: a cognitive perspective. In M. Mikulincer, P. R. Shaver, M. L. Cooper, & R. J. Larsen (Eds.), *APA handbook of personality and social psychology: Vol. 4. Personality processes and individual differences* (pp. 129–145). Washington, DC: American Psychological Association.
- Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology* (pp. 99–166). (Vol. 3). New York, NY: Wiley.
- Rotter, J. B. (1966). Generalized expectancies from internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80*(1), 1–28.
- Rutter, M. (1967). A children's behaviour questionnaire for completion by teachers: preliminary findings. *Journal of Child Psychology and Psychiatry, 8*(1), 1–11.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081.
- Samuel, D. B., & Widiger, T. A. (2008). A meta-analytic review of the relationships between the five-factor model and DSM-IV-TR personality disorders: a facet level analysis. *Clinical Psychology Review, 28*(8), 1326–1342.
- Saucier, G. (2009). Recurrent personality dimensions in inclusive lexical studies: indications for a Big Six structure. *Journal of Personality, 77*(5), 1577–1614.
- Saucier, G., Georgiades, S., Tsaousis, I., & Goldberg, L. R. (2005). The factor structure of Greek personality adjectives. *Journal of Personality and Social Psychology, 88*(5), 856–875.
- Saucier, G., & Ostendorf, F. (1999). Hierarchical subcomponents of the Big Five personality factors: a cross-language replication. *Journal of Personality and Social Psychology, 76*(4), 613–627.
- Schmitt, D. P., Allik, J., McCrae, R. R., & Benet-Martínez, V. (2007). The geographic distribution of Big Five personality traits: patterns and profiles of human self-description across 56 nations. *Journal of Cross-Cultural Psychology, 38*(2), 173–212.

- Schwarz, A., & Cohen, S. (2013, March 31). More diagnoses of ADHD causing concern. *New York Times*.
- Seligman, M. E., Ernst, R. M., Gillham, J., Reivich, K., & Linkins, M. (2009). Positive education: positive psychology and classroom interventions. *Oxford Review of Education, 35*(3), 293–311.
- Sheldon, K. M., & Hoon, T. H. (2007). The multiple determination of well-being: independent effects of positive traits, needs, goals, selves, social supports, and cultural contexts. *Journal of Happiness Studies, 8*(4), 565–592.
- Sheldon, K. M., Ryan, R. M., Rawsthorne, L. J., & Ilardi, B. (1997). Trait self and true self: cross-role variation in the Big-Five personality traits and its relations with psychological authenticity and subjective well-being. *Journal of Personality and Social Psychology, 73*(6), 1380.
- Sherman, R. A., Nave, C. S., & Funder, D. C. (2010). Situational similarity and personality predict behavioral consistency. *Journal of Personality and Social Psychology, 99*(2), 330–343.
- Shiner, R. L. (2009). The development of personality disorders: perspectives from normal personality development in childhood and adolescence. *Development and Psychopathology, 21*(03), 715–734.
- Shiner, R., & Caspi, A. (2003). Personality differences in childhood and adolescence: measurement, development, and consequences. *Journal of Child Psychology and Psychiatry, 44*(1), 2–32.
- Shiner, C. G., & DeYoung, B. M. (2013). The structure of temperament and personality traits: a developmental perspective. In P. Zelazo (Ed.), *The Oxford handbook of developmental psychology: Vol. 2. Self and other* (pp. 113–141). New York, NY: Oxford University Press.
- Simms, L. J. (2007). The Big Seven model of personality and its relevance to personality pathology. *Journal of Personality, 75*(1), 65–94.
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: a practice-friendly meta-analysis. *Journal of Clinical Psychology, 65*(5), 467–487.
- Skodol, A. E. (2011). Scientific issues in the revision of personality disorders for *DSM-5*. *Personality and Mental Health, 5*(2), 97–111.
- Skodol, A. E., & Bender, D. S. (2009). The future of personality disorders in *DSM-V?* *American Journal of Psychiatry, 166*(4), 388–391.
- Slobodskaya, H. R. (2014). The hierarchical structure of personality and common psychopathology in childhood. *Journal of Research in Personality, 53*, 36–46.
- Smith, R. E., Shoda, Y., Cumming, S. P., & Smoll, F. L. (2009). Behavioral signatures at the ballpark: intraindividual consistency of adults' situation-behavior patterns and their interpersonal consequences. *Journal of Research in Personality, 43*(2), 187–195.
- Soenens, B., Park, S. Y., Vansteenkiste, M., & Mouratidis, A. (2012). Perceived parental psychological control and adolescent depressive experiences: a cross-cultural study with Belgian and South-Korean adolescents. *Journal of Adolescence, 35*(2), 261–272.
- Soto, C. J., & John, O. P. (2014). Traits in transition: the structure of parent-reported personality traits from early childhood to early adulthood. *Journal of Personality, 82*(3), 182–199.
- Soto, C. J., John, O. P., Gosling, S. D., & Potter, J. (2011). Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample. *Journal of Personality and Social Psychology, 100*(2), 330–348.
- Sroufe, L. A., Carlson, E. A., Levy, A. K., & Egeland, B. (1999). Implications of attachment theory for developmental psychopathology. *Development and Psychopathology, 11*, 1–13.
- Stephan, Y., Caudroit, J., & Chalabaev, A. (2011). Subjective health and memory self-efficacy as mediators in the relation between subjective age and life satisfaction among older adults. *Aging & Mental Health, 15*(4), 428–436.
- Stephan, Y., Caudroit, J., Jaconelli, A., & Terracciano, A. (2014). Subjective age and cognitive functioning: a 10-year prospective study. *American Journal of Geriatric Psychiatry, 22*(11), 1180–1187.
- Stephan, Y., Chalabaev, A., Kotter-Grühn, D., & Jaconelli, A. (2013). “Feeling younger, being stronger”: an experimental study of subjective age and physical functioning among older adults. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 68*(1), 1–7.
- Stephan, Y., Sutin, A. R., & Terracciano, A. (2015). How old do you feel? The role of age discrimination and biological aging in subjective age. *PLoS One, 10*(3), e0119293.
- Tackett, J. L. (2006). Evaluating models of the personality-psychopathology relationship in children and adolescents. *Clinical Psychology Review, 26*(5), 584–599.
- Tackett, J. L., Krueger, R. F., Iacono, W. G., & McGue, M. (2008). Personality in middle childhood: a hierarchical structure and longitudinal connections with personality in late adolescence. *Journal of Research in Personality, 42*(6), 1456–1462.
- Tackett, J. L., & Kushner, S. C. (2014). Conceptualizing youth borderline personality disorder within a normative personality framework. In C. Sharp, & J. L. Tackett (Eds.), *Handbook of borderline personality disorder in children and adolescents* (pp. 95–110). New York, NY: Springer.
- Tackett, J. L., Silberschmidt, A. L., Krueger, R. F., & Sponheim, S. R. (2009). A dimensional model of personality disorder: incorporating *DSM* Cluster A characteristics. *Personality Disorders: Theory, Research, and Treatment, 1*, 27–34.
- Tackett, J. L., Slobodskaya, H. R., Mar, R. A., Deal, J., Halverson, C. F., Baker, S. R., & Besevegis, E. (2012). The hierarchical structure of childhood personality in five countries: continuity from early childhood to early adolescence. *Journal of Personality, 80*(4), 847–879.
- Tang, T. Z., DeRubeis, R. J., Hollon, S. D., Amsterdam, J., Shelton, R., & Schalet, B. (2009). Personality change during depression treatment. *Archives of General Psychiatry, 66*(12), 1322–1330.
- Tellegen, A., & Waller, N. G. (1987). Re-examining basic dimensions of natural language trait descriptors. In *95th Annual Convention of the American Psychological Association*, New York, NY.
- Tellegen, A., & Waller, N. G. (2008). Exploring personality through test construction: development of the Multidimensional Personality Questionnaire. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment* (pp. 261–292). (Vol. 2). London, England: Sage.
- Terracciano, A., Costa, P. T., & McCrae, R. R. (2006a). Personality plasticity after age 30. *Personality and Social Psychology Bulletin, 32*(8), 999–1009.

- Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T., Jr. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 20*(3), 493–506.
- Terracciano, A., McCrae, R. R., & Costa, P. T. (2006b). Longitudinal trajectories in Guilford-Zimmerman temperament survey data: results from the Baltimore Longitudinal Study of Aging. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 61*(2), P108–P116.
- Terracciano, A., McCrae, R. R., & Costa, P. T. (2010). Intra-individual change in personality stability and age. *Journal of Research in Personality, 44*(1), 31–37.
- Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology, 88*(3), 500.
- Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: testing a principle of trait activation. *Journal of Research in Personality, 34*(4), 397–423.
- Theron, L. C., & Donald, D. R. (2013). Educational psychology and resilience in developing contexts: a rejoinder to Toland and Carrigan (2011). *School Psychology International, 34*(1), 51–66.
- Thorndike, E. L. (1920). Intelligence and its uses. *Harper's Magazine, 140*, 227–235.
- Triandis, H. C. (2001). Individualism-collectivism and personality. *Journal of Personality, 69*(6), 907–924.
- Trull, T. J., & Ebner-Priemer, U. (2013). Ambulatory assessment. *Annual Review of Clinical Psychology, 9*, 151.
- Trull, T. J., Lane, S. P., Koval, P., & Ebner-Priemer, U. W. (2015). Affective dynamics in psychopathology. *Emotion Review, 7*(4), 355–361.
- Tseng, W. S. (1997). Overview: culture and psychopathology: a guide to clinical assessment. In W. S. Tseng, & J. Streltzer (Eds.), *Culture and psychopathology: A guide to clinical assessment* (pp. 1–28). New York, NY: Brunner/Mazel.
- Tseng, W. S. (2001). Handbook of cultural psychiatry. *International Review of Psychiatry, 14*, 71–73.
- Tseng, W. S. (2003). *Clinician's guide to cultural psychiatry*. San Diego, CA: Academic Press.
- Tseng, W. S., & McDermott, J. F. (1981). *Culture, mind, and therapy: An introduction to cultural psychiatry*. New York, NY: Brunner/Mazel.
- Tseng, W. S., & Streltzer, J. (2008). *Cultural competence in health care*. New York, NY: Springer Science & Business Media.
- Uher, J. (2013). Personality psychology: lexical approaches, assessment methods, and trait concepts reveal only half of the story—why it is time for a paradigm shift. *Integrative Psychological and Behavioral Science, 47*(1), 1–55.
- Uliaszek, A. A., Alden, A., & Zinbarg, R. E. (2014). Dimensionality in cognitive-behavioral assessment. In G. P. Brown, & D. A. Clark (Eds.), *Assessment in cognitive therapy* (pp. 149). New York, NY: Guilford Press.
- Ungar, M. (2008). Resilience across cultures. *British Journal of Social Work, 38*(2), 218–235.
- Vaishnavi, S., Connor, K., & Davidson, J. R. (2007). An abbreviated version of the Connor-Davidson Resilience Scale (CD-RISC), the CD-RISC2: psychometric properties and applications in psychopharmacological trials. *Psychiatry Research, 152*(2), 293–297.
- van de Leemput, I. A., Wichers, M., Cramer, A. O., Borsboom, D., Tuerlinckx, F., Kuppens, P., & Derom, C. (2014). Critical slowing down as early warning for the onset and termination of depression. *Proceedings of the National Academy of Sciences, 111*(1), 87–92.
- van de Vijver, F. J. R., & Leung, K. (1997). *Methods and data analysis for cross-cultural research*. Newbury Park, CA: Sage.
- Van Egeren, L. F. (2009). A cybernetic model of global personality traits. *Personality and Social Psychology Review, 13*(2), 92–108.
- van Ijzendoorn, M. H., & Sagi-Schwartz, A. (2008). Cross-cultural patterns of attachment: universal and contextual dimensions. In J. Cassidy, & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 880–905). New York, NY: Guilford Press.
- Vandenberg, R. J. (2002). Toward a further understanding of and improvement in measurement invariance methods and procedures. *Organizational Research Methods, 5*, 139–158.
- Viken, R. J., Rose, R. J., Kaprio, J., & Koskenvuo, M. (1994). A developmental genetic analysis of adult personality: extraversion and neuroticism from 18 to 59 years of age. *Journal of Personality and Social Psychology, 66*(4), 722–730.
- Visser, S. N., Danielson, M. L., Bitsko, R. H., Holbrook, J. R., Kogan, M. D., Ghandour, R. M., & Blumberg, S. J. (2014). Trends in the parent-report of health care provider-diagnosed and medicated attention-deficit/hyperactivity disorder: United States, 2003–2011. *Journal of the American Academy of Child & Adolescent Psychiatry, 53*(1), 34–46.
- Wagerman, S. A., & Funder, D. C. (2009). Situations. In P. J. Corr, & G. Matthews (Eds.), *Cambridge handbook of personality* (pp. 27–42). New York, NY: Cambridge University Press.
- Wakefield, J. C. (1992). The concept of mental disorder: on the boundary between biological facts and social values. *American Psychologist, 47*(3), 373.
- Waller, N. G., & Zavala, J. D. (1993). Evaluating the Big Five. *Psychological Inquiry, 4*(2), 131–134.
- Weiss, D., & Freund, A. M. (2012). Still young at heart: negative age-related information motivates distancing from same-aged people. *Psychology and Aging, 27*(1), 173–180.
- Weiss, D., & Lang, F. R. (2012). “They” are old but “I” feel younger: age-group dissociation as a self-protective strategy in old age. *Psychology and Aging, 27*(1), 153–163.
- Widiger, T. A. (1998). Four out of five ain't bad. *Archives of General Psychiatry, 55*(10), 865–866.
- Widiger, T. A. (2009). Neuroticism. In M. R. Leary, & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 129–146). New York, NY: Guilford Press.
- Widiger, T. A. (2011). Personality and psychopathology. *World Psychiatry, 10*(2), 103–106.
- Widiger, T. A., Costa, P. T., & McCrae, R. R. (2002). A proposal for Axis II: diagnosing personality disorders using the five factor model. In P. T. Costa, & T. A. Widiger (Eds.), *Personality disorders and the five factor model of personality* (2nd ed., pp. 431–456). Washington, DC: American Psychological Association.
- Widiger, T. A., & Simonsen, E. (2005). Alternative dimensional models of personality disorder. *Journal of Personality Disorders, 19*(2), 110–130.
- Widiger, T. A., & Smith, G. T. (2008). Personality and psychopathology. In O. P. John, R. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 743–769). New York, NY: Guilford Press.

- Wiggins, J. S., & Pincus, A. L. (1989). Conceptions of personality disorders and dimensions of personality. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 1(4), 305.
- Wiggins, J. S., & Trapnell, P. D. (1996). A dyadic interactional perspective on the five-factor model. In J. S. Wiggins (Ed.), *The five factor model of personality: Theoretical perspectives* (pp. 88–162). New York, NY: Guilford Press.
- Windle, G. (2011). What is resilience? A review and concept analysis. *Reviews in Clinical Gerontology*, 21(02), 152–169.
- Woerner, W., Fleitlich-Bilyk, B., Martinussen, R., Fletcher, J., Cucchiaro, G., Dalgalarondo, P., & Tannock, R. (2004). The Strengths and Difficulties Questionnaire overseas: evaluations and applications of the SDQ beyond Europe. *European Child & Adolescent Psychiatry*, 13(2), ii47–ii54.
- Wood, A. M., & Joseph, S. (2010). The absence of positive psychological (eudemonic) well-being as a risk factor for depression: a ten year cohort study. *Journal of Affective Disorders*, 122(3), 213–217.
- Wood, A. M., Linley, P. A., Maltby, J., Kashdan, T. B., & Hurling, R. (2011). Using personal and psychological strengths leads to increases in well-being over time: a longitudinal study and the development of the strengths use questionnaire. *Personality and Individual Differences*, 50(1), 15–19.
- Wright, A. G. C., Thomas, K. M., Hopwood, C. J., Markon, K. E., Pincus, A. L., & Krueger, R. F. (2012). The hierarchical structure of DSM-5 pathological personality traits. *Journal of Abnormal Psychology*, 121, 951–957.
- Yang, K. S. (2006). Indigenous personality research: the Chinese case. In U. Kim, K. S. Yang, & K. K. Hwang (Eds.), *Indigenous and cultural psychology: Understanding people in context* (pp. 285–314). New York, NY: Springer.
- Yang, Y., Read, S. J., Denson, T. F., Xu, Y., Zhang, J., & Pedersen, W. C. (2014). The key ingredients of personality traits situations, behaviors, and explanations. *Personality and Social Psychology Bulletin*, 40(1), 79–91.
- Yu, X. N., Lau, J. T. F., Mak, W. W. S., Zhang, J., & Lui, W. W. S. (2011). Factor structure and psychometric properties of the Connor-Davidson resilience scale among Chinese adolescents. *Comprehensive Psychiatry*, 52(2), 218–224.
- Yutang, L. (2008). *The gay genius*. London, UK: Hesperides Press.
- Zentner, M., & Shiner, R. L. (Eds.). (2012). *Handbook of temperament*. New York, NY: Guilford Press.
- Zimmerman, M. (1994). Diagnosing personality disorders: a review of issues and research methods. *Archives of General Psychiatry*, 51(3), 225–245.
- Zuckerman, M. (2002). Zuckerman-Kuhlman Personality Questionnaire (ZKPQ): an alternative five-factorial model. In B. D. Raad, & M. Perugini (Eds.), *Big five assessment* (pp. 377–396). Gottingen, Germany: Hogrefe & Hube.
- Zuckerman, M. (2007). *Sensation seeking and risky behavior*. Washington, DC: American Psychological Association.
- Zuckerman, M. (2008). Zuckerman-Kuhlman Personality Questionnaire (ZKPQ): an operational definition of the alternative five factorial model of personality. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The SAGE handbook of personality theory and assessment: (pp. 219–238)*. (Vol. 2). Thousand Oaks, CA: Sage.
- Zuckerman, M., Kuhlman, D. M., & Camac, C. (1988). What lies beyond E and N? Factor analyses of scales believed to measure basic dimensions of personality. *Journal of Personality and Social Psychology*, 54(1), 96.
- Zuckerman, M., Kuhlman, D. M., Joireman, J., Teta, P., & Kraft, M. (1993). A comparison of three structural models for personality: the Big Three, the Big Five, and the Alternative Five. *Journal of Personality and Social Psychology*, 65(4), 757.

Chapter 10

Measures of Personality

Chapter Outline

| | | | |
|--|------------|---|------------|
| Personality assessment | 267 | Respondent bias | 274 |
| Self-report inventories | 268 | Examiner bias | 275 |
| The Big Five in personality questionnaires | 268 | Researcher bias | 275 |
| The Sixteen Personality Factor Questionnaire fifth edition | 269 | Performance-based tests | 276 |
| The Myers–Briggs Type Indicator | 269 | Rorschach inkblot method: new interpretation systems, developments in psychometric properties, and criticisms | 277 |
| Multidimensional Personality Questionnaire | 270 | Thematic Apperception Test and the SCORS-G assessment system | 279 |
| Severity Indices of Personality Problems | 271 | The Fairy Tale Test: a novel personality test for children | 280 |
| Cross-cultural measures | 272 | Summary | 283 |
| The Cross-Cultural (Chinese) Personality Assessment Inventory | 272 | References | 283 |
| Multicultural Personality Questionnaire | 273 | | |
| Sources of bias in testing | 274 | | |

PERSONALITY ASSESSMENT

Clinical psychologists are increasingly being asked to make prescriptive statements about everyday functioning. Unfortunately, results from many psychological tests are not easily generalizable to real-world functioning. Common approaches include a combination of history taking, self-reports, paper-and-pencil cognitive assessments, and the psychologist's observations of the client's behavior. From this combination, the psychologist is expected to make predictions about the client's ability to return to the classroom, return to work, and successfully complete other activities of daily living. The limitations inherent in this process have led to increasing calls for assessment methods that provide more generalizable data about client functioning (Jurado & Rosselli, 2007).

A contemporary distinction of personality that is closely associated with the classification of assessment instruments is the distinction between the explicit personality and the implicit personality (James & LeBreton, 2012). *Explicit* personality is the part of personality that individuals can access and thus represents the way individuals view themselves. In contrast, *implicit* personality constitutes the aspect of personality that lies outside of individual awareness and is not accessible via introspection (James, 1998; James & LeBreton, 2012).

James and LeBreton (2012) define explicit personality as the “dynamic mental structures and processes that influence and individual's behavior adjustments to his/her environment that are accessible via introspection section” (p. 4). Moreover, the explicit personality refers to the conscious aspects of personality and the individual's dispositions to think, behave, or feel (e.g., Bornstein, 2002; Hogan, 1991; McClelland, Koestner, & Weinberger, 1989). Psychologists who wish to evaluate and measure the explicit employ direct assessments, such as self-report surveys or structured interviews. Examples of explicit measures include the Sixteen Personality Factor Questionnaire (16PF) (Cattell & Mead, 2008; Costa & McCrae, 1992) and the Chinese Personality Inventory (Cheung et al., 1996).

Implicit personality involves the dynamic structures and processes that influence an individual's behavioral adjustments to his or her environment that are not accessible via introspection. Researchers are often interested in the assessment of implicit needs, motives, and cognitive processes, such as defense mechanisms (e.g., Freud, 1959; Allport, 1961; McClelland et al., 1989; Mischel & Shoda, 1995; Westen & Gabbard, 2002) to build a more integrative view of one's personality.

Implicit and *explicit* aspects of personality represent complementary attributes of the personality system but, interestingly, are often not highly correlated with each other (James & LeBreton, 2012; McClelland et al., 1989). Although personality psychologists have argued that both elements should be considered, and not discounting the contributions that have been made, to date organizational scientists have almost exclusively focused on the explicit assessment of personality

(e.g., Bing, LeBreton, Davison, Migetz, & James, 2007a; Bing, et al., 2007b; Frost, Ko, & James, 2007; James & LeBreton, 2012; McClelland et al., 1989).

SELF-REPORT INVENTORIES

The Big Five in personality questionnaires

In the early 1980s, [Costa and McCrae \(1985\)](#) developed the NEO Personality Inventory (NEO-PI), now the most widely known personality inventory for assessing the Big Five structure of personality. The NEO was initially designed to measure the three dimensions of Neuroticism, Extraversion and Openness to experience. Later, [Costa and McCrae \(1989\)](#) added the dimensions of Agreeableness and Conscientiousness.

[Costa and McCrae \(1992\)](#) published the Revised NEO Personality Inventory (NEO-PI-R). The NEO-PI-R is a 240-item questionnaire that assesses 30 specific traits (or facets), 6 for each of the five basic personality dimensions: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). Items are answered on a 5-point Likert scale, ranging from strongly disagree to strongly agree ([Costa & McCrae, 1992](#)). Parallel self-report (Form S) and observer rating (Form R) versions have been validated. For each of the 48 items identified as potentially problematic, two alternatives were written. The first was generally a restatement of the item in simpler words; the second was a new item theoretically relevant to the facet. The NEO-PI-R was standardized in samples of middle-aged and older adults, using various types of factor-analytic methods. The results revealed substantial internal consistency, temporal stability, and convergent and discriminant validity against spouse and peer ratings ([Costa & McCrae, 1992](#); [McCrae & Costa, 2003](#)).

The NEO-PI-3 ([McCrae & Costa, 2010](#)) is easier to read, and several confusing items were discarded. It has an overall reading grade level of 5.3 and has eliminated most of the items that adolescents aged 14–20 found difficult. Psychometrically, the NEO-PI-3 shows modest improvements over the NEO-PI-R.

One advantage of the NEO-PI-3 is its system of 30 facets, which were selected to represent the most important constructs found in psychological literature ([Costa, McCrae, & Dye, 1991](#)). Scales were developed to assess six facets defining each factor, and item factor analysis for each of the five domains confirmed that the a priori scales corresponded closely to observed factors ([McCrae & Costa, 2008](#)). Some of the characteristics of the facets are:

- NEO facets in each domain demonstrate discriminant validity, within and across domains ([McCrae & Costa, 1992](#)).
- The specific variance of individual facets is reliable and consensually valid ([Costa & McCrae, 2008](#)).
- The facets are universal and are able to define the familiar five factors in a wide variety of cultures and languages ([McCrae, Terracciano, & 78 Members of the Personality Profiles of Cultures Project, 2005](#)).
- Facets demonstrate longitudinal stability ([Terracciano, Costa, & McCrae, 2006](#)) and diverse developmental trajectories ([Terracciano, McCrae, Brant, & Costa, 2005](#)).
- Facets demonstrate incremental validity in predicting behaviors ([Paunonen & Ashton, 2001](#)), as well as psychiatric symptoms ([Quirk, Christiansen, Wagner, & McNulty, 2003](#); [Reynolds & Clark, 2001](#)).
- Facets define personality profiles that are judged to be clinically more useful ([Singer, 2005](#)) than personality disorder diagnoses ([Samuel & Widiger, 2006](#)).

Several Big Five inventories have been developed during the first decade of this century (e.g., [Gosling, Rentfrow, & Swann, 2003](#); [Herzberg & Brähler, 2006](#); [Langford, 2003](#); [Rammstedt & John, 2007](#)). One of these is the 10-item Big Five Inventory (BFI-10; [Rammstedt & John, 2007](#)), an abbreviated version of the BFI ([John, Donahue, & Kentle, 1991](#)). Consisting of 10 items, it assesses the Big Five by two items per dimension, one coded in the positive direction of the scale and the other in the negative direction.

The NEO Five Factor Inventory (NEO-FFI) is a shorter version of the 240-item NEO-PI-R ([Costa & McCrae, 1992](#)). It consists of 60 items designed to measure the five dimensions without the six facets. It consists of items that are closely associated with the five factors in the original version.

In devising their various measures, [McCrae and Costa \(1982, 1991\)](#) took great care in avoiding many of the traps commonly encountered in self-report questionnaires. First, the items were designed to be simple and straightforward, and the language was further simplified in the NEO-PI-3 ([Jackson, 1975](#); [Wrobel & Lachar, 1982](#)). Second, a 5-point Likert scale was selected so that items could discriminate well at all trait levels ([Reise & Henson, 2000](#)). Third, scales were roughly balanced in keying to minimize acquiescence ([McCrae, Herbst, & Costa, 2001](#)). Fourth, the items were keyed for one and only one facet scale, avoiding item overlap between scales.

As the NEO inventories operationalize the five-factor model (FFM), emphasis was placed in the replicability of their factor structure (e.g., [Costa, McCrae, & Martin, 2008](#); [McCrae et al., 2005](#)). The NEO inventories have also been used in

longitudinal studies in order to evaluate the stability of traits through time. Data demonstrate that the facet scales of the NEO inventory are highly reliable (e.g., McCrae, Kurtz, Yamagata, & Terracciano, 2011). The construct validity of the NEO inventories was examined with other criterion-related measures (e.g., McCrae, 1989; McCrae & Costa, 1988) and the prediction of behaviors and clinical outcomes (Hopwood et al., 2009). The advantages of the NEO inventories are that (1) they enable a comprehensive assessment of all five broad personality domains and a selection of the most important and specific traits, while also providing information about the patient's strengths and weaknesses; (2) their psychometric properties have been the subject of extensive research; (3) they can be applied to a wide age range, to a variety of cultures, and to different types of psychopathology; and (4) they are available in both self-report and informant rating versions (McCrae et al., 2011).

The major disadvantage of the facets includes their limitation in providing all the necessary information for a comprehensive clinical assessment. More specifically, they cannot replace a life history, provide a psychiatric diagnosis, or identify specific problems in living. Another reported limitation is the relative "transparency" of the items. Such items may predispose respondents to present a false picture of themselves. The authors claim that they deliberately avoided the construction of validity scales, as such scales reduce the focus to the client's underlying motivation to provide an objective or sincere self-image (e.g., McCrae et al., 1989).

The Sixteen Personality Factor Questionnaire fifth edition

The Sixteen Personality Factor Questionnaire fifth edition [Institute for Personality and Ability Testing (IPAT), 2009] is the latest edition of the 16PF personality test designed to measure normal personality functions (Cattell, Eber, & Tatsuoka, 1970). Since its original release in 1994, developers have revised the 16PF five times, updating content and norms, all of which have added to its overall psychometric qualities (IPAT, 2009). There are also validity scales, such as impression management.

The 16PF was originally constructed by factor analyzing descriptions of personality based on English-language adjectives (Cattell et al., 1970; IPAT, 2009). The factor analysis yielded 16 primary factors. One of these factors, Reasoning (B), is a proxy for measuring cognitive or reasoning ability. All items and associated traits are conceptually bipolar. For example, descriptors for the primary factor Warmth (A) range from "reserved" to "attentive to others." This underlying structure (i.e., each trait and its associated items exist along a continuum) assumes a dominance response process. In a dominance process, people respond to an item relative to how similar or dissimilar they perceive themselves to be in relation to the item (Stark, Chernyshenko, Drasgow, & Williams, 2006). These 16 primary factors led to the formation of five second-order or, more commonly, global traits. Thus, the scales of the 16PF, 16 primary and 5 global, reflect an underlying multilevel conceptualization of personality (Table 10.1). Furthermore, Cattell and Mead (2008) theorized third-order factors as well, and only recently has reliable evidence of a two-factor solution been established.

The Myers–Briggs Type Indicator

One of the most widely known self-report inventories is the Myers–Briggs Type Indicator (MBTI), which is based on Jungian theory. The MBTI is a four-factor model that allows people to describe themselves by four letters (e.g., ENTJ or ISFP) that represent their particular type. The scale yields eight scores (one for each type) that can be considered on four typological opposites (e.g., Introversion or Extraversion) (Paul, 2004).

According to McCrae and Costa (1989), the MBTI is unusual among personality assessment for three reasons: it is based on a sophisticated and established theory (Jungian); it purports to measure types rather than traits specified on a continuous scale; and it is widely used to explain individuals' personality characteristics not only to professionals, but also to the individuals themselves, as well as to their coworkers, friends, and families. The authors also point out its limitations: the original Jungian concepts are distorted and even contradicted; there is no bimodal distribution of preference scores; and studies using the MBTI have frequently not confirmed either the theory or the measure.

It is composed of 94 forced-choice items that yield scores on each of the eight factors, as well as the famous four dimensions: *Introversion–Extraversion*, *Sensation–Intuition*, *Thinking–Feeling*, and *Judging–Perceiving*. Respondents are classified into one of 16 personality types based on the largest score obtained for each bipolar scale (e.g., a person scoring higher on Introversion than Extraversion, Intuition than Sensation, Feeling than Thinking, and Judging than Perceiving would be classified as an Introverted Intuitive Feeling Judging type).

The MBTI-Form G (Briggs-Myers & Briggs, 1985) provides linear scores on each dimension, which are usually discussed in terms of types based on cutoff scores. Thus the Extraversion–Introversion dimension has a normal distribution, with high scores being considered Extraverted and low scores being considered Introverted. The MBTI has been the focus

TABLE 10.1 Sixteen Personality Factor Questionnaire (16PF) Factor Names and Descriptors

| Descriptors of Low Range | Primary Factors | Descriptors of High Range |
|--|-------------------------|--|
| Reserved, Impersonal, Distant | Warmth (A) | Warm, Participating, Attentive to Others |
| Concrete, Lower Mental Capacity | Reasoning (B) | Abstract, Bright, Fast Learner |
| Reactive, Affected by Feelings | Emotional Stability (C) | Emotionally Stable, Adaptive, Mature |
| Deferential, Cooperative, Avoids Conflict | Dominance (E) | Dominant, Forceful, Assertive |
| Serious, Restrained, Careful | Liveliness (F) | Enthusiastic, Animated, Spontaneous |
| Expedient, Nonconforming | Rule Consciousness (G) | Rule Conscious, Dutiful |
| Shy, Timid, Threat Sensitive | Social Boldness (H) | Socially Bold, Venturesome, Thick Skinned |
| Tough, Objective, Unsentimental | Sensitivity (I) | Sensitive, Aesthetic, Tender Minded |
| Trusting, Unsuspecting, Accepting | Vigilance (L) | Vigilant, Suspicious, Skeptical, Wary |
| Practical, Grounded, Down to Earth | Abstractedness (M) | Abstracted, Imaginative, Idea Oriented |
| Forthright, Genuine, Artless | Privateness (N) | Private, Discreet, Nondisclosing |
| Self-Assured, Unworried, Complacent | Apprehension (O) | Apprehensive, Self-Doubting, Worried |
| Traditional, Attached to Familiar | Openness to Change (Q1) | Open to Change, Experimenting |
| Group Orientated, Affiliative | Self-Reliance (Q2) | Self-Reliant, Solitary, Individualistic |
| Tolerates Disorder, Unexacting, Flexible | Perfectionism (Q3) | Perfectionistic, Organized, Self-Disciplined |
| Relaxed, Placid, Patient | Tension (Q4) | Tense, High Energy, Driven |
| Global Factors | | |
| Introverted, Socially Inhibited | Extraversion | Extraverted, Socially Participating |
| Low Anxiety, Unperturbable | Anxiety | High Anxiety, Perturbable |
| Receptive, Open Minded, Intuitive | Tough Mindedness | Tough-Minded, Resolute, Unempathic |
| Accommodating, Agreeable, Selfless | Independence | Independent, Persuasive, Willful |
| Unrestrained, Follows Urges | Self-Control | Self-Controlled, Inhibits Urges |
| Source: Reprinted from Cattell, H. E. P. (2003). The Sixteen Personality Factor (16PF) Questionnaire. In M. J. Hilsenroth, D. L. Segal, & M. Hersen (Eds.), <i>Comprehensive handbook of psychological assessment: Vol. 2. Personality assessment</i> (pp. 39–49). Hoboken, NJ: Wiley, with permission. Copyright 2003 John Wiley & Sons. | | |

of extensive research, which overall supports the inventory's satisfactory concurrent and predictive validity and reliability (Furnham & Stringfield, 1993).

Validity studies have explored the relationship between the MBTI and other measures, such as the 16PF and the NEO-PI-R. For example, Saggino and Kline (1996) looked at correlations between the MBTI and Cattell's 16PF, as well as the Eysenck Personality Questionnaire. Their factor analysis of the MBTI yielded five factors. They argued that the EI (Extraversion–Introversion) dimension is clear, but the TF (Thinking–Feeling) dimension is “not sufficiently pure” because it loads onto different factors.

There have been a number of studies that have related the Big Five personality traits to the personality disorders, suggesting significant overlap (Samuel & Widiger, 2008; Bastiaansen, Rossi, Schotte, & De Fruyt, 2011). Some studies have related the MBTI to dark-side traits (Janowsky, Morter, & Hong, 2002). It should be noted, however, that proponents of the MBTI insist that the measure was never designed to measure, nor does it measure, “pathology” or mental illness of any form (Quenk, 2009).

Multidimensional Personality Questionnaire

Tellegen's (1982) model (Chapter 13) of personality was operationalized with the Multidimensional Personality Questionnaire (MPQ). It provides an accurate measurement of specific lower-order traits, as well as higher-order personality dimensions that have been conceptualized as broader factors of temperament (Clark & Watson, 1999; Tellegen, 1985). Conceptually and empirically, the 11 lower-order (primary) trait scales of the MPQ typically map onto three higher-order factors, Positive Emotionality (PEM), Negative Emotionality (NEM), and Constraint (CON), making the instrument particularly useful for assessing a variety of traits across situations.

The MPQ dimensions also parallel the structure of other popular normal and abnormal personality models, such as the FFM (e.g., the NEO-PI; [Costa & McCrae, 1985, 1992](#)) and the Dimensional Personality Symptom models ([De Clercq, De Fruyt, van Leeuwen, & Mervielde, 2006](#)). These alternative models include constructs, such as Neuroticism and Emotional Instability, respectively, which align onto MPQ dimensions, such as NEM.

Development of Alternative MPQ Instruments

Due to the length and time commitment necessary to complete the full-form MPQ, which consists of 276 or 300 items, a briefer 155-item form of the MPQ (MPQ-BF; [Patrick, Curtin, & Tellegen, 2002](#)) was developed and validated in community and college samples. However, the MPQ and MPQ-BF are most appropriate for use with adults who have at least a high school level of education ([Patrick et al., 2002](#)) and were validated and cross-validated on samples characterized by mean ages between 30s and 40s. This limits the potential applicability of these instruments with both younger participants and forensic or clinical samples with lower potential reading comprehension.

The MPQ Simplified-Wording Form (MPQ-SF) was developed to adapt the MPQ dimensions to populations with lower reading comprehension ([Patrick, Kramer, Tellegen, Verona, & Kaemmer, 2013](#)). Specifically, items from the MPQ-BF with readability scores above the sixth-grade level were reworded, or items from other versions of the MPQ that were readable at the sixth-grade level were included, to create a version with a target sixth-grade overall readability level according to standard indices (e.g., [Friedman & Hoffman-Goetz, 2006](#)).

[Javdani, Finy, and Verona \(2014\)](#) conducted a study that indicates that the MPQ-SF is characterized by adequate internal consistencies for its higher- and most lower-order scales. In addition, the MPQ-SF is characterized by an overall structure that is generally consistent with that reported for other versions of the MPQ in multiple adult samples. Specifically, the original three facets of NEM, PEM, and CON were extracted on which most primary trait scales demonstrated adequate loadings on their expected components, with Traditionalism deviating most from its original relationship with CON in the sample.

Severity Indices of Personality Problems

The theoretical conceptualization of the Severity Indices of Personality Problems (SIPP-118; [Verheul et al., 2008](#)) is based on a number of assumptions. The first assumption is that personality is a changeable entity. Second, changes are expected in specific components of personality. It is assumed that one can discriminate rigid, maturation-based components of personality from the changeable components of personality. Examples of the rigid, maturation-based components are temperament and basic traits. Examples of the changeable components of personality are the adaptive capacities. These adaptive capacities refer to the dynamic organization of personality that concerns the regulation of self and relationships with others, and comprise characteristics, such as affect and impulse regulation, self and other representations, identity, coping strategies, and acquired skills. Thus, according to this view, the changeability of personality and personality disorder is likely to be more pronounced for (mal)adaptive capacities than for the more stable, constitutionally based components ([Verheul et al., 2008](#)). For this reason, a questionnaire measuring changes in personality disorders should focus on the adaptive capacities. Third, the authors assumed an inverse relation between level of adaptation and the severity of personality pathology. Personality pathology can therefore be conceptualized as a deficiency in the development of adaptational capacities that enable persons to deal with developmental tasks and life challenges.

Fourth, the SIPP-118 is based on the assumption of a distinction between specific traits and a general level of adaptation; it aims at measuring the common components of personality pathology beyond the specific types or categories of personality disorders. Fifth, the instrument adopts a dimensional approach to personality pathology, assuming continuity between adaptation and maladaptation as relatively independent of specific styles of personality functioning. Finally, the instrument construction is based on the assumption that psychotherapy works in personality disorders due to its ability to modify the changeable (mal)adaptive capacities and thereby enhance the level of adaptation.

An expert-guided, rational-intuitive approach in the selection of items was used. In the first trial, 265 items were elaborated. Finally, these items were reduced to 118, so that the measure comprised 16 internally consistent and clinically interpretable facets ([Verheul et al., 2008](#)). The facets were clustered into five higher-order domains, which were weighted sums using primary and secondary loadings in accordance with factor-analytic and qualitative considerations. The factors were defined as follows: (1) *Self-Control*, comprising the facets of emotion regulation and effortful control; (2) *Identity Integration*, comprising the facets of self-respect, stable self-image, self-reflexive functioning, enjoyment, and purposefulness; (3) *Relational Capacities*, comprising the facets of intimacy, enduring relationships, and feeling recognized; (4) *Responsibility*, comprising the facets of trustworthiness and responsible industry; and (5) *Social Concordance*, comprising the facets of aggression regulation, frustration tolerance, respect, and cooperation. Intercorrelations between these factors ranged in the middle.

A Norwegian study has replicated the original Dutch study to establish the cross-national validity of the questionnaire (Arnevik, Wilberg, Monsen, Andrea, & Karterud, 2009). The results of this study revealed good cross-national validity of the SIPP-118. So far, the SIPP-118 had not been tested in a sample of adolescents; this study examined the psychometric properties of the SIPP-118 in adolescents by replicating the original adult study. Furthermore, the authors examined the SIPP-118 as a valid measure of general personality pathology by investigating the relationship between SIPP-118 and well-established measures of psychosocial function and symptomatic distress.

CROSS-CULTURAL MEASURES

The Cross-Cultural (Chinese) Personality Assessment Inventory

The Chinese Personality Assessment Inventory (CPAI; Cheung et al., 1996) originated in a collaborative project between the Chinese University of Hong Kong and the Institute of Psychology at the Chinese Academy of Science. The aim of the project was to develop a culturally relevant multidimensional personality measure by adopting the scientific methodology of mainstream psychology. A combined emic–etic approach was adopted in the development of the CPAI and its revised version, the CPAI-2 (Cheung et al., 1996; Cheung, Cheung, & Leung, 2008; Cheung, Fan, Cheung, & Leung, 2008). Universal and indigenous personality traits considered to be important in the Chinese culture were generated in a bottom-up approach to develop a set of normal personality and clinical scales for comprehensive personality assessment. Instead of translating imported measures or extracting adjectives from dictionaries, the researchers explored multiple sources for folk descriptions of personality, including contemporary Chinese novels, Chinese proverbs, and the psychological research literature. They conducted focus groups with participants from diverse backgrounds, street surveys on self-descriptions, and surveys of various professionals on other descriptions. Using a consensus method, the research team combined the conceptually related personality descriptors to form the preliminary list of personality scales to be included in the measure. Local expressions of these constructs were written as items. At the same time, the researchers did not ignore the existing literature on etic personality measures. Large-scale studies involving participants from a wide range of backgrounds were conducted for item selection and scale development. The standardization samples were derived from various regions of China.

Four normal personality factors and two clinical factors were extracted from the CPAI scales. For the CPAI-2, 28 normal personality scales load on four factors: *Social Potency/Expansiveness*, *Dependability*, *Accommodation*, and *Interpersonal Relatedness*, and 12 clinical scales load on the two clinical factors: Emotional Problem and Behavioral Problem (Cheung et al., 2008a). The adolescent version (CPAI-A) consists of 25 normal personality scales that load on four factors: Social Potency/Expansiveness, Dependability, Emotional Stability, and Interpersonal Relatedness, and 14 clinical scales that load on two clinical factors similar to those in the CPAI-2 (Cheung et al., 2008b). Some of the indigenously constructed scales load on factors that are etic in nature; for example, “face” loads on the Dependability or Emotional Stability factors, while somatization loads on the Emotional Problem factor. The emic personality factor Interpersonal Relatedness consists of more indigenously derived scales, such as harmony and *renqing* (reciprocity in instrumental and affective relationships). In an extensive research program carried out by the test developers and other researchers, the validity and applied utility of the CPAI as an assessment measure was built up.

Cross-cultural research was conducted to compare CPAI with similar Western personality measures to examine the cultural universals and specifics in its personality constructs, thereby combining emic and etic approaches. For example, while the convergent validity of the CPAI and the Minnesota Multiphasic Personality Inventory (MMPI-2) showed correspondence between many of the clinical scales, discrepancies between some of the scales highlighted possible cultural differences in the manifestation of psychopathology between Chinese and American cultures (Cheung, Cheung, & Zhang, 2004). Studies on the clinical and other applied utilities of the CPAI in organizational and educational settings illustrated the added value of the indigenous personality constructs in predicting various criterion variables (Cheung et al., 2008a; Cheung, Fan, & To, 2008; Cheung, Zhang, & Cheung, 2010).

The indigenously derived CPAI also provides a means to address the question of the universality of the personality structure defined in the FFM. In a joint factor analysis between the CPAI and the NEO-PI-R (Costa & McCrae, 1992), it was found that the indigenous Interpersonal Relatedness factor—which covers personality features in instrumental interpersonal relationships in a collectivistic culture, such as harmony and reciprocity in relationship—did not load on any of the NEO-PI-R factors (Cheung, Hattie, & Ng, 2001). In the joint analysis of the revised version of the CPAI (CPAI-2; Cheung et al., 2008a) and the NEO-FFI, the Interpersonal Relatedness factor was again found to be distinct. In a cross-cultural study using translated versions of the CPAI-2 in Korean, Japanese, and Asian American samples, the Interpersonal Relatedness factor was identified in all samples as a unique factor in the joint analysis of the CPAI-2 and the NEO-FFI (Cheung, 2009).

In Cheung et al.'s (2001) study, the NEO-PI-R Openness factor did not load on any of the CPAI factors, which suggests that openness is more relevant to Western culture. To explore the relevance of openness in the Chinese cultural context, a set of indigenously derived openness scales were added to the CPAI-2. It was expected that a separate Openness factor would be extracted from the CPAI-2 after adding these scales. However, some of the openness scales loaded with extraversion to form the expanded Social Potency/Expansiveness factor, which depicts dynamic leadership, while the other interpersonally related openness scales derived from folk descriptions, interpersonal tolerance, and social sensitivity, loaded with the Accommodation factor and the Interpersonal Relatedness factor, respectively. Although openness-related features of personality were recognizable in the CPAI-2, they were more complex than the Openness factor found in Western culture. They operate better in conjunction with other interpersonally oriented dimensions in defining the structure of personality in a Chinese context.

The replication of a four-factor structure in the CPAI-2 even after the addition of openness-related scales suggests that the lack of loading on the Openness factor in the joint analysis between the original CPAI and the NEO-PI-R may reflect cultural differences in the underlying psychological meaning of openness. Although characteristics of people who are regarded as open could be described and recognized, openness is not an inherently distinct structure in the implicit theory and taxonomy of personality in the Chinese culture and has not been included as a major dimension in other lexical measures of Chinese personality (Cheung et al., 2008a). Instead, these openness-related characteristics coexisted with other traits on the CPAI-2 to define culturally relevant personality taxonomy.

Although the CPAI was developed in a Chinese cultural context, the relevance of its emic constructs could be examined in a reversed emic–etic approach. To test the cross-cultural relevance of its indigenously derived scales, the CPAI has been translated into English, Korean, Japanese, and, more recently, into Dutch, Romanian, and Vietnamese. Cross-cultural samples have confirmed the congruence of the factor structure, especially among Asian and Asian American samples (Cheung, 2009; Cheung, Cheung, Leung, Ward, & Leong, 2003; Cheung, Cheung, Howard, & Lin, 2006). These findings suggested that some of the indigenously derived personality constructs are also cross-culturally relevant, which led to the renaming of the CPAI-2 as the Cross-Cultural Personality Assessment Inventory.

As Yang (2006) noted, in individualist cultures, personal-oriented personality traits are more developed, differentiated, and influential in everyday life, whereas in collectivist cultures, social-oriented personality traits are more developed, differentiated, and influential. The combined emic–etic approach to personality assessment (Cheung et al., 2010) allows the comparison of indigenously derived and imported concepts and measures in different cultural contexts and the examination of the relative emphasis of these culturally relevant dimensions in different settings.

Multicultural Personality Questionnaire

The most popular theory of the multicultural personality is that put forth by a team of researchers in the Netherlands specialized in personnel and industrial/organizational psychology. van der Zee and van Oudenhoven's (2000) theory of the multicultural personality is linked to the construct of *multicultural effectiveness*, which is defined "as success in the fields of professional effectiveness, personal adjustment and intercultural interactions" (p. 293). These authors developed the 91-item Multicultural Personality Questionnaire (Cheung et al., 2010) that centers around five personality traits: *Cultural Empathy* (the ability to empathize with culturally diverse individuals), *Emotional Stability* (the ability to stay calm and collected under stressful conditions), *Social Initiative* (approaching social situations in an active manner and taking the initiative in such situations), *Open-Mindedness* (being open and nonjudgmental regarding diverse cultural groups and variant worldviews), and *Flexibility* (an attitude of seeing new situations as positive challenges and the ability to adapt behavior to fit cultural contexts). Recent integrative reviews of approximately 40 empirical studies that incorporated the Multicultural Personality Questionnaire have generally supported both the five-factor structural validity of the model, as well as its incremental validity in predicting score variance on culture-related criterion variables above and beyond the variance accounted for by the Big Five (Matsumoto & Hwang, 2013; Ponterotto, 2008; Ponterotto & Fietzer, 2014).

The Multicultural Personality Questionnaire (van der Zee & van Oudenhoven, 2000, 2001) consists of 91 items. It is a five-factor survey instrument that requests participants to respond to personal descriptors in response to the question: "To what extent do the following statements apply to you?" For example, factors are as follows: *Cultural Empathy*, "Senses when others get irritated"; *Open-Mindedness*, "Is intrigued by differences"; *Social Initiative*, "Takes the lead"; *Emotional Stability*, "Suffers from conflicts with others"; and *Flexibility*, "Wants to know exactly what will happen."

The Multicultural Personality Questionnaire has been used in multiple studies, particularly in Europe. These studies support the construct validity of the five-factor Multicultural Personality Questionnaire as assessed through both exploratory and confirmatory factor analyses across diverse samples (e.g., Leone, van der Zee, van Oudenhoven, Perugini, & Ercolani, 2005; van der Zee, Zaai, & Piekstra, 2003; van Oudenhoven, Timmerman, & van der Zee, 2007). The Multicultural Personality Questionnaire factor scores have also been quite reliable across samples, settings, and contexts (e.g.,

van der Zee & van Oudenhoven, 2000, 2001; Ponterotto, 2008). Reliability coefficients typically range between moderate and high limits for students, employees, and general citizens, both in the context of transition to a new culture and in an intercultural context within one's home country; for example, at school, at work, or in the neighborhood (Ponterotto, 2008). In addition, the empirical evidence suggests that the five scales are able to predict indicators of intercultural success among immigrants (e.g., van der Zee, van Oudenhoven, & Bakker, 2002; Hofstra, 2009), expatriates and their families (Ali, van der Zee, & Sanders, 2003; van der Zee, Ali, & Haaksma, 2007), intercultural teams (van der Zee, Atsma, & Brodbeck, 2004), and international students and employees (Leong, 2007; van der Zee and Brinkmann, 2004; van Oudenhoven and van der Zee, 2002). In doing so, the five Multicultural Personality Questionnaire factors have demonstrated incremental validity over broad personality measures, such as the Big Five in predicting criteria, such as students' international orientation (Leone et al., 2005; van der Zee & van Oudenhoven, 2001) and employees' overall behavior (van der Zee et al., 2003).

A limitation of the Multicultural Personality Questionnaire model is its specific focus on adult expatriates and international students involved in international sojourns. The model is not intended for broad applicability to adolescents and adults living in culturally evolving and shifting communities.

SOURCES OF BIAS IN TESTING

Holden and Book (2012, p. 71) define faking as "intentional misrepresentation in self-report." Participants are likely to fake results in high-stakes situations in an attempt to increase their chances of attaining a desired outcome. They may "fake good" by exaggerating their positive characteristics on an integrity assessment for a job application, or "fake bad" by underperforming in an assessment of academic abilities to qualify for additional support (e.g., Holden, 2007; Viswesvaran & Ones, 1999). Faking good—the tendency to answer in a way that will be viewed favorably by others—has also been termed Socially Desirability Responding (SDR), although it may represent only one type of SDR.

Accordingly, detecting and preventing faking on self-report personality inventories has become a matter of theoretical and practical importance. In test development, many personality inventories include validity indices. For example, the MMPI-2 includes seven validity indices (Butcher et al., 2001). Other inventories have been developed to assess individuals' response styles, such as the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1998) and the Marlowe–Crowne Social Desirability Scale (MCDS; Crowne & Marlowe, 1960). Bias is commonly triggered by the test taker (or respondent), the examiner, or the researcher.

Respondent bias

SDR refers to an overly positive self-representation on self-report questionnaires. It is viewed as an undesirable characteristic in that it can introduce systematic variance in scores that is unrelated to the variance of interest. As such, it can be viewed as a bias that may have an attenuating effect on the validity of self-report inventories (Tracey, 2016). SDR has attracted the attention of researchers in the field of personality assessment for more than 50 years. It is typically defined as a tendency to provide overly positive self-evaluations in association with current standard social norms and values (Zerbe & Paulhus, 1987).

MacCann, Ziegler, and Roberts (2012) defined SDR as: (1) a behavior that (2) requires motivation for engagement, which (3) may result in inaccurate scores and (4) results from the interaction of the person with the situation. Heggestad (2012) reviewed the literature and found that engaging in SDR is a function of personality factors (i.e., lack of conscientiousness, emotional stability, integrity, and rule consciousness) and situation factors (i.e., importance of the outcome, knowledge of job requirements, and knowledge of how the test will be used).

The disadvantages of SDR have led to the proliferation of the development of appropriate scales (Paulhus, 1991; Uziel, 2010). The most widely used instrument for the past 60 years has been the MCDS (Crowne & Marlowe, 1964), which consists of 33 items that were chosen based on their judged social desirability and item analysis. The items are thought to reflect "behaviors which are culturally sanctioned and approved but which are improbable of occurrence" (Crowne & Marlowe, 1960, p. 350).

Paulhus (2002) and Paulhus and Trapnell (2008) proposed a new model, the two-tiered SDR, according to which SDR can be classified by the levels of both consciousness (Conscious–Unconscious) and content of self-presentation (Egoistic–Moralistic). This two-tiered model builds on Paulhus's (1984) conceptualization of SDR, according to which it can be separated into unconscious *Self-Enhancement* and conscious *Impression Management*. Self-Enhancement is a stable individual characteristic manifested as positively biased self-descriptions that an individual believes to be true. In contrast, Impression Management represents a deliberate attempt to create a favorable self-image and depends on the characteristics of the situation. The second tier of the model follows from the research on the structure of self-favoring bias, which has revealed that people give favorable self-presentations in two separate content domains.

Another crucial source of bias in popular rating scales is the *acquiescence* or *agreeing response style* (Aichholzer, 2015). Such responses tend to consistently endorse positively expressed (pro-trait) or negatively expressed (con-trait) items (Paulhus, 1991). Acquiescence appears to be an attribute highly consistent across domains and stable over time (e.g., Danner, Aichholzer, & Rammstedt, 2015; Wetzel, Lüdtke, Zettler, & Bohnke, 2015). The best way to control for acquiescence bias is by using balanced scales (Danner et al., 2015). Balanced scales contain the same proportion of positive and negative items.

On the *item level*, acquiescence in balanced scales can be controlled using structural equation modeling or ipsative transformation. Using structural equation modeling allows for decomposition of the variance of a manifest variable into construct variance (e.g., extraversion), acquiescence variance, and residual measurement error variance. This allows exploring the relationship between latent variables that are adjusted for acquiescence and measurement error. An alternative approach to control for acquiescence on item level can be ipsative transformation of the items' raw scores (i.e., subtracting the mean score of a balanced scale from each item's raw score; e.g., subtracting the mean score of the BFI-10 from each BFI-10 item). The resulting scores are adjusted for acquiescence and thus can be interpreted as more valid indicators of the underlying construct (e.g., Brown & Maydeu-Olivares, 2011).

On the *scale level*, acquiescence can be controlled by recoding negatively poled items before computing the mean score across items. Acquiescence would increase the scores of positively poled items and decrease the scores of negatively poled items by increasing the confidence interval of an individual's test score.

Examiner bias

A newly discovered type of bias is *examiner processing bias*, which occurs when the clinician is faced with evidence drawn from multiple modalities, some of which may be contradictory. Thus the examiner is compelled to evaluate the evidence more thoroughly (Baldini, Parker, Nelson, & Siegel, 2014; Shapiro, Jazaieri, & Goldin, 2012). The *mindful processing* may diminish the adverse impact of naturally occurring information processing bias or cognitive distortions on the part of the clinician. In this context, it will be useful to explore more systematically the range of cognitive distortions that help shape clinical decisions, as the impact of these distortions may affect different types of diagnostic and assessment data (Caplan & Cosgrove, 2004; Garb, 2005). Although research on information processing bias has traditionally emphasized the impact of cognitive dynamics (Kahneman, 2003), in recent years increasing attention has been paid to the moderating role of emotion on judgment and prediction. Slovic, Finucane, Peters, and MacGregor (2007) documented people's tendency to use subtle emotional responses to guide decisions. In clinical settings the *affect heuristic* can cause clinicians' immediate emotional reactions to patients to inadvertently bias their conclusions, with patients who are disliked perceived as being more severely impaired (or warranting a more stigmatizing diagnosis), and those who evoke a more positive emotional response perceived as higher functioning (Robinson & Clore, 2002; Sibinga & Wu, 2010). Thus, in addition to examining the impact of stereotyping, attributional distortion, and other forms of information processing bias in diagnosis and assessment, researchers must examine the role of affect-based distortion in perceptions of and decisions regarding patients.

Such bias includes stereotypes, heuristics, misattributions, and confirmatory bias.

Stereotypes: Numerous studies have revealed that some patients' characteristics may be modestly related or unrelated to personality disorder diagnosis (e.g., gender and age). Such characteristics may affect clinicians' decisions.

Heuristics: Processing shortcuts can also affect personality disorder diagnoses. For example, if one works in a setting with a high percentage of antisocial patients, one would be more likely to diagnose a patient with ambiguous personality disorder symptoms as antisocial (the *base rate heuristic*). Similarly, if one had an experience with a borderline patient, one might misdiagnose another patient as having borderline personality disorder if the second patient shares some noticeable features with the first patient, even if those features are unrelated to borderline pathology.

Misattributions: The processing bias of misattribution—the classic actor–observer effect—can lead to a variety of diagnostic errors. For example, a patient might be incorrectly identified as having paranoid personality disorder if the clinician fails to recognize that this patient's suspicious stance is an adaptation to a threatening environment (Paris, 2008). Similarly, a patient might be misdiagnosed as having dependent personality disorder if the clinician does not take into account that the patient was raised in a highly sociocentric society (Bornstein, 2012a).

Researcher bias

Confirmatory bias is similar to self-fulfilling prophecy. We all seek to find evidence that validates our a priori beliefs or values, and may underestimate or ignore evidence that contradicts our expectations (e.g., Garb, 2005). Confirmatory bias occurs when a researcher develops a hypothesis or belief and uses respondents' information to support that belief.

Cultural bias may be the outcome of assumptions or expectations regarding the motivations and values of test participants. *Ethnocentrism* is judging another culture according to the values and standards of one's own culture. *Cultural relativism* concerns how an individual's beliefs and behaviors would be perceived by others in terms of that individual's own culture.

There are three sources in cross-cultural research. The first is *construct bias*, which occurs when the construct measured is not identical across groups. Ho's (1996) work on filial piety (psychological characteristics associated with being a good son or daughter) provides a good example. Another important source of bias is *method bias*, which may be the outcome of sample incomparability, instrument characteristics, tester and interviewer effects, or the method of administration. Examples of method bias include differential stimulus familiarity in mental testing and differential social desirability in personality and survey research. A third source of bias is *item bias* or *differential item functioning*. An item is biased if participants with the same level on the underlying construct (e.g., they are equally extraverted), but those who come from different cultural groups do not have the same expected score on the item. The expected item score is usually derived from the total test score.

PERFORMANCE-BASED TESTS

One of the major criticisms over the past 50 years against projective techniques was their inadequate psychometric properties and, in particular, the limited or even lack of validity (e.g., Garb, Wood, Lilienfeld, & Nezworski, 2002; Medoff, 2010).

Chris Piotrowski (2015) carried out a thorough investigation of the past 25 years (1995–2015) to examine projective test usage worldwide (Table 10.2).

TABLE 10.2 Major Investigatory Aspects of Journal Articles on Projective Techniques (1990–2015)

| Topical focus | <i>N</i> |
|--------------------------|----------|
| Test validity | 548 |
| Personality measures | 412 |
| Test reliability | 334 |
| Psychometrics | 306 |
| Methodology | |
| Empirical analysis | 1771 |
| Quantitative approach | 666 |
| Interviews | 71 |
| Clinical case study | 66 |
| Qualitative design | 53 |
| Literature review | 47 |
| Longitudinal design | 43 |
| Metaanalysis | 16 |
| Age group (years) | |
| Adult (18+) | 1553 |
| Adolescents (13–17) | 450 |
| Children (1–12) | 307 |
| Aged (65+) | 268 |

Source: Reprinted from Piotrowski, C. (2015). Projective techniques usage worldwide: a review of applied settings 1995–2015. *Journal of the Indian Academy of Applied Psychology*, 41(3), Special Issue, 9–19, with permission. Copyright 2015 Journal of the Indian Academy of Applied Psychology.

In general, the overall analysis indicates that projective tests have continued to be used (to some degree) in the majority of countries surveyed over the past 20 years. In 50% of these studies ($n = 14$), at least one projective technique was ranked within the top five tests in terms of usage. The Rorschach seems to be the most popular projective test, evident by being ranked among the top 5 tests in 12 of these 14 studies. This corroborates research-based findings (Piotrowski, 1996). Human figure drawings, sentence completion methods, and the Thematic Apperception Test (TAT) ranked among the top 15 tests in 25 of the 28 surveys in the current analysis. Validation research on these instruments shows modest support (e.g., Yama, 1990). In the aggregate, a general conclusion can be confidently offered that projective tests continue to be relied upon across diverse psychological practitioner groups, in various clinical settings, for all age groups (children, adolescents, and adults), and across many countries worldwide over the past 2 decades (1995–2015).

However, clinicians' usage of projective techniques should not be the sole criterion to judge the popularity of projective techniques among assessment measures. Another crucial criterion is the number of publications concerning projective techniques, from widely known journals, such as the *Journal of Personality Assessment* and *Psychological Assessment*. It appears that for the last 3 years (2014–16) there is an increase on publication referring to Rorschach.

Rorschach inkblot method: new interpretation systems, developments in psychometric properties, and criticisms

Contemporary Scoring Systems

By most accounts, the modern era of Rorschach practice and research began with the publication of Exner's (1974) Comprehensive System (CS), as the first empirically grounded framework for Rorschach inkblot method (RIM) scoring and interpretation that combined features of five well-established systems available at that time. The CS was revised in 1986, and refined again in 1991 (Exner, 2001; Exner & Erdberg, 2005). Although Exner's (1974, 1986, 1991) system has elicited a plethora of criticism (e.g., Wood, Nezworski, Lilienfeld, & Garb, 2003), it provided a single overarching framework that incorporated both structural and content scoring. The empirical foundation of the RIM was strengthened as a result of Exner's (1974, 1986, 1991) work, and the test achieved a degree of respectability that it had not enjoyed for many years (Meyer, 1999; Weiner, 2000a,b). The utility of the CS was further enhanced by the delineation of detailed international norms (Shaffer, Erdberg, & Meyer, 2007), and the development of rigorous empirical frameworks for the derivation and validation of RIM scores (McGrath, 2008; Meyer, 1996; Weiner, 2001).

Although Exner's CS has remained the dominant RIM scoring and interpretation system during the past several decades (Meyer & Archer, 2001; Weiner, 2004), a number of well-validated RIM scoring systems designed to assess narrower, more focused constructs (e.g., thought disorder, interpersonal dependency, and potential to benefit from psychotherapy) also attracted the attention from Rorschach researchers, and have been utilized in the laboratory, clinic, and field.

To further enhance the empirical foundation and clinical utility of the RIM, Meyer, Viglione, Mihura, Erard, and Erdberg (2011) developed the Rorschach Performance Assessment System (R-PAS). Supporting Exner's (1974, 1986, 1991) CS, and incorporating aspects of narrower scoring systems with strong empirical foundations (e.g., Rorschach Oral Dependency scale; Masling, Rabie, & Blondheim, 1967), the R-PAS was developed to optimize RIM administration, refine RIM scoring, and enhance RIM interpretation. As Meyer et al. (2011) noted, among the key goals of R-PAS are to: (1) distinguish variables with strong empirical support from those with weaker support; (2) provide a simplified system of terminology, symbols, and calculations to increase parsimony; (3) describe in detail the empirical evidence and theoretical rationale for each RIM variable; (4) optimize the number of responses given, and provide statistical procedures to adjust for overall complexity of a record, to ensure that each record is interpretable; and (5) provide a more intuitive, graphic procedure for comparing respondents' scores with those of a large international reference sample, facilitating RIM interpretation.

The Rorschach Psychoanalytic Science and Practice Model

The Rorschach Psychoanalytic Science and Practice (RPSP) model provides an assessment model that is designed along the lines of the *Psychodynamic Diagnostic Manual* (PDM Task Force, 2006) applied to various psychopathological syndromes. Similarly to the *Psychodynamic Diagnostic Manual*, the RPSP is based on the assertion and conviction that mental health comprises more than simply absence of symptoms. It involves a person's overall mental functioning, which consists of cognitive, affective, relational, and self-observing capacities. Designed to classify psychopathological manifestations according to the *Psychodynamic Diagnostic Manual*, the RPSP adopts a dimensional approach to developmental psychopathology (Hudziak, Achenbach, Althoff, & Pine, 2007). Thus, the model employs a standardized individualized conception of Rorschach assessment.

Basically, the RPSP resembles [Weiner's \(2003\)](#) ego psychology perspective on the interpretation of the Rorschach protocol that has been administered and coded according to CS guidelines ([Exner, 2003](#)). This model employs additional psychodynamic perspectives, particularly those of object relations, self-psychology, and relational psychoanalysis.

Psychometric Properties of RIM Scores

Several critics have questioned the adequacy and representativeness of clinical and nonclinical CS norms (e.g., [Lilienfeld, Wood, & Garb, 2000](#)). In addition, researchers who question the clinical utility of the measure have argued that RIM scores do not meet acceptable criteria for reliability and validity. Those who argue in support of the test contend that—while not perfect—the RIM fares well in this regard when compared with other widely used assessment tools ([Bornstein, 2002, 2012b](#); [Weiner, 2000a,b](#)).

Examining the construct validity of RIM scores is complicated by the fact that reliability and validity data vary from system to system, and from variable to variable within complex systems (like the CS) that generate multiple scores ([Hunsley & Bailey, 1999](#); [Meyer & Archer, 2001](#)). As [Bornstein \(2012b\)](#) and [Viglione and Taylor \(2003\)](#) noted, examining the reliability and validity of RIM ratios, percentages, and derivations is particularly challenging, as it is not easy to depict which components of multiscore variables are responsible when reliability or validity data are inadequate.

Reliability

[Gronnerod \(2003, 2006\)](#) used metaanalytic procedures to estimate retest correlations for a broad array of CS and non-CS RIM scores, finding that both short- and long-term retest reliabilities were generally good, with reliability coefficients (r) for the majority of RIM scores in moderate to upper range limits. As [Meyer \(2004\)](#) and [Weiner \(2004\)](#) noted, in evaluating RIM retest reliability, researchers should distinguish those scores that are expected to be relatively stable over time (e.g., defense style and ego impairment) from those that are more state-like (e.g., suicidality and experienced stress), so reliability coefficients can be properly contextualized.

Reviews of interrater reliability for a long array of RIM variables show that interrater reliability for most RIM variables is adequate.

Validity

RIM scores differ in the degree to which they show adequate concurrent and predictive validity. Evidence in this area is derived from a variety of samples (e.g., psychiatric patients, medical patients, and community adults), involving a broad array of outcome measures (e.g., depression, aggressiveness, impulsivity, narcissism, dependency; [Bornstein, 2012c](#)).

Several other findings from studies of the convergent and discriminant validity of RIM scores are worth noting, as these findings have implications for use of the RIM in various applied settings:

1. *RIM scores predict spontaneous behavior better than goal-directed responding.* As [McClelland et al. \(1989\)](#) noted, this pattern holds for other performance-based tests as well. As [Bornstein \(1998a, b\)](#) demonstrated, the concurrent validity of RIM scores (specifically Rorschach Oral Dependency scores) increases when participants' attention shifts away from task-relevant behavior (in this case dependency-related help seeking), and decreases when participants' attention is focused on the relevance of the task so their behavior becomes more goal directed. These patterns hold for children, as well as adults, and clinical, as well as nonclinical, samples.
2. *RIM scores correlate as expected with scores from other performance-based tests.* As would be expected given shared method variance, RIM scores tend to correlate strongly with scores on other performance-based tests that assess similar constructs (e.g., the TAT and the Holtzman inkblot test).
3. *RIM scores show modest correlations with self-reports.* In general, RIM scores tend to correlate with questionnaire- and interview-based self-reports of similar constructs in the range of .20–.30. Although these modest correlations have been incorrectly cited as evidence of problems with the validity of RIM scores ([Wood et al., 2003](#)), they represent compelling evidence for the discriminant validity of RIM scores, which would be expected to correlate modestly with self-reports ([Bornstein, 2002, 2012b](#)).

Rorschach validity has been a frequent target for criticisms ([Lilienfeld et al., 2000](#)). Coding Rorschach responses is complex, which can lead to disagreements between examiners.

Although there are thousands of studies on the Rorschach, it is highly complicated to conduct metaanalyses given that there are so many studies that address so many different scales and constructs. One option has been to conduct “global” metaanalyses of test validity by selecting a subset of representative studies and averaging their findings to estimate the

overall or “global” validity of the test taken as a whole. Global validity metaanalyses have consistently shown that the Rorschach, taken as a whole, has moderate overall validity (and roughly equivalent to the MMPI), which strongly suggests that at least some Rorschach indices possess meaningful validity. Although this addresses general “test” validity, it does not address the validity of each of the test’s numerous scales (Garb, 1999; Lilienfeld et al., 2000).

A large-scale metaanalytic study evaluated the evidence in the literature for the validity of the 65 core Rorschach CS variables (Mihura, Meyer, Dumitrascu, & Bombel, 2013; see comment by Wood, Garb, Nezworski, Lilienfeld, & Duke, 2015; Mihura, Meyer, Bombel, & Dumitrascu, 2015), finding that variables with the strongest support were largely those that assess psychotic processes, psychological resources, and cognitive complexity, and that those with the least support tended to be very rare scores or some of the more recently developed scales (e.g., for assessing egocentricity). No other psychological tests have construct validity metaanalyses completed for so many of their scales, and most other tests have no metaanalyses of their validity. These CS metaanalyses mediated the development of a new Rorschach system (R-PAS).

Thematic Apperception Test and the SCORS-G assessment system

Aronow, Weiss, and Reznikoff (2001) propose three contributors to the TAT response: card stimulus, testing environment, and the patient’s inner world. To date there is limited research on stimulus pull of the TAT (Murray, 1943). It has long been accepted that card content may influence narratives in systematic ways (Aronow et al., 2001). Early research on card pull suggested that cards differ in terms of the nature, consistency, and intensity of pull each exerts (e.g., Eron, 1950; Pine, 1960).

Stimulus pull can be defined as the “tendency of the stimulus to evoke or predispose certain perceptual and/or affective responses in the subject” (Peterson & Schilling, 1983, p. 273). It demarcates a reality associated to the actual picture perception (Peterson & Schilling, 1983). To date there is no single widely accepted scoring system for the TAT comparable to the CS for the Rorschach (Exner, 1995). Jenkins (2008) reported that the most common measures used to rate TAT narratives are the Social Cognition and Object Relations Scale (SCORS; Westen, 1995) and the Defense Mechanism Manual (DMM; Cramer, 1991).

Early empirical research on TAT stimulus pull focused on rating the frequency of themes and emotions evoked by the cards in both patient and nonpatient samples (Eron, 1948, 1950, 1953). Eron’s (1950) work in developing normative data was considered groundbreaking. There was also research into the perceptual clarity associated with the cards (e.g., the extent to which individuals were observing the characteristics, objects, and social perceptions of characters’ similarity) (Murstein, 1972).

Later researchers began using specific rating scales to examine unique aspects of stimulus pull. Whereas the notion of stimulus pull is widely accepted, there is less consensus regarding the extent and the impact (Siefert et al., 2016). TAT coding systems differ in terms of the constructs they assess, the methods they employ, and the nature of the unit of analysis. Thus, the impact of card pull may differ across systems.

The Social Cognition and Object Relations Scale Global Rating Method (SCORS-G; Stein, Hilsenroth, Slavin-Mulford, & Pinsky, 2011; Westen, Lohr, Silk, Kerber, & Goodrich, 1989) is a recently developed rating system that assesses eight personality dimensions. Consistent with its clinical focus, each dimension is assessed on a continuum from maladaptive to adaptive. The eight scales can be combined into a global scale representing the overall quality of representation. This scale consists of eight variables that are scored on a 7-point anchored scale where lower scores (e.g., 1, 2, or 3) indicate more pathological responses and higher scores (e.g., 5, 6, or 7) indicate healthy responses. The first variable is complexity of representations of people (COM), which evaluates internal states and how well the patient is able to see internal states in the self and other when reporting narratives. It also assesses the patient’s relational boundaries and ability to integrate both positive and negative aspects of self and others. Affective quality of representations (AFF) examines a patient’s expectations of others within a relationship and the description of significant relationships in the past. It assesses emotional tone of the narrative. Emotional investment in relationships (EIR) assesses a patient’s ability for intimacy and emotional sharing; emotional investment and values in moral standards (EIM) assesses the extent to which the patient uses abstract thought in relation to morality and compassion for others.

Understanding of social causality assesses the extent to which the patient understands human behavior. Experience and management of aggressive impulses (AGG) assesses the patient’s ability to tolerate and manage aggression appropriately. Self-esteem assesses the patient’s self-concept, and identity and coherence of self assesses a patient’s level of fragmentation and integration. Although originally developed for use with clinical populations as a tool for personality structure and diagnostic assessment (Stein et al., 2011; Westen et al., 1989), it has more frequently been used as a research instrument (e.g., Bram, 2014; Stein, Slavin-Mulford, Sinclair, Siefert, & Blais, 2012).

The Fairy Tale Test: a novel personality test for children

The Fairy Tale Test (FTT) is an individually administered projective test for children aged 6–12 years. It was inspired by the association between fairy tales and unconscious processes (e.g., Bettelheim, 1976). I developed it as part of my doctorate thesis “The Development of the Fairy Tale Projective Test (FTT) in the Personality Assessment of Children” (Coulacoglou, 1993), which I standardized on a Greek sample of 803 nonclinical children aged 7–12 years. Ten years later (2001–03), I restandardized the test on a new sample of 873 Greek nonclinical children from the greater Athens area. The restandardization included a younger age group (6–7 years) and supplementary psychometric studies. Since then, the FTT has been standardized in many countries and published in 13 languages (Coulacoglou, 2014).

The FTT consists of seven sets of cards. Each set consists of three cards. The cards illustrate variations of popular fairy tale characters, mainly from the stories of Little Red Riding Hood and Snow White and the Seven Dwarfs. The use of these variations is to provide the child with an opportunity to project different aspects of him- or herself, as well as to stimulate the emergence of defense mechanisms.

The five main fields of application of the FTT are:

1. To examine the impact that certain life events may have on the child’s personality (e.g., the birth of a sibling, divorce, long-term illness or hospitalization of the child, or death of a family member, etc.).
2. As a diagnostic tool in detecting possible psychopathological signs, such as anxiety, depression, hostile aggression, low self-esteem, poor reality testing, poor ego strength, and the frequency and type of defense mechanisms (e.g., Arnould, Daviller, & deTychey Feral, 2011; Abgrall, Coulacoglou, Spyridaki, & Toyas, 2014; Coulacoglou, Tchinou, & Michopoulou, 2001; Coulacoglou, 2008).
3. To aid in the evaluation of family dynamics and family functioning: the quality of the relationship between parents and child, as well as of the marital relationship (Sanyal, Dasgupta, Marinakis, & Doukas, 2006).
4. As a tool in the evaluation of psychotherapeutic interventions (administering the FTT before and after psychotherapy).
5. As a research tool in the cross-cultural study of personality (Savina, Coulacoglou, Sanyal, & Zhang, 2012; Valadez Sierra, Coulacoglou, Gkotsi, Mitsios, & Triantopoulou, 2010).

Like all personality measures, the FTT has both advantages and limitations.

Its major assets are:

Stimulus material: The child is presented with three cards at once rather than one at a time. Having three versions of a single character facilitates the projection of the different sides of self. The illustrated characters are well-known heroes from classic tales that children find enchanting. The close relation between fairy tales and unconscious processes has been stressed by many authors, mostly from a psychoanalytic or Jungian approach (e.g., Freud, 1913; Fromm, 1951; von Franz, 1970/1996; Bettelheim, 1976; Kaes, Perrot, Guerin, Mery, & Reumaux, 1989). The technique of the illustrations differs from one set to another, as some were drawn in watercolors and others in ink or pencil. The rationale behind this perception is that this variability in drawing techniques makes the long administration less boring.

Administration: Administration is in the form of an interview in which the child is asked to respond to questions relating to each of the cards. This method of administration is entertaining and makes the process more attractive and less tiresome. Making up a story may be a difficult or frustrating task for young children, especially those who lack imagination or are inhibited.

Sample Cards from Little Red Riding Hood



Card 1



Card 2



Card 3

Sample Cards from Snow White and the Dwarfs



Card 1



Card 2



Card 3

Interpretation: While the vast majority of thematic tests focus mainly on family or interpersonal relations, the FTT assesses a large number of personality variables and defense mechanisms. Quantitative interpretation of the FTT consists of the rating of 30 personality variables. Qualitative interpretation includes the analysis of defense mechanisms, as well as the evaluation of family dynamics and ego functioning.

Some of the FTT's major drawbacks are:

Duration of test administration: The duration of the test could be considered lengthy, especially in cases where children are inhibited or have difficulty concentrating (e.g., hyperactive).

The special attention necessary in coding some cases: There are cases where it is not clear which character the child identifies with (e.g., with aggressor or victim, or both).

Overlapping of variables: Some responses may fall into more than one variable, especially with regard to the various types of aggression or anxiety.

FTT Personality Variables and Indicators

The 30 personality variables and indicators are classified under six broad aspects of personality functioning: Impulses, Ego Functions, Needs, Desires, Emotional States, and Object Relationships. However, some variables may fall into more than one of these conceptual categories; for example, sexual preoccupation commonly falls under Ego Functions (e.g., "the dwarf wants to marry Snow White"), but could fall under Impulses when there is a response like "the giant wants to make love to Snow White."

The selection of variables was conducted through the evaluation process (discussing and analyzing) of children's responses (a pilot study of 100 protocols).

Impulses: Oral Aggression (OA), Aggression as Dominance (AGRDOM), Instrumental Aggression (AGRINSTR), Impulsive Aggression (AGRIMP), Aggression as Envy (AGRENVY), Aggression as Jealousy (AGRJEAL), Aggression as Defense (AGRDEF), and Aggression as Retaliation (AGRRET).

Desires: Desire for Material Goods (DMG), Desire for Superiority (DSUP), and Desire to Help (DH).

Needs: Oral Needs (ON), Need for Affiliation (NAFIL), Need to Give and/or Receive Affection (NAFCT), Need for Approval (NAPRO), and Need for Protection (NPRO).

Ego functions: Ambivalence (AMB) (in the FTT, AMB is expressed as indecision, hesitation, doubt, alternative responses, and emotional conflict), Self-Esteem (SE), Morality (MOR), Sense of Property (SPRO), Sense of Privacy (SPRIV), Sexual Preoccupation (SEXPR), Adaptation to Fairy Tale Content (AFTC), Idiosyncratic Responses (IR), and Repetitive Responses (REP).

Emotional states: Anxiety (ANX), Fear of Aggression (FA), and Depressive Feeling (D).

Object relations: Internalized Mother Relations (IMR) and Internalized Father Relation (IFR).

Standardization Sample

The sample of the Greek restandardization consists of 873 nonclinical children aged 6–12 years. A stratified sampling procedure was used to ensure that the test represented an equal number of children of both genders and of each age group. During the subsequent analysis of data and construction of norm tables, we formed age groups of 6–7, 8–9, and 10–12 years, with an almost equivalent number of boys and girls in each age group.

Scoring and Interpretation

We can interpret children's responses to the FTT quantitatively, as well as qualitatively.

Quantitative interpretation includes the rating and scoring of the 30 personality variables and indicators. Most of them are rated on a 1–3 point scale (whereby 1 is low in intensity and 3 is high in intensity). Raw scores are converted into normalized t scores ($M = 50$, $SD = 10$) to compare the personality variables measured by the FTT and to correct for any irregularities in the distribution of the scales. We define significant deviations on the FTT profile as one standard deviation above or below the mean (+10 t score units). Therefore, we interpret scores between 40 and 60 t as within normal limits. We consider deviations that fall two standard deviations above or below the mean to be highly significant. Furthermore, examiners distinguish between low normal scores, which fall between 40 and 50 t , and high normal scores, which fall between 50 and 60 t .

Qualitative interpretation: We examine a protocol for the detection of significant themes, keywords, or phrases and for the presence of defense mechanisms. We also evaluate intrapersonal or family dynamics.

Reliability

The purpose of retest reliability is to determine whether a second administration of the instrument would produce results similar to those of the first (2-month interval). Retest reliability was examined on 122 protocols. The reliabilities for the majority of the 30 variables ranged from moderate to high. It appears that the personality traits that exhibit high temporal stability as found in the FTT are Desire for Superiority (DSUP), Aggression Dominance (AGRDOM), Oral Needs (ON), Aggression Envy (AGRENVY), Desire to Help (DH), and Anxiety (ANX) (Anxiety Self-Image, ANXself).

Validity

The construct validity of the FTT was examined in two ways: (1) through the application of exploratory factor analysis and confirmatory factor analysis and the comparison between FTT factor scores and defense mechanisms, and (2) by comparing the FTT factor scores with other personality instruments: the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983; Achenbach, 1991), the Beck Youth Inventories (BYI; J. S. Beck, A. T. Beck, & Jolly, 2001), and the Aggression Questionnaire (AQ; Buss & Warren, 2000).

Second-order factors emerged (Table 10.3):

Factor 1: Reactive Aggression and Social Withdrawal

Factor 2: Ambivalence

TABLE 10.3 Second-Order Rotated Component Analysis of Five-Factor Solution

| Component | 1 | 2 | 3 | 4 | 5 |
|--|-----|------|------|-----|------|
| Primitive Aggression (6) | .94 | | | | |
| Isolation Tendencies and Impulsive Aggression (11) | .93 | | | | |
| Low Reality Testing (2) | | .73 | | | |
| Ambivalence (4) | | .71 | | | |
| Affectivity (10) | | -.56 | | | |
| Aggressive Assertiveness (1) | | | .77 | | |
| Profitable Aggression (3) | | | .55 | | |
| Depressive Feeling (9) | | | -.53 | | |
| Possessiveness and Insecurity (13) | | | | .68 | |
| Jealousy and Sexuality (12) | | | | .65 | |
| Internalized Symptoms and Self-Concepts (5) | | | | .45 | |
| Fear versus Envy (8) | | | | | -.72 |
| Helpfulness (7) | | | | | .49 |

Total variance explained = 56%.

Component 1 = Reactive Aggression and Social Withdrawal.

Component 2 = Ambivalence.

Component 3 = Proactive Aggression.

Component 4 = Possessive Jealousy.

Component 5 = Helpfulness versus Envy.

Source: Reprinted from Coulacoglou, C. (2014). A Study on the psychometric properties of the Fairy Tale Test (FTT). *Rorschachiana: Journal of the International Society for the Rorschach*, 35(2), 176–213, with permission. Copyright 2014 Hogrefe Publishing.

Factor 3: Proactive Aggression

Factor 4: Possessive Jealousy

Factor 5: Helpfulness Versus Envy

Association With the CBCL

Associations between FTT second-order factor scores and the CBCL provided valuable information on the psychological identity of some of the factors. More specifically: Factor 1 (Reactive Aggression and Social Withdrawal) correlated positively with Attention Problems ($r = .07$), Delinquent Rule-Breaking Behavior ($r = .07$), Aggressive Behavior ($r = .13$), Externalizing Problems ($r = .12$), and Total Problems factor ($r = .09$). Factor 4 (Possessive Jealousy) correlates positively with Attention Problems ($r = .10$).

Association With the Beck Youth Inventories

Correlations between FTT factors and Beck Youth scales revealed a few, yet significant, correlations. FTT second-order factors and BYI associations included Factor 2 (Ambivalence), which correlated positively with Anxiety Inventory (** $P < .03$).

Association With the Aggression Questionnaire

Correlations of the FTT second-order factors with the AQ scales revealed that Factor 2 (Ambivalence) correlated with Verbal Aggression and Hostility, and Factor 5 (Helpfulness vs. Envy) correlated with Anger.

Correlations With AQ Inconsistent Responding Index

It is worth mentioning that according to the inconsistency measure of the AQ, 68% of tested children responded in an inconsistent way. Due to the high percentage of inconsistent responses, we decided to examine the relation between this scale and the other measures. It was found that generally children described as disturbed in the other criterion measures responded in an inconsistent way in the AQ.

SUMMARY

The chapter has presented widely used personality questionnaires, as well as some performance-based measures. The authors chose to focus on novel interpretation systems for both the RIM and the TAT. A novel performance-based instrument for children, the FTT, is also presented. The chapter endorses a special section on test bias and the efforts to measure it. This section presents new strategies in evaluating bias and in particular Social Desirable Responding and acquiescence. The newly discovered Examiner Processing Bias is introduced.

REFERENCES

- Abgrall, A., Coulacoglou, C., Spyridaki, K., & Toyas, D. (2014). Épreuves projectives en clinique infantile: FTT et TAT. *Le Journal des Psychologues*, 316, 65–69.
- Achenbach, T. M. (1991). *Integrative guide for the 1991 CBCL/4-18, YSR and TRF profiles*. Burlington: Department of Psychiatry, University of Vermont.
- Achenbach, T. M., & Edelbrock, C. (1983). *Manual for the child behavior checklist and revised child behavior profile*. Burlington, VT: Queen City Printers.
- Aichholzer, J. (2015). Controlling acquiescence bias in measurement invariance tests. *Psihologija*, 48(4), 409–429.
- Ali, A., van der Zee, K., & Sanders, G. (2003). Determinants of intercultural adjustment among expatriate spouses. *International Journal of Intercultural Relations*, 27(5), 563–580.
- Allport, G. W. (1961). *Pattern and growth in personality*. Oxford, England: Holt, Rinehart & Winston.
- Arnevik, E., Wilberg, T., Monsen, J. T., Andrea, H., & Karterud, S. (2009). A cross-national validity study of the Severity Indices of Personality Problems (SIPP-118). *Personality and Mental Health*, 3(1), 41–55.
- Arnould, C., Daviller, M. E., & deTychey Feral, C. (2011). Pertinence du Fairy Tales Test chez des enfants français ayant des troubles des apprentissages: résultats préliminaires [Testing the relevance of the Fairy Tale Test in a French sample of children with learning disabilities: preliminary results]. *Neuropsychiatrie de l'Enfance et de l'Adolescence*, 59(8), 501–507.
- Aronow, E., Weiss, K. A., & Reznikoff, M. (2001). *A practical guide to the Thematic Apperception Test: The TAT in clinical practice*. New York, NY: Brunner-Routledge.
- Baldini, L. L., Parker, S. C., Nelson, B. W., & Siegel, D. J. (2014). The clinician as neuroarchitect: the importance of mindfulness and presence in clinical practice. *Clinical Social Work Journal*, 42(3), 218–227.
- Bastiaansen, L., Rossi, G., Schotte, C., & De Fruyt, F. (2011). The structure of personality disorders: comparing the DSM-IV-TR Axis II classification with the five-factor model framework using structural equation modeling. *Journal of Personality Disorders*, 25(3), 378–396.

- Beck, J. S., Beck, A. T., & Jolly, J. (2001). *Manual for the Beck Youth Inventories of Emotional and Social Impairment*. San Antonio, TX: Psychological Corporation.
- Bettleheim, B. (1976). *The uses of enchantment*. New York, NY: Knopf.
- Bing, M. N., LeBreton, J. M., Davison, H. K., Migetz, D. Z., & James, L. R. (2007a). Integrating implicit and explicit social cognitions for enhanced personality assessment: a general framework for choosing measurement and statistical methods. *Organizational Research Methods, 10*(2), 346–389.
- Bing, M. N., Stewart, S. M., Davison, H. K., Green, P. D., McIntyre, M. D., & James, L. R. (2007b). An integrative typology of personality assessment for aggression: implications for predicting counterproductive workplace behavior. *Journal of Applied Psychology, 92*(3), 722–744.
- Bornstein, R. F. (1998a). Implicit and self-attributed dependency needs in dependent and histrionic personality disorders. *Journal of Personality Assessment, 71*(1), 1–14.
- Bornstein, R. F. (1998b). Reconceptualizing personality disorder diagnosis in the DSM-V: the discriminant validity challenge. *Clinical Psychology: Science and Practice, 5*(3), 333–343.
- Bornstein, R. F. (2002). A process dissociation approach to objective-projective test score interrelationships. *Journal of Personality Assessment, 78*(1), 47–68.
- Bornstein, R. F. (2012a). From dysfunction to adaptation: an interactionist model of dependency. *Annual Review of Clinical Psychology, 8*, 291–316.
- Bornstein, R. F. (2012b). Rorschach score validation as a model for 21st-century personality assessment. *Journal of Personality Assessment, 94*(1), 26–38.
- Bornstein, R. F. (2012c). Illuminating a neglected clinical issue: societal costs of interpersonal dependency and dependent personality disorder. *Journal of Clinical Psychology, 68*(7), 766–781.
- Bram, A. D. (2014). Object relations, interpersonal functioning, and health in a nonclinical sample: construct validation and norms for the TAT SCORS-G. *Psychoanalytic Psychology, 31*(3), 314–342.
- Briggs-Myers, I., & Briggs, K. C. (1985). *Myers-Briggs Type Indicator (MBTI)*. Palo Alto, CA: Consulting Psychologists Press.
- Brown, A., & Maydeu-Olivares, A. (2011). Item response modeling of forced-choice questionnaires. *Educational and Psychological Measurement, 71*(3), 460–502.
- Buss, A. H., & Warren, W. L. (2000). *The aggression questionnaire*. Los Angeles, CA: Western Psychological Services.
- Butcher, J. N., Graham, J. R., Ben-Porath, Y. S., Tellegen, A., Dahlstrom, W. G., & Kaemmer, B. (2001). *MMPI-2 (Minnesota Multiphasic Personality Inventory-2): Manual for administration and scoring* (Rev. ed.). Minneapolis, MN: University of Minnesota Press.
- Caplan, P. J., & Cosgrove, L. (2004). *Bias in psychiatric diagnosis*. Northvale, NJ: Jason Aronson.
- Cattell, H. E., & Mead, A. D. (2008). The sixteen personality factor questionnaire (16PF). In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment* (pp. 135–178). (Vol. 2). Los Angeles, CA: Sage.
- Cattell, R. B., Eber, H. W., & Tatsuoka, M. M. (1970). *Handbook for the sixteen personality factor questionnaire (16PF)*. Champaign, IL: Institute for Personality and Ability Testing.
- Cheung, F. M. (2009). Factor congruence of the CPAI-2 in Asian and American samples. In F. M. Cheung, & M. P. Born (Eds.), *From the East to the West: Generalizability of the Cross-Cultural Personality Assessment Inventory (CPAI) in Western contexts*. Oslo, Norway: Eleventh European Congress of Psychology.
- Cheung, S. F., Cheung, F. M., Howard, R., & Lin, Y. -H. (2006). Personality across the ethnic divide in Singapore: are “Chinese traits” uniquely Chinese? *Personality and Individual Differences, 41*, 467–477.
- Cheung, F. M., Cheung, S. F., & Leung, F. (2008a). Clinical utility of the Cross-Cultural (Chinese) Personality Assessment Inventory (CPAI-2) in the assessment of substance use disorders among Chinese men. *Psychological Assessment, 20*(2), 103–113.
- Cheung, F. M., Cheung, S. F., Leung, K., Ward, C., & Leong, F. (2003). The English version of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology, 34*(4), 433–452.
- Cheung, F. M., Cheung, S. F., & Zhang, J. (2004). Convergent validity of the Chinese Personality Assessment Inventory and the Minnesota Multiphasic Personality Inventory-2: preliminary findings with a normative sample. *Journal of Personality Assessment, 82*(1), 92–103.
- Cheung, F. M., Fan, W., Cheung, S. F., & Leung, K. (2008b). Standardization of the Cross-Cultural [Chinese] Personality Assessment Inventory for adolescents in Hong Kong: a combined emic-etic approach to personality assessment. *Acta Psychologica Sinica, 40*(7), 839–852.
- Cheung, F., Fan, W., & To, C. (2008c). The Chinese Personality Assessment Inventory as a culturally relevant personality measure in applied settings. *Social and Personality Psychology Compass, 2*(1), 74–89.
- Cheung, D., Hattie, J., & Ng, D. (2001). Reexamining the stages of concern questionnaire: a test of alternative models. *Journal of Educational Research, 94*(4), 226–236.
- Cheung, F. M., Leung, K., Fan, R. M., Song, W. Z., Zhang, J. X., & Zhang, J. P. (1996). Development of the Chinese personality assessment inventory. *Journal of Cross-Cultural Psychology, 27*(2), 181–199.
- Cheung, F. M., Zhang, J. X., & Cheung, S. F. (2010). From indigenous to cross-cultural personality: the case of the Chinese Personality Assessment Inventory. In M. H. Bond (Ed.), *The handbook of Chinese psychology* (2nd ed., pp. 295–308). New York, NY: Oxford University Press.
- Clark, L. A., & Watson, D. (1999). Temperament: a new paradigm for trait psychology. In L. A. Pervin, & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 399–423). New York, NY: Guilford Press.
- Costa, P. T., & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., & McCrae, R. R. (1989). *The NEO-PI/NEO-FFI manual supplement*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., & McCrae, R. R. (2008). The revised NEO personality inventory (NEO-PI-R). In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment* (pp. 179–198). (Vol. 2). Los Angeles, CA: Sage.

- Costa, P. T., McCrae, R. R., & Dye, D. A. (1991). Facet scales for agreeableness and conscientiousness: a revision of the NEO Personality Inventory. *Personality and Individual Differences, 12*(9), 887–898.
- Costa, P. T., McCrae, R. R., & Martin, T. A. (2008). Incipient adult personality: the NEO-PI-3 in middle-school-aged children. *British Journal of Developmental Psychology, 26*(1), 71–89.
- Coulacoglou, C. (1993). *The development of the Fairy Tale Projective Test (FTT) in the personality assessment of children*. Unpublished doctoral dissertation, University of Exeter, United Kingdom.
- Coulacoglou, C. (2008). *Exploring the child's personality: Clinical and cross-cultural applications of the Fairy Tale Test*. Springfield, IL: Charles C Thomas.
- Coulacoglou, C. (2014). A study on the psychometric properties of the Fairy Tale Test (FTT). *Rorschachiana: Journal of the International Society for the Rorschach, 35*(2), 176–213.
- Coulacoglou, C., Tchinou, A., & Michopoulou, A. (2001). Personality assessment of children with psychosomatic symptoms: two case presentations. *Journal of Projective Psychology and Mental Health, 8*(2), 149–152.
- Cramer, P. (1991). *The development of defense mechanisms: theory, research and assessment*. New York, NY: Springer-Verlag.
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*(4), 349–354.
- Crowne, D. P., & Marlowe, D. (1964). *The approval motive*. New York, NY: Wiley.
- Danner, D., Aichholzer, J., & Rammstedt, B. (2015). Acquiescence in personality questionnaires: relevance, domain specificity, and stability. *Journal of Research in Personality, 57*, 119–130.
- De Clercq, B., De Fruyt, F., van Leeuwen, K., & Mervielde, I. (2006). The structure of maladaptive personality traits in childhood: a step toward an integrative developmental perspective for DSM-V. *Journal of Abnormal Psychology, 115*(4), 639–657.
- Eron, L. D. (1948). Frequencies of themes and identifications in the stories of schizophrenic patients and non-hospitalized college students. *Journal of Consulting Psychology, 12*(6), 387–395.
- Eron, L. D. (1950). A normative study of the Thematic Apperception Test. *Psychological Monographs: General and Applied, 64*(9), 1–47.
- Eron, L. D. (1953). Responses of women to the Thematic Apperception Test. *Journal of Consulting Psychology, 17*(4), 269–282.
- Exner, J. E. (1974). *The Rorschach: A Comprehensive System*. Oxford, England: Wiley.
- Exner, J. E., Jr. (1986). *A Rorschach workbook for the Comprehensive System* (2nd ed.). Bayville, NY: Rorschach Workshops.
- Exner, J. E. (1991). *The Rorschach: a Comprehensive System: interpretation* (2nd ed.). New York, NY: Wiley.
- Exner, J. E. (1995). *A Rorschach workbook for the Comprehensive System*. University of California: Rorschach Workshops.
- Exner, J. E., Jr. (2001). *A Rorschach workbook for the Comprehensive System* (5th ed.). Asheville, NC: Rorschach Workshops.
- Exner, J. E. (2003). *The Rorschach: A Comprehensive System (basic foundations and principles of interpretation)* (Vol. 1). (4th ed.). Hoboken, NJ: Wiley.
- Exner, J. E., Jr., & Erdberg, P. (2005). *The Rorschach, advanced interpretation*. Hoboken, NJ: Wiley.
- Freud, S. (1913). *Totem and taboo*. London: Hogarth Press.
- Freud, S. (1959). Freud's psycho-analytic procedure. In J. Strachey (Ed.), *The standard edition of the complete psychological works of Sigmund Freud* (pp. 249–270). (Vol. 7). London: Hogarth Press.
- Friedman, D. B., & Hoffman-Goetz, L. (2006). A systematic review of readability and comprehension instruments used for print and web-based cancer information. *Health Education and Behavior, 33*(3), 352–373.
- Fromm, E. (1951). *The forgotten language: An introduction to the meaning of dreams, fairy tales and myths*. New York, NY: Rinehart.
- Frost, B. C., Ko, C. H. E., & James, L. R. (2007). Implicit and explicit personality: a test of a channeling hypothesis for aggressive behavior. *Journal of Applied Psychology, 92*(5), 1299–1319.
- Furnham, A., & Stringfield, P. (1993). Personality and occupational behavior: Myers–Briggs Type Indicator correlates of managerial practices in two cultures. *Human Relations, 46*(7), 827–848.
- Garb, H. N. (1999). Call for a moratorium on the use of the Rorschach inkblot test in clinical and forensic settings. *Assessment, 6*(4), 313–317.
- Garb, H. N. (2005). Clinical judgment and decision making. *Annual Review of Clinical Psychology, 1*, 67–89.
- Garb, H. N., Wood, J. M., Lilienfeld, S. O., & Nezworski, M. T. (2002). Effective use of projective techniques in clinical practice: let the data help with selection and interpretation. *Professional Psychology: Research and Practice, 33*(5), 454–463.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504–528.
- Gronnerod, C. (2003). Temporal stability in the Rorschach method: a meta-analytic review. *Journal of Personality Assessment, 80*(3), 272–293.
- Gronnerod, C. (2006). Reanalysis of the Gronnerod (2003) Rorschach temporal stability meta-analysis data set. *Journal of Personality Assessment, 86*(2), 222–225.
- Heggestad, E. D. (2012). A conceptual representation of faking: putting the horse back in front of the cart. In M. Ziegler, C. MacCann, & R. D. Roberts (Eds.), *New perspectives on faking in personality assessment* (pp. 87–101). New York, NY: Oxford University Press.
- Herzberg, P. Y., & Brähler, E. (2006). Assessing the Big-Five personality domains via short forms. *European Journal of Psychological Assessment, 22*(3), 139–148.
- Ho, D. Y. F. (1996). Filial piety and its psychological consequences. In M. H. Bond (Ed.), *Handbook of Chinese psychology* (pp. 155–165). Hong Kong: Oxford University Press.
- Hofstra, J. (2009). *Attaching cultures: The role of attachment styles in explaining majority members' acculturation*. Unpublished doctoral dissertation, University of Groningen, Netherlands.

- Hogan, R. T. (1991). Personality and personality measurement. In M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (pp. 873–919). (Vol. 2). Palo Alto, CA: Consulting Psychologists Press.
- Holden, R. R. (2007). Socially desirable responding does moderate personality scale validity both in experimental and in nonexperimental contexts. *Canadian Journal of Behavioural Science, 39*(3), 184–201.
- Holden, R. R., & Book, A. S. (2012). Faking does distort self-report personality assessment. In M. Ziegler, C. MacCann, & R. D. Roberts (Eds.), *New perspectives on faking in personality assessment* (pp. 71–86). New York, NY: Oxford University Press.
- Hopwood, C. J., Morey, L. C., Ansell, E. B., Grilo, C. M., Sanislow, C. A., McGlashan, T. H., & Skodol, A. E. (2009). The convergent and discriminant validity of five-factor traits: current and prospective social, work, and recreational dysfunction. *Journal of Personality Disorders, 23*(5), 466–476.
- Hudziak, J. J., Achenbach, T. M., Althoff, R. R., & Pine, D. S. (2007). A dimensional approach to developmental psychopathology. *International Journal of Methods in Psychiatric Research, 16*(1), 16–23.
- Hunsley, J., & Bailey, J. M. (1999). The clinical utility of the Rorschach: unfulfilled promises and an uncertain future. *Psychological Assessment, 11*(3), 266–277.
- Institute for Personality and Ability Testing. (2009). *16PF fifth edition manual*. Champaign, IL: Author.
- Jackson, D. N. (1975). The relative validity of scales prepared by naive item writers and those based on empirical methods of personality scale construction. *Educational and Psychological Measurement, 35*(2), 361–370.
- James, L. R. (1998). Measurement of personality via conditional reasoning. *Organizational Research Methods, 1*(2), 131–163.
- James, L. R., & LeBreton, J. M. (2012). *Assessing the implicit personality through conditional reasoning*. Washington, DC: American Psychological Association.
- Janowsky, D. S., Morter, S., & Hong, L. (2002). Relationship of Myers Briggs Type Indicator personality characteristics to suicidality in affective disorder patients. *Journal of Psychiatric Research, 36*(1), 33–39.
- Javdani, S., Finy, M. S., & Verona, E. (2014). Evaluation of the validity of the Multidimensional Personality Questionnaire–Simplified–Wording Form (MPQ-SF) in adolescents with treatment histories. *Assessment, 21*(3), 352–362.
- Jenkins, S. R. (2008). *A handbook of clinical scoring systems for thematic apperceptive techniques*. New York, NY: Taylor & Francis.
- John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five inventory: Versions 4a and 54*. Berkeley, CA: University of California, Institute of Personality and Social Research.
- Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: a review of our current understanding. *Neuropsychology Review, 17*, 213–233.
- Kaes, R., Perrot, J., Guerin, C., Mery, J., & Reumaux, F. (1989). *Contes et divans [Fairy tales and divans]*. Paris: Dunod.
- Kahneman, D. (2003). A perspective on judgment and choice: mapping bounded rationality. *American Psychologist, 58*(9), 697–720.
- Langford, P. H. (2003). A one-minute measure of the Big Five? evaluating and abridging Shafer's (1999a) Big Five markers. *Personality and Individual Differences, 35*(5), 1127–1140.
- Leone, L., van der Zee, K. I., van Oudenhoven, J. P., Perugini, M., & Ercolani, A. P. (2005). The cross-cultural generalizability and validity of the Multicultural Personality Questionnaire. *Personality and Individual Differences, 38*(6), 1449–1462.
- Leong, C. H. (2007). Predictive validity of the Multicultural Personality Questionnaire: a longitudinal study on the socio-psychological adaptation of Asian undergraduates who took part in a study-abroad program. *International Journal of Intercultural Relations, 31*(5), 545–559.
- Lilienfeld, S. O., Wood, J. M., & Garb, H. N. (2000). The scientific status of projective techniques. *Psychological Science in the Public Interest, 1*(2), 27–66.
- MacCann, C., Ziegler, M., & Roberts, R. D. (2012). Faking in personality assessment: reflections and recommendations. In M. Ziegler, C. MacCann, & R. D. Roberts (Eds.), *New Perspectives on Faking in Personality Assessment* (pp. 309–329). New York, NY: Oxford University Press.
- Masling, J., Rabie, L., & Blondheim, S. H. (1967). Obesity, level of aspiration, and Rorschach and TAT measures of oral dependence. *Journal of Consulting Psychology, 31*(3), 233–239.
- Matsumoto, D., & Hwang, H. (2013). Assessing cross-cultural competence: a review of tests. *Journal of Cross-Cultural Psychology, 44*, 849–873.
- McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96*(4), 690–702.
- McCrae, R. R. (1989). Why I advocate the five-factor model: joint factor analyses of the NEO-PI with other instruments. In D. M. Buss, & N. Cantor (Eds.), *Personality psychology: Recent trends and emerging directions* (pp. 237–245). New York, NY: Springer.
- McCrae, R. R., & Costa, P. T. (1982). Self-concept and the stability of personality: cross-sectional comparisons of self-reports and ratings. *Journal of Personality and Social Psychology, 43*(6), 1282–1292.
- McCrae, R. R., & Costa, P. T. (1988). Age, personality, and the spontaneous self-concept. *Journal of Gerontology, 43*(6), 177–185.
- McCrae, R., & Costa, P. (1989). Reinterpreting the Myers–Briggs type indicators from the perspective of the five-factor model of personality. *Journal of Personality, 57*(1), 17–40.
- McCrae, R. R., & Costa, P. T. (1991). The NEO personality inventory: using the five-factor model in counseling. *Journal of Counseling and Development, 69*(4), 367–372.
- McCrae, R. R., & Costa, P. T., Jr. (1992). Discriminant validity of NEO-PIR facet scales. *Educational and Psychological Measurement, 52*(1), 229–237.
- McCrae, R. R., & Costa, P. T. (2003). *Personality in adulthood: a five-factor theory perspective* (2nd ed.). New York, NY: Guilford Press.
- McCrae, R. R., & Costa, P. T. (2008). Empirical and theoretical status of the five-factor model of personality traits. In G. J. Boyle, G. Matthews, & D. H. Saklofske (Eds.), *The Sage handbook of personality theory and assessment* (pp. 273–294). (Vol. 1). Los Angeles, CA: Sage.
- McCrae, R. R., & Costa, P. T. (2010). *NEO inventories for the NEO Personality Inventory-3 (NEO-PI-3), NEO Five-Factor Inventory-3 (NEO-FFI-3), NEO Personality Inventory-Revised (NEO-PI-R) professional manual*. Lutz, FL: Psychological Assessment Resources.

- McCrae, R. R., Costa, P. T., Jr., Dahlstrom, W. G., Barefoot, J. C., Siegler, I. C., & Williams, R. B., Jr. (1989). A caution on the use of the MMPI K-correction in research on psychosomatic medicine. *Psychosomatic Medicine*, *51*(1), 58–65.
- McCrae, R. R., Herbst, J. H., & Costa, P. T., Jr. (2001). Effects of acquiescence on personality factor structures. In R. Riemann, F. Ostendorf, & F. Spinath (Eds.), *Personality and temperament: Genetics, evolution, and structure* (pp. 217–231). Berlin, Germany: Pabst Science Publishers.
- McCrae, R. R., Kurtz, J. E., Yamagata, S., & Terracciano, A. (2011). Internal consistency, retest reliability, and their implications for personality scale validity. *Personality and Social Psychology Review*, *15*, 28–50.
- McCrae, R. R., & Terracciano, A. 78 Members of the Personality Profiles of Cultures Project. (2005). Universal features of personality traits from the observer's perspective: data from 50 cultures. *Journal of Personality and Social Psychology*, *88*(3), 547–561.
- McGrath, R. E. (2008). The Rorschach in the context of performance-based personality assessment. *Journal of Personality Assessment*, *90*(5), 465–475.
- Medoff, D. (2010). Protecting the integrity of forensic psychological testing: a reply to Geffner, et al. (2009). *Journal of Child Custody*, *7*(1), 78–92.
- Meyer, G. J. (1996). The Rorschach and MMPI: toward a more scientifically differentiated understanding of cross-method assessment. *Journal of Personality Assessment*, *67*(3), 558–578.
- Meyer, G. J. (1999). Introduction to the first special section in the special series on the utility of the Rorschach for clinical assessment. *Psychological Assessment*, *11*(3), 235–239.
- Meyer, G. J. (2004). The reliability and validity of the Rorschach and TAT compared to other psychological and medical procedures: an analysis of systematically gathered evidence. In M. Hilsenroth, & D. Segal (Eds.), *Personality assessment: Comprehensive handbook of psychological assessment* (pp. 315–342). (Vol. 2). Hoboken, NJ: Wiley.
- Meyer, G. J., & Archer, R. P. (2001). The hard science of Rorschach research: what do we know and where do we go? *Psychological Assessment*, *13*(4), 486–502.
- Meyer, G. J., Viglione, D. J., Mihura, J. L., Erard, R. E., & Erdberg, P. (2011). *Rorschach performance assessment system: Administration, coding, interpretation, and technical manual*. Toledo, OH: Rorschach Performance Assessment System.
- Mihura, J. L., Meyer, G. J., Bombel, G., & Dumitrascu, N. (2015). Standards, accuracy, and questions of bias in Rorschach meta-analyses: reply to Wood, Garb, Nezworski, Lilienfeld, and Duke (2015). *Psychological Bulletin*, *141*(1), 250–260.
- Mihura, J. L., Meyer, G. J., Dumitrascu, N., & Bombel, G. (2013). The validity of individual Rorschach variables: systematic reviews and meta-analyses of the Comprehensive System. *Psychological Bulletin*, *139*(3), 548–605.
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*(2), 246–268.
- Murray, H. A. (1943). *Manual for the Thematic Apperception Test*. Cambridge, MA: Harvard University Press.
- Murstein, B. I. (1972). A thematic test and the Rorschach in predicting marital choice. *Journal of Personality Assessment*, *36*(3), 213–217.
- Paris, J. (2008). Recent advances in research on personality disorders. *Current Psychiatry Reviews*, *4*(1), 10–13.
- Patrick, C. J., Curtin, J. J., & Tellegen, A. (2002). Development and validation of a brief form of the Multidimensional Personality Questionnaire. *Psychological Assessment*, *14*(2), 150–163.
- Patrick, C. J., Kramer, M. D., Tellegen, A., Verona, E., & Kaemmer, B. A. (2013). Development and preliminary validation of a simplified-wording form of the Multidimensional Personality Questionnaire. *Assessment*, *20*(4), 405–418.
- Paul, A. (2004). *The cult of personality*. New York, NY: Free Press.
- Paulhus, D. L. (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology*, *46*(3), 598–609.
- Paulhus, D. L. (1991). Measurement and control of response bias. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 17–59). (Vol. 1). San Diego, CA: Academic Press.
- Paulhus, D. L. (1998). *Paulhus Deception Scales (PDS) user's manual*. North Tonawanda, NY: Multi-Health Systems.
- Paulhus, D. L. (2002). Socially desirable responding: the evolution of a construct. In H. I. Brown, D. N. Jackson, & D. E. Wiley (Eds.), *The role of constructs in psychological and educational measurement* (pp. 49–69). Mahwah, NJ: Erlbaum.
- Paulhus, D. L., & Trapnell, P. D. (2008). Self-presentation on personality scales: an agency-communion framework. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality* (pp. 492–517). New York, NY: Guilford Press.
- Paunonen, S. V., & Ashton, M. C. (2001). Big Five factors and facets and the prediction of behavior. *Journal of Personality and Social Psychology*, *81*(3), 524–539.
- PDM Task Force. (2006). *Psychodynamic diagnostic manual*. Silver Spring, MD: Alliance of Psychoanalytic Organizations.
- Peterson, C. A., & Schilling, K. M. (1983). Card pull in projective testing. *Journal of Personality Assessment*, *47*(3), 265–275.
- Pine, F. (1960). A manual for rating drive content in the Thematic Apperception Test. *Journal of Projective Techniques*, *24*, 32–45.
- Piotrowski, C. (1996). The status of Exner's Comprehensive System in contemporary research. *Perceptual and Motor Skills*, *82*(3), 1341–1342.
- Piotrowski, C. (2015). Projective techniques usage worldwide: a review of applied settings 1995–2015. *Journal of the Indian Academy of Applied Psychology*, *41*(3), 9–19[Special Issue].
- Ponterotto, J. G. (2008). Theoretical and empirical advances in multicultural counseling and psychology. In S. D. Brown, & R. W. Lent (Eds.), *Handbook of counseling psychology* (4th ed., pp. 121–140). Hoboken, NJ: Wiley.
- Ponterotto, J. G., & Fietzer, A. W. (2014). Multiculturalism and adjustment. In V. Benet Martínez, & Y. -Y. Hong (Eds.), *The Oxford handbook of multicultural identity: Basic and applied perspectives*. New York, NY: Oxford University Press.
- Quenk, N. L. (2009). *Essentials of Myers-Briggs Type Indicator assessment* (2nd ed.). Hoboken, NJ: Wiley.
- Quirk, S. W., Christiansen, N. D., Wagner, S. H., & McNulty, J. L. (2003). On the usefulness of measures of normal personality for clinical assessment: evidence of the incremental validity of the Revised NEO Personality Inventory. *Psychological Assessment*, *15*(3), 311–325.

- Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: a 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality, 41*(1), 203–212.
- Reise, S. P., & Henson, J. M. (2000). Computerization and adaptive administration of the NEO PI-R. *Assessment, 7*(4), 347–364.
- Reynolds, S. K., & Clark, L. A. (2001). Predicting dimensions of personality disorder from domains and facets of the five factor model. *Journal of Personality, 69*(2), 199–222.
- Robinson, M. D., & Clore, G. L. (2002). Episodic and semantic knowledge in emotional self-report: evidence for two judgment processes. *Journal of Personality and Social Psychology, 83*(1), 198–215.
- Saggino, A., & Kline, P. (1996). The location of the Myers–Briggs Type Indicator in personality factor space. *Personality and Individual Differences, 21*(4), 591–597.
- Samuel, D. B., & Widiger, T. A. (2006). Clinicians' judgments of clinical utility: a comparison of the DSM-IV and five-factor models. *Journal of Abnormal Psychology, 115*(2), 298–308.
- Samuel, D. B., & Widiger, T. A. (2008). A meta-analytic review of the relationships between the five-factor model and DSM-IV-TR personality disorders: a facet level analysis. *Clinical Psychology Review, 28*(8), 1326–1342.
- Sanyal, N., Dasgupta, M., Marinakis, D., & Doukas, O. (2006). Personality assessment of a child with emotional problems: a case study. *SIS Journal of Projective Psychology and Mental Health, 13*(2), 139–146.
- Savina, E., Coulacoglou, C., Sanyal, N., & Zhang, J. (2012). The study of externalizing and internalizing behaviours in Greek, Russian, Indian, and Chinese children using the Fairy Tale Test. *School Psychology International, 33*(1), 39–53.
- Shaffer, T. W., Erdberg, P., & Meyer, G. J. (2007). Introduction to the JPA special supplement on international reference samples for the Rorschach Comprehensive System. *Journal of Personality Assessment, 89*(1), 2–6.
- Shapiro, S. L., Jazaieri, H., & Goldin, P. R. (2012). Mindfulness-based stress reduction effects on moral reasoning and decision making. *Journal of Positive Psychology, 7*(6), 504–515.
- Sibinga, E. M., & Wu, A. W. (2010). Clinician mindfulness and patient safety. *Journal of the American Medical Association, 304*(22), 2532–2533.
- Siefert, C. J., Stein, M. B., Slavin-Mulford, J., Sinclair, S. J., Haggerty, G., & Blais, M. A. (2016). Estimating the effects of Thematic Apperception Test card content on SCORS-G ratings: replication with a nonclinical sample. *Journal of Personality Assessment, 98*(6), 1–10.
- Singer, J. A. (2005). *Personality and psychotherapy: Treating the whole person*. New York, NY: Guilford Press.
- Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2007). The affect heuristic. *European Journal of Operational Research, 177*(3), 1333–1352.
- Stark, S., Chernyshenko, O. S., Drasgow, F., & Williams, B. A. (2006). Examining assumptions about item responding in personality assessment: should ideal point methods be considered for scale development and scoring? *Journal of Applied Psychology, 91*(1), 25–39.
- Stein, M. B., Hilsenroth, M., Slavin-Mulford, J., & Pinsker, J. (2011). *Social Cognition and Object Relations Scale–Global Rating method (SCORS-G)* (4th ed.). Unpublished manuscript, Massachusetts General Hospital and Harvard Medical School, Boston, MA.
- Stein, M. B., Slavin-Mulford, J., Sinclair, S. J., Siefert, C. J., & Blais, M. A. (2012). Exploring the construct validity of the social cognition and object relations scale in a clinical sample. *Journal of Personality Assessment, 94*(5), 533–540.
- Tellegen, A. (1982). *Brief manual for the Multidimensional Personality Questionnaire*. Unpublished manuscript, University of Minnesota, Minneapolis.
- Tellegen, A. (1985). Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma, & J. D. Maser (Eds.), *Anxiety and the anxiety disorders* (pp. 681–706). Hillsdale, NJ: Erlbaum.
- Terracciano, A., Costa, P. T., & McCrae, R. R. (2006). Personality plasticity after age 30. *Personality and Social Psychology Bulletin, 32*(8), 999–1009.
- Terracciano, A., McCrae, R. R., Brant, L. J., & Costa, P. T., Jr. (2005). Hierarchical linear modeling analyses of the NEO-PI-R scales in the Baltimore Longitudinal Study of Aging. *Psychology and Aging, 20*(3), 493–506.
- Tracey, T. J. (2016). A note on socially desirable responding. *Journal of Counseling Psychology, 63*(2), 224–232.
- Uziel, L. (2010). Rethinking social desirability scales: from impression management to interpersonally oriented self-control. *Perspectives on Psychological Science, 5*, 243–262.
- Valadez Sierra, M. D., Coulacoglou, C., Gkotsi, K., Mitsios, A., & Triantopoulou, A. (2010). Los primeros resultados de la tipificación del test de los Cuentos de Hadas (FTT) en México [The preliminary results of the standardization of the FTT in Mexico]. *Psicodiagnosticar, 20*, 51–68.
- van der Zee, K. I., & Brinkmann, U. (2004). Construct validity evidence for the intercultural readiness check against the Multicultural Personality Questionnaire. *International Journal of Selection and Assessment, 12*(3), 285–290.
- van der Zee, K. I., & van Oudenhoven, J. P. (2000). The Multicultural Personality Questionnaire: a multidimensional instrument of multicultural effectiveness. *European Journal of Personality, 14*, 291–309.
- van der Zee, K. I., & van Oudenhoven, J. P. (2001). The Multicultural Personality Questionnaire: reliability and validity of self- and other ratings of multicultural effectiveness. *Journal of Research in Personality, 35*(3), 278–288.
- van der Zee, K., Atsma, N., & Brodbeck, F. (2004). The influence of social identity and personality on outcomes of cultural diversity in teams. *Journal of Cross-Cultural Psychology, 35*(3), 283–303.
- van der Zee, K. I., Ali, A. J., & Haaksma, I. (2007). Determinants of effective coping with cultural transition among expatriate children and adolescents. *Anxiety, Stress, and Coping, 20*(1), 25–45.
- van der Zee, K. I., van Oudenhoven, J. P., & Bakker, W. (2002). Individual differences in adaptation and well-being. In D. Gorter, & K. I. van der Zee (Eds.), *Frisians abroad* (pp. 57–69). Leeuwarden, Netherlands: Fryske Akademy.
- van der Zee, K. I., Zaal, J. N., & Piekstra, J. (2003). Validation of the Multicultural Personality Questionnaire in the context of personnel selection. *European Journal of Personality, 17*(1), 77–100.
- van Oudenhoven, J. P., & van der Zee, K. I. (2002). Predicting multicultural effectiveness of international students: the Multicultural Personality Questionnaire. *International Journal of Intercultural Relations, 26*(6), 679–694.

- van Oudenhoven, J. P., Timmerman, M. E., & van der Zee, K. (2007). Cross-cultural equivalence and validity of the Multicultural Personality Questionnaire in an intercultural context. *Journal of International Communication, 13*(2), 51–65.
- Verheul, R., Andrea, H., Berghout, C. C., Dolan, C., Busschbach, J. J., van der Kroft, P. J., & Fonagy, P. (2008). Severity Indices of Personality Problems (SIPP-118): development, factor structure, reliability, and validity. *Psychological Assessment, 20*(1), 23–34.
- Viglione, D. J., & Taylor, N. (2003). Empirical support for interrater reliability of Rorschach Comprehensive System coding. *Journal of Clinical Psychology, 59*(1), 111–121.
- Viswesvaran, C., & Ones, D. S. (1999). Meta-analyses of fakability estimates: implications for personality measurement. *Educational and Psychological Measurement, 59*(2), 197–210.
- von Franz, M. L. (1996). *The interpretation of fairy tales*. Boston, MA: Shambhala.
- Weiner, I. B. (2000a). Using the Rorschach properly in practice and research. *Journal of Clinical Psychology, 56*(3), 435–438.
- Weiner, I. B. (2000b). Making Rorschach interpretation as good as it can be. *Journal of Personality Assessment, 74*(2), 164–174.
- Weiner, I. B. (2001). Advancing the science of psychological assessment: the Rorschach inkblot method as exemplar. *Psychological Assessment, 13*(4), 423–432.
- Weiner, I. B. (2003). *Principles of Rorschach interpretation* (2nd ed.). Mahwah, NJ: Erlbaum.
- Weiner, I. B. (2004). Rorschach inkblot method. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment* (pp. 553–588). Mahwah, NJ: Erlbaum.
- Westen, D. (1995). *Social Cognition and Object Relations Scale: Q-sort for Projective Stories (SCORS-Q)*. Unpublished manuscript, Department of Psychiatry, Cambridge Hospital and Harvard Medical School, Cambridge, MA.
- Westen, D., & Gabbard, G. O. (2002). Developments in cognitive neuroscience II: implications for theories of transference. *Journal of the American Psychoanalytic Association, 50*(1), 99–134.
- Westen, D., Lohr, N. E., Silk, K., Kerber, K., & Goodrich, S. (1989). *Object relations and social cognition TAT scoring manual* (4th ed.). Unpublished manuscript, University of Michigan, Ann Arbor.
- Wetzel, E., Lüdtke, O., Zettler, I., & Böhnke, J. R. (2015). The stability of extreme response style and acquiescence over 8 years. *Assessment, 23*(3), 279–291.
- Wood, J. M., Garb, H. N., Nezworski, M. T., Lilienfeld, S. O., & Duke, M. C. (2015). A second look at the validity of widely used Rorschach indices: comment on Mihura, Meyer, Dumitrescu, and Bombel (2013). *Psychological Bulletin, 141*(1), 236–249.
- Wood, J. M., Nezworski, M. T., Lilienfeld, S. O., & Garb, H. N. (2003). *What's wrong with the Rorschach? Science confronts the controversial inkblot test*. San Francisco, CA: Jossey-Bass.
- Wrobel, T. A., & Lachar, D. (1982). Validity of the Wiener subtle and obvious scales for the MMPI: another example of the importance of inventory-item content. *Journal of Consulting and Clinical Psychology, 50*(3), 469–470.
- Yama, M. F. (1990). The usefulness of human figure drawings as an index of overall adjustment. *Journal of Personality Assessment, 54*(1–2), 78–86.
- Yang, K. S. (2006). Indigenous personality research: the Chinese case. In U. Kim, K. -S. Yang, & K. -K. Hwang (Eds.), *Indigenous and cultural psychology: Understanding people in context* (pp. 285–314). New York, NY: Springer.
- Zerbe, W. J., & Paulhus, D. L. (1987). Socially desirable responding in organizational behavior: a reconception. *Academy of Management Review, 12*(2), 250–264.

Chapter 11

Advances in Theoretical, Developmental, and Cross-Cultural Perspectives of Psychopathology

Chapter Outline

| | | | |
|--|------------|--|------------|
| Theoretical developments, modifications, and accomplishments in psychopathology | 293 | Childhood adversities and psychosis: the traumagenic neurodevelopmental model | 314 |
| Emotion regulation and psychopathology | 294 | Existential anxiety and unusual subjective experience | 314 |
| The temporal dynamics of emotions | 294 | Death anxiety as a transdiagnostic construct | 314 |
| The process model of emotion regulation | 295 | Existential anxiety and the phenomenon of psychotic-like experiences | 315 |
| Distress tolerance and emotion (dys)regulation | 296 | Recent advances in schizophrenia spectrum disorders and other psychotic disorders | 317 |
| Metaanalytic studies of emotion regulation | 296 | The neurological substrate of psychiatric disorders | 317 |
| Cognitive emotion regulation | 296 | The role of schizotypy in the schizophrenia spectrum disorder | 318 |
| Cognitive emotion regulation across cultures | 298 | Personality disorders and schizotypal traits in daily life | 318 |
| The psychopathology of intellectual disabilities | 300 | Cognitive assessment in schizophrenia | 319 |
| The Assessment for Dual Diagnosis | 300 | Cross-cultural perspectives and advances in mental illness | 320 |
| Developmental Behavior Checklist | 300 | The cultural context of psychopathology | 320 |
| Diagnostic Assessment for the Severely Handicapped | 300 | The role of culture in the development of specific disorders | 322 |
| Nisonger Child Behavior Rating Form | 301 | Coping and psychopathology | 323 |
| Psychiatric Assessment Schedule for Adults with a Developmental Disorder | 301 | Models of coping | 323 |
| Psychopathology Instrument for Adults with Mental Retardation | 301 | Coping strategies | 324 |
| Reiss Screen for Maladaptive Behavior | 302 | Resilience and self-compassion | 324 |
| Developmental psychopathology | 302 | Summary | 325 |
| Advances in mental health issues in infancy | 303 | References | 326 |
| Recent achievements in developmental psychopathology | 307 | | |
| Assessment methods of infants and preschoolers | 309 | | |
| Exploring the psychosis continuum | 313 | | |

THEORETICAL DEVELOPMENTS, MODIFICATIONS, AND ACCOMPLISHMENTS IN PSYCHOPATHOLOGY

“Personality is the sum of all these qualities (i.e. feelings, thoughts and behavior), a synthesis of various and often contradictory trends, the unity of which these trends are but partial expressions” (Bowlby, 2013, p. 2). Historically, there have been numerous attempts to classify, formulate, and frame types of personality. Psychiatrists have expressed a strong interest not only in full-blown psychoses but also in their patients’ personalities, especially before the patients fell ill. They also focused their attention on minor mental symptoms, such as obsessions and phobias, that may be part of the personality of individuals who are considered “normal.” These studies illuminated the relationship between mental illness and healthy personality and raised the crucial issue of whether there are sharp boundaries between the two. “The tendency to divorce

mental symptoms from personality has also been responsible for another great psychiatric evil—the use of an outstanding symptom as a diagnostic label” (Bowlby, 2013, p. 5).

The most impressive feature of psychopathology is the subtle interplay of a variety of factors that underlie its symptomatology and behavioral manifestations. Genetic, molecular, and cellular abnormalities in combination with affective, cognitive, personality, and environmental factors are all implicated in psychopathological outcomes. In addition to the continuous efforts in classifying mental disorders, research has focused on other areas involved in psychopathology, such as its early origins, the increasing interest in the psychosis’s continuity, and the often-blurred boundaries between “normality” and deviancy. Risk factors, protective factors, coping strategies, resilience, and a broad range of assessment methods are employed in the aforementioned areas.

Let us now look at recent advances regarding domains or facets of psychopathology. One major area of active research combining theoretical and empirical findings is the various nosologic taxonomies of psychiatric disorders. The traditional classifications, such as the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders (DSM)* and the International Classification of Diseases (ICD), have been systematically challenged and criticized during the past 2 decades, especially regarding the extent of comorbidity between disorders and an almost exclusive reliance on symptomatology.

In past years, the key role of personality and cognitive factors has been compelling and their subtle impact on psychopathology has been acknowledged. Alternative classification models have emerged either to complement or to replace the traditional taxonomies.

An active research field in developmental psychopathology includes the developmental trajectories of personality and psychiatric disorders starting as early as infancy. There is an escalating interest in identifying the early origins of psychopathology, but also a heated debate as to the reliability of mental disorders as this early time, as mental health symptoms are unstable and transient. There are also rapid developmental shifts and variability on “normal” functioning. Perhaps the most common “disorder” is “regulatory disorder,” which is closely associated to temperament. Over the past few decades, self-emotion regulation has increasingly become the focus of theoretical and empirical research. Theories posit that psychopathology can result from the inability to regulate negative emotions through strategies, such as reappraisal, acceptance, problem solving, or attentional deployment. Related concepts to emotion regulation (ER) include emotional distress tolerance and mindfulness.

Metacognitive theory and therapy emerged toward the end of the 20th century as a new framework for conceptualizing and treating a range of disorders. Two recent metacognitive assessment tools include the Metacognition Assessment Scale–Abbreviated Scale (MAS-A) (Lysaker et al., 2005) and the Metacognition Assessment Interview (MAI) (Semerari et al., 2012).

More advances in psychopathology include the constructs of coping and resilience. One useful resilience mechanism against psychopathology is self-compassion. It refers to a warm-hearted, empathic, and nonjudgmental attitude toward the self during suffering and failure. Intervention studies using compassion-focused therapies revealed improvement in depression and anxiety in nonclinical samples.

Finally, another field that has received considerable attention is psychopathology and culture. Culture-related disorders are activated from cross-cultural psychopathology by exerting pathogenic, psychoselective, psychoplastic, pathoelaborating, psychofacilitating, and psychoreactive influences (Tseng, 2006).

EMOTION REGULATION AND PSYCHOPATHOLOGY

The temporal dynamics of emotions

Emotional well-being is not just experiencing more positive than negative emotions. The ability to flexibly adapt one’s emotions to fluctuating situational demands is also a major component of psychological health (Hollenstein, Lichtwarck-Aschoff, & Potworowski, 2013). A lack of such flexibility may result in emotions that are overly predictable across time, a phenomenon labeled *emotional inertia* (Butler, 2011; Suls, Green, & Hillis, 1998). Emotional inertia is assumed to be the outcome of impaired ER (Suls et al., 1998; Kuppens, Allen, & Sheeber, 2010; Gross & Munoz, 1995). In a study, Koval, Butler, Hollenstein, Lanteigne, and Kuppens (2015) investigated whether emotional inertia is associated with two ER strategies: *cognitive reappraisal* (an antecedent-focused strategy involving the reinterpretation of an emotion-eliciting stimulus) and *expressive suppression* (a response-focused strategy involving the inhibition of emotionally expressive behavior). Overall, the current studies revealed that the way individuals regulate their emotions may contribute to individual differences in emotional inertia.

The patterns and regularities with which emotions fluctuate over time are known as emotion dynamics. Emotion dynamics reflect how people respond to events and regulate their emotions (e.g., Kuppens, Oravecz, & Tuerlinckx, 2010).

The microlevel dynamics of emotions can illuminate the foundations of emotional well-being and psychopathology (Hollenstein et al., 2013; Kashdan & Rottenberg, 2010; Wichers, 2014).

A number of studies have associated greater variability and/or instability of affect with poor well-being (e.g., Gruber, Kogan, Quoidbach, & Mauss, 2013), as well as with various mental disorders (e.g., Farmer & Kashdan, 2014; Thompson et al., 2012), suggesting that emotional stability is central to mental health.

Another line of research proposes that healthy emotional functioning implicates flexibility rather than stability (Kashdan & Rottenberg, 2010). Research supporting this perspective revealed that increased moment-to-moment predictability (i.e., inertia) of negative emotions is linked to impaired well-being (e.g., Koval, Kuppens, Allen, & Sheeber, 2012) and increased risk of major depressive disorder (MDD) (Kuppens et al., 2012; van de Leemput et al., 2014).

The process model of emotion regulation

The *process model* (PM) (Gross, 1998) helped to delineate emotion regulation (ER) research by highlighting the way different ER strategies may affect people's emotional responses. The original process model has been successively revised and extended. In one reformulation, Gross and Thompson (2007) recognized that "emotion generation is an ongoing process, not a one-shot deal" (p. 16). According to this view, "emotion regulation can also occur in parallel at multiple points in the emotion generative process. Using many forms of emotion regulation might in fact be the modal case" (p. 17). A subsequent update of the process model (Sheppes & Gross, 2011) replaced the notion that ER is more effective when it is instigated early during emotion generation (the "generic timing hypothesis") with the idea that emotion-generative and emotion-regulatory processes compete with one another at earlier or later stages of information processing (the "process-specific timing hypothesis"). Finally, the process model has recently been extended to explain how ER unfolds dynamically over time (Gross, 2015).

The *extended process model* (EPM) of ER (Gross, 2015) attempts to describe central regulatory stages and links them to psychopathology. At the core of each stage is a central ER-related decision that needs to be made. Decision failures can be associated with various forms of psychopathologies. Specifically, regulatory decisions and potential failure may be related to an initial decision on (1) whether to regulate (identification stage), (2) which general regulatory category to apply (selection stage), (3) which specific regulatory tactic to actively implement (implementation stage), or (4) whether to stop regulating or to change regulation type following initial implementation (monitoring stage).

Clinical conditions are not necessarily characterized by difficulties at a single ER stage; instead, they may implicate failures at multiple stages. Conditions that relate to difficulties in one stage may not be related to failures in another stage.

The extended process model has important implications for clinical assessment because it moves from a categorical description of mental disorders to a transdiagnostic approach (Insel et al., 2010) and in particular with the major objectives of the Research Domain Criteria (RDoC) (Insel et al., 2010). Application of the extended process model to intervention involves forming treatment protocols that focus on improving the functioning of basic elements associated with various regulatory stages. Recent interventions seem to have advanced in a direction that is following the premises of the extended process model. For example, during *novel attentional bias modification* (ABM) treatment (Grafton & MacLeod, 2014; Hakamata et al., 2010), patients with various anxiety disorders undergo a general computerized training protocol that modifies their attentional biases to threat, a modification that has been associated with a decrease in clinical symptoms. In conformity to the extended process model, ABM aims at reducing the overrepresentation of threatening information associated with the current emotional state.

Other interventions include *emotion regulation therapy* (Mennin & Fresco, 2014) and *dialectical behavioral therapy* (Neacsiu, Bohus, & Linehan, 2013), which involve improving basic regulatory elements in specific clinical disorders. The affect regulation training (Berking & Schwarz, 2013) systematically targets basic elements of several regulatory stages across various clinical conditions. In a study, Kuo, Khoury, Metcalfe, Fitzpatrick, and Goodwill (2015) examined (1) whether frequency of childhood emotional abuse is uniquely associated with borderline personality disorder (BPD) feature severity when controlling for other forms of abuse and (2) whether difficulties with ER account for the relationship between childhood emotional abuse and BPD feature severity.

Koole and Veenstra (2015) propose a new approach that complements traditional goal-directed models of ER (e.g., Gross's extended model). Specifically, Koole and Veenstra propose a *situated cognition approach* to ER. According to this approach, ER dynamics is the outcome of the interplay between the personality and characteristics of the situation. A situated cognition approach (SCA) to ER emphasizes bottom-up control processes like emergence and self-organization. In this respect, the approach departs from traditional models of ER that have highlighted top-down control processes of ER.

Distress tolerance and emotion (dys)regulation

ER has been broadly defined as the monitoring, evaluation, and modifying of emotional reactions to accomplish goals (Thompson, 1994). This process can incorporate both implicit ER (i.e., preconscious or unconscious processes) and explicit ER, which involves the application of conscious strategies to modify emotional responses (Gyurak, Gross, & Etkin, 2011). By modifying emotional experiences, such regulation efforts influence feelings and behaviors. Thus, ER is closely linked to well-being, mental health, cognitive functioning, and social relationships. Fully functional ER requires the ability to recognize the emotional significance of perceived stimuli, to appreciate the need for regulation, and then to select and implement an appropriate strategy (Sheppes, Suri, & Gross, 2015). Thus, it involves the coordination of multiple high-level processes, such as executive functions, and occasionally social-cognitive skills, such as perspective taking.

Emotion dysregulation (ED) is a core feature of disorders that span the internalizing and externalizing spectra (Beauchaine & Thayer, 2015; Hofmann, Sawyer, Fang, & Asnaani, 2012). Researchers have observed links between ED and self-inflicted injury (e.g., Gratz & Tull, 2010), identity disturbance (Kaufman, Cundiff, & Crowell, 2015), substance abuse (e.g., Dvorak et al., 2014), depression (Crowell et al., 2014), conduct problems (Beauchaine, Gatzke-Kopp, & Mead, 2007; Cappadocia, Desrocher, Pepler, & Schroeder, 2009), attention-deficit/hyperactivity disorder (ADHD) (Mitchell, Robertson, Anastopolous, Nelson-Gray, & Kollins, 2012), anxiety (Folk, Zeman, Poon, & Dallaire, 2014), posttraumatic stress (Weiss, Tull, Anestis, & Gratz, 2013), BPD (Fossati, Feeney, Maffei, & Borroni, 2014), and eating disorders (Lavender et al., 2014; Racine & Wildes, 2013). Thus, ED is a robust transdiagnostic indicator of vulnerability and may contribute to high rates of comorbidity across various diagnoses (Beauchaine & Thayer, 2015).

ED is a multidimensional construct involving a lack of awareness and understanding of emotions, denial or avoidance of emotions, an unwillingness to experience negative emotions, difficulties in controlling behaviors when faced with emotional distress, and deficits in the modulation of emotional arousal, including a lack of access to effective strategies for modulating the intensity or duration of emotions (Gratz & Roemer, 2004; Gratz & Tull, 2010).

Difficulties accessing effective ER strategies may directly affect distress tolerance (DT), which is the capacity to withstand negative psychological states within the perspective of goal-directed behavior (Leyro, Zvolensky, & Bernstein, 2010). It has been suggested that low levels of DT are associated with a wide range of negative outcomes, including various forms of psychopathology and multiple maladaptive behaviors (e.g., Leyro et al., 2010). Research has shown that difficulties accessing effective ER strategies are associated with (1) heightened experiential avoidance or the tendency to avoid uncomfortable internal experiences (e.g., Fergus, Bardeen, & Orcutt, 2013) and (2) lower perceived DT (McHugh, Reynolds, Leyro, & Otto, 2013). Moreover, evidence suggests the dimension of ED is associated with various forms of psychopathology characterized by low DT, such as generalized anxiety disorder (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006), posttraumatic stress symptoms (Tull, Barrett, McMillan, & Roemer, 2007), and disordered eating (Lavender & Anderson, 2010).

Metaanalytic studies of emotion regulation

Two metaanalyses have attempted to estimate the average effect of ER strategies on emotional experience and related outcomes. In the first one, Augustine and Hemenover (2009) used Parkinson and Totterdell's (1999) taxonomy to classify different affect regulation strategies. This taxonomy was developed by asking participants to classify 162 strategies into meaningful strategies. The results of this metaanalysis revealed two principal types of strategies: behavior and cognitive strategies.

Aldao, Nolen-Hocksema, and Schweizer (2010) examined the effects of six ER strategies (acceptance, avoidance, problem solving, reappraisal, rumination, and suppression) on psychopathology. Avoidance and rumination were found to be positively associated with psychopathological symptoms, whereas acceptance and problem solving were negatively associated. With regard to the strategies described by the process model of Gross (1998), suppression was found to be positively correlated with psychopathological symptoms, whereas reappraisal was negatively correlated. Webb, Miles, and Sheeran (2012) outlined a new taxonomy that delineates the relationship between ER processes and specific ER strategies (Table 11.1). Moreover, they illustrate a number of potential moderators of the relation between strategy use and emotional outcomes.

Cognitive emotion regulation

Among the variety of strategies individuals habitually use to regulate their emotions, cognitive emotion regulation (CER) strategies refer to what individuals think to handle their emotions in response to eliciting events (Garnefski, Kraaij, & Spinhoven, 2001; Gross, 2001). In other words, the term CER indicates the conscious thoughts by means of which

TABLE 11.1 A Taxonomy for Linking Emotion Regulation Processes With Specific Strategies and Strategy Subtypes

| Process | Strategy | Subtype | Definition |
|------------------------|---------------|---|---|
| Attentional deployment | Distraction | Active positive distraction (D1) | The instructions explicitly direct participants to think about something positive that is unrelated to the focal emotion or emotional stimulus, to distract themselves. |
| | | Passive positive distraction (D2) | Participants are provided with emotionally positive materials or a task that is positive and unrelated to the focal emotion or emotional stimulus; participants are given no explicit instructions to distract themselves. |
| | | Active neutral distraction (D3) | The instructions explicitly direct participants to think about something neutral that is unrelated to the focal emotion or emotional stimulus, to distract themselves. |
| | | Passive neutral distraction (D4) | Participants are provided with materials or a task that is neutral and unrelated to the focal emotion or emotional stimulus; participants are given no explicit instructions to distract themselves. |
| | Concentration | Concentrate on feelings (C1) | The instructions direct participants to attend to, focus on, make judgment about, or relieve their emotional experience. |
| | | Concentrate on causes and implication (C2) | The instructions direct participants to think about the causes, meanings, or consequences of or the reasons for their feelings. |
| | | Concentrate—mixed (C3) | The instructions direct participants to concentrate on feelings, causes, and implications. |
| Cognitive change | Reappraisal | Reappraise emotional response (R1) | Participants are instructed to interpret the focal emotion in a particular manner. For example, participants may be told that the emotion is normal or that they should accept or not judge the emotion. |
| | | Reappraise emotional stimulus (R2) | Participants are instructed to reinterpret the emotional stimulus (the context or the cause of the emotion). For example, participants might be asked to imagine that a negative event had a positive outcome. |
| | | Reappraise via perspective taking (R3) | The instructions ask participants to alter the impact of the emotional stimulus by adopting a more or a less objective perspective. For example, participants may be asked to imagine themselves in the situation depicted or may be asked to be objective or to view the stimulus as detached observers. |
| | | Reappraisal—mixed (R4) | The instructions are framed such that the strategy could involve reappraising the emotional response and/or reappraising the emotional stimulus and/or reappraisal via perspective taking. |
| Response modulation | Suppression | Suppress the expression of emotion (S1) | Participants are instructed to hide the way they are feeling (e.g., not to smile). They are told to act in such a manner that an observer could not guess how they are feeling. |
| | | Suppress the experience of emotion (S2) | Participants are instructed to control their emotional experience. They are told to control or not allow themselves to experience the focal emotion. |
| | | Suppress thoughts of the emotion-eliciting event (S3) | Participants are instructed to control thoughts of or not allow themselves to think about the emotion-eliciting event. |
| | | Suppression—mixed (S4) | Participants are instructed both to hide the focal emotion and to control or not allow themselves to experience that emotion. |
| Control conditions | | No instructions (Cont1) | No instructions relating to emotional experience or emotion regulation are given, or participants are told to think or feel what they like. |
| | | Instructions not to regulate in a specific manner (Cont2) | Participants are told that they should not regulate in a certain manner (e.g., that they should not reappraise the stimulus). |
| | | Instructions to enhance emotions (Cont3) | The instructions direct participants to enhance or maintain the focal emotion. |
| | | Instructions to experience naturally (Cont4) | The instructions direct participants to respond naturally to the emotional stimulus; participants should let their feelings flow without trying to regulate them. |
| | | Control—mixed (Cont5) | Participants are told to use a combination of the control instructions. |

Source: Reprinted from Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: a meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin*, 138(4), 775–808, with permission. Copyright 2012 by the American Psychological Association.

individuals regulate their emotions in response to adverse events (Garnefski, Kraaij, & Spinhoven, 2002; Garnefski et al., 2002b; Thompson, 1991). For instance, one may reframe the meaning of a harmful event in terms of personal growth, or instead emphasize its negative aspects. Researchers have recently started to study the cognitive components of ER (what individuals think) separate from other types of strategies, such as behavioral strategies (what individuals actually do), arguing that cognitive coping and taking actions can be considered as two different processes employed at different points in time, with cognitive processes (e.g., planning) generally preceding taking action (Garnefski et al., 2001). Up to now, most research has examined the link between CER and distress symptoms to identify which strategies are risk (or protective) factors associated with emotional disorders, and may thus be important targets for psychotherapy interventions (Garnefski & Kraaij, 2007). By contrast, surprisingly few studies have examined whether dispositional use of CER strategies in response to adversity may be associated with the individual's optimal psychological functioning and experience (Ben-Zur, 2009; Karademas, 2007).

Cognitive Strategies of Emotion Regulation

CER can be viewed as the cognitive way of regulating emotionally arousing information (Thompson, 1994). It is also known as the cognitive part of coping (Garnefski et al., 2001). Several studies have demonstrated that there is a robust relationship between the use of certain cognitive strategies and psychopathology (e.g., Ehring, Fischer, Schnulle, Bösterling, & Tuschen-Caffier, 2008; Ehring, Tuschen-Caffier, Schnulle, Fischer, & Gross, 2010).

Focusing attention on the cognitive components of ER, Garnefski et al. (2001) have recently developed the Cognitive Emotion Regulation Questionnaire (CERQ), which measures nine conscious cognitive strategies people can employ after experiencing negative life events.

In this line of research, several studies have shown that large individual differences exist in the use of cognitive regulatory strategies, that is, in the content of the thoughts by which individuals regulate their emotional responses to life events (Garnefski et al., 2001; Garnefski & Kraaij, 2007). In general, individuals report habitually using adaptive strategies (e.g., positive reappraisal, planning) more often than less adaptive strategies (i.e., self-blame, rumination, other blame, and catastrophizing). Extensive research has then tested whether CER may be associated with the development of emotional disorders, consistently finding that some strategies, such as catastrophizing, self-blame, rumination, and (inversely) positive reappraisal, are stronger predictors of distress, depression, and anxiety symptoms than other strategies, such as planning and acceptance (e.g., Garnefski et al., 2001, 2002a, 2002b; Jermann, Van der Linden, d'Acremont, & Zermatten, 2006; Schroevers, Kraaij, & Garnefski, 2007). Overall, these findings suggest that by using certain CER strategies, individuals may be more vulnerable to maladaptive symptoms in response to negative life events, whereas by using other cognitive strategies, such as positive reappraisal, individuals may be more tolerant and resistant against adversities (Garnefski & Kraaij, 2007).

Overall, existing studies suggest that—just as some regulation strategies are more closely associated with emotional problems than others—regulatory strategies may be differently effective in promoting individuals' well-being as well. In particular, it has been suggested that regulatory strategies may influence well-being through different mechanisms, so that strategies directly increasing the experience of positive emotions in the face of negative events—such as positive reappraisal—should be more effective in enhancing well-being (Shiota, 2006).

Cognitive emotion regulation across cultures

In a recent study, Potthoff et al. (2016) compared six European countries to investigate cross-cultural differences in the use of cognitive strategies and examine possible cross-cultural differences between specific strategies and psychopathology. Data were collected from the Netherlands, Hungary, Spain, Italy, Portugal, and Germany ($N = 1553$). The authors used the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001) to measure CER strategies in response to stressful or traumatic life events. The results of this study revealed differences on strategies that have been linked to symptoms of psychopathology. Overall, northern European countries used fewer strategies, such as rumination, catastrophizing, and other-blame, in comparison to Southern European countries.

Two cultural variables that might explain the observed differences are Hofstede's cultural dimensions *power distance* and *uncertainty avoidance* (Hofstede, Hofstede, & Minkov, 2010). Power distance refers to the degree to which less powerful people in a culture accept power inequalities, which has been shown to be consistently related to unpleasantness of negative emotions (Basabe et al., 2002; Hofstede et al., 2010). Similarly, uncertainty avoidance, which symbolizes the degree to which people feel threatened by ambiguous situations, has a positive association with emotional unpleasantness (Hofstede & Hofstede, 2005). There is evidence that northern European countries score lower on power distance and uncertainty avoidance, which suggest a more adaptive pattern of ER (i.e., northern European countries making less use of maladaptive cognitive strategies) (Hofstede & Hofstede, 2005).

Culture is expected to influence the way people regulate their emotions. Culture may also shape the adaptiveness of that ER (i.e., whether ER is good or bad for a person's well-being) (Butler, 2012). Furthermore, culture may shape the adaptiveness of that ER (i.e., whether ER is good or bad for a person's well-being) (Butler, 2012). Because culture reinforces behaviors that promote culturally supported values (Mesquita, De Leersnyder, & Albert, 2014), behaviors that are consistent with a culture's values may become more practiced (and thus easier to implement) and more socially rewarded, both of which may lead to greater well-being.

Research (Gross, Richards, & John, 2006) has shown that Asian Americans reported using ER more frequently. Much of the research on cultural differences in the motivation to regulate emotion in general and much of the research on cultural differences in ER have focused on cultural differences in using the ER strategy of *expressive suppression*. This strategy inhibits the outward expression of an ongoing emotion (e.g., "I cannot control my emotions by not expressing them"). Numerous studies have demonstrated that individuals from Asian backgrounds (e.g., Hong Kong Chinese, Japanese, and Asian Americans) are more likely to report using *suppression* than individuals from European backgrounds (Matsumoto, Yoo, & Nakagawa, 2008; Soto, Perez, Kim, Lee, & Minnick, 2011; English & John, 2013). When using countries as the unit of analysis, samples from countries higher (vs. lower) on interdependence (Hong Kong vs. Canada) also reported higher levels of suppression (Matsumoto et al., 2008).

The Difficulties in Emotion Regulation Scale

The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is one of the most widely used self-report measures of ER deficits. The DERS was developed to capture clinically relevant problems. However, it has also been used to examine normative developmental processes and experiences.

The DERS consists of 36 items that load onto 6 subscales (Gratz & Roemer, 2004). (1) *Nonacceptance of emotional responses* reflects a tendency toward negative secondary responses to negative emotions and/or denial of distress. (2) *The difficulties engaging in goal-directed behavior scale* captures problems concentrating and accomplishing tasks while experiencing negative emotions. (3) *The impulse control difficulties subscale* reflects struggles to control behavior when upset. (4) *The lack of emotional awareness scale* captures inattention to emotional responses. (5) *The limited access to ER strategies scale* assesses beliefs that there is little a person can do to regulate one's emotions effectively after becoming upset. The last subscale, labeled *lack of emotional clarity*, reflects the extent to which individuals feel confused about the emotions they are experiencing.

Although the DERS is a useful and widely studied instrument, many of the items are conceptually similar. DERS subscales contain between five and eight statements that load strongly on to each subscale, suggesting that multiple items may not be necessary to adequately assess the underlying constructs. Furthermore, the similarity of some items may be perceived as repetitive to participants, potentially increasing frustration and fatigue (Gratz & Roemer, 2004; Gratz & Tull, 2010). In addition, a study by Kaufman et al. (2015b) was designed to evaluate whether a shortened version of the widely used DERS can perform similarly to the full measure. Results from the two confirmatory factor analyses indicated that the DERS-SF (or DERS-16) has sound psychometric properties that are comparable to or better than the original measure. Furthermore, scores on the DERS-SF effectively capture the dimensions of ER deficits measured by the original DERS. They also found that correlations between scores on the DERS-SF and on other clinically relevant scales mirrored correlations observed when using the full DERS.

The shortened version, DERS-16, consists of 16 items that assess the following dimensions of ER difficulties: nonacceptance of negative emotions (3 items), inability to engage in goal-directed behaviors when distressed (3 items), difficulties controlling impulsive behaviors when distressed (3 items), limited access to ER strategies perceived as effective (5 items), and lack of emotional clarity (2 items) (Bjureberg et al., 2016).

Cognitive Emotion Regulation Questionnaire

The Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001, 2002a, 2002b) is a 36-item scale that evaluates 9 cognitive strategies of ER (4 items each). *Positive reappraisal* refers to the attempt of reinterpreting the event in terms of personal growth (e.g., "I think I can learn something from the situation"). *Putting into perspective* refers to thoughts emphasizing the relativity of the event when comparing it to other (more serious) situations (e.g., "I tell myself that there are worse things in life"). *Positive refocusing* refers to the attempt of thinking about pleasant and happy situations instead of thinking about the harmful event (e.g., "I think of something nice instead of what has happened"). *Refocusing on planning* consists of thoughts about what to do and how to face the negative event (e.g., "I think about a plan of what I can do best"). *Acceptance* refers to thoughts of resigning oneself to what has happened (e.g., "I think that I must learn to live with it"). *Self-blame* and *blaming others* refer to putting the blame of what has happened either on oneself or on others

(e.g., “I feel that I am the one to blame for it”). *Rumination* refers to thinking about the feelings experienced as a consequence of the negative event (e.g., “I dwell upon the feelings the situation has evoked in me”). *Catastrophizing* consists of emphasis on the negative aspects of the event (e.g., “I often think that what I have experienced is the worst that can happen to a person”).

THE PSYCHOPATHOLOGY OF INTELLECTUAL DISABILITIES

Intellectual disability (ID), formerly known as mental retardation (Schalock et al., 2007), can be conceptualized as (1) significantly subaverage intelligence quotient, (2) deficits in adaptive behavior, and (3) an onset before the age of 18 (Oltmanns & Emery, 2012). ID is classified into mild, moderate, severe, and profound. Individuals with mild ID make up the largest percentage of those with ID, approximately 85% (Belva, 2014).

Prior to the 1970s, individuals with ID were not considered capable of experiencing mental disorders because of insufficient ego strength (Deb, Thomas, & Bright, 2001). However, in the past 3 decades this line of reasoning has changed, as it has been revealed that individuals with ID not only experience psychiatric disorders, but also have an increased risk of developing them compared to the general population (e.g., Cooper, Smiley, Morrison, Williamson, & Allan, 2007). Researchers have reported estimates in the range of 10%–71%, depending on the diagnostic criteria used and the population investigated (e.g., Raghavan, 2004). Commonly encountered psychiatric disorders in those with ID include major depressive disorder (MDD), ADHD, anxiety disorder, psychotic disorder, and autism spectrum disorder (ASD), among others (e.g., Hastings, Beck, Daley, & Hill, 2005).

The identification of mental illness in individuals with ID is not a simple task, as self-reporting (e.g., Konstantareas & Hewitt, 2001) is often limited. Therefore, third-party members (that include family members or caregivers) are valuable in contributing to the diagnostic procedure. There is an increasing interest in the design of instruments to measure psychopathology in individuals with ID (e.g., Russell, 1997).

According to Belva (2014) some of the most widely used instruments designed to assess psychopathology in individuals with ID include the following.

The Assessment for Dual Diagnosis

The Assessment for Dual Diagnosis (ADD) (Matson & Bamberg, 1998) is a 79-item instrument designed to screen for psychopathology in individuals with mild and moderate ID. The measure consists of 13 scales: Mania, Depression, Anxiety, Posttraumatic Stress Disorder (PTSD), Substance Abuse, Somatoform Disorder, Dementia, Conduct Disorder, Pervasive Developmental Disorder, Schizophrenia, Personality Disorder, Eating Disorder, and Sexual Disorder.

Developmental Behavior Checklist

The original Developmental Behavior Checklist–Primary Carer Version (DBC-P) was created to assess for emotional and behavioral disturbances in children and adolescents ages 4–18 years with ID. The 96-item, multiple-choice checklist provides 5 subscales derived using factor analysis: Disruptive, Self-Absorbed, Communication Disturbance, Anxiety, and Social Relating (Bontempo et al., 2008; Clarke et al., 2003). The DBC-P yields five subscales scores for the aforementioned subscales and a total behavior problem score. The total behavior problem score is calculated by adding all 96 items, and a total score of 46 or greater has been determined as the clinical cutoff (Einfeld & Tonge, 1992).

Within the DBC-P is the DBC–Early Screen (DBC-ES), which consists of 17 items that have proven effective as a screen for autism in young children with developmental disability (Gray & Tonge, 2005; Gray, Tonge, Sweeney, & Einfeld, 2008). In addition to the 96-item DBC-P, a 24-item short form of the measure, the DBC-P24, has also been developed (Taffe et al., 2007).

Diagnostic Assessment for the Severely Handicapped

The Diagnostic Assessment for the Severely Handicapped (DASH-II) (Matson, Gardner, Coe, & Sovner, 1991) is an 84-item instrument designed to identify potential psychopathology and measure associated symptoms in individuals with severe and profound ID (Matson, 1995; Matson et al., 1991). The scale includes 13 subscales: Impulse Control, Organic Problems, Anxiety, Mood Disorders, Mania, ASD/Autism, Schizophrenia, Stereotypies, Self-Injurious Behavior, Elimination Disorders, Eating Disorders, Sleep Disorders, and Sexual Disorders. The DASH-II is administered to a caregiver who is asked to rate the individual’s frequency of behaviors based on the past 2 weeks. The caregiver who rates the individual must have known the individual for at least 6 months.

Nisonger Child Behavior Rating Form

The Nisonger Child Behavior Rating Form (NCBRF) (Aman, Tassé, Rojahn, & Hammer, 1996) is a 76-item, informant-reported behavior rating scale that was adapted to assess children and adolescents aged 3–16 years with ID (Tassé, Aman, Hammer, & Rojahn, 1996). At the time of its development, the authors noticed a need for assessment tools that could be used specifically with children with ID (Aman, 1991).

The NCBRF consists of two versions, a parent version and a teacher version, each with two sections (Social Competence and Problem Behavior). The Social Competence section consists of 10 items depicting adaptive/prosocial types of behavior (e.g., “was cheerful or happy”).

The Problem Behavior section contains a variety of maladaptive behaviors (e.g., “defiant, challenges adult authority”).

The Social Competence section consists of two subscales labeled Compliant/Calm and Adaptive/Social. Additionally, the Problem Behavior section possesses 60 items that load on 6 subscales, found using factor analysis (Aman et al., 1996): Conduct Problem, Insecure/Anxious, Hyperactive, Self-Injury/Stereotypic, Self-Isolated/Ritualistic, and Overly Sensitive. The teacher version of the NCBRF may be completed by a teacher or teacher’s aide. Both the Social Competence and the Problem Behavior items are similar to those on the parent version with minor changes.

Norris and Lecavalier (2011) investigated the factorial, criterion, and convergent validity of the NCBRF parent version using data from 399 children aged 5–18 years. The authors found that the analysis of the Social Competence items indicated a good fit using the root mean square error of approximation (RMSEA = .05), supporting the two-factor structure originally proposed by Aman et al. (1996), whereas the Problem Behavior items indicated a mediocre fit (RMSEA = .08).

Psychiatric Assessment Schedule for Adults with a Developmental Disorder

The Psychiatric Assessment Schedule for Adults with a Developmental Disorder (PAS-ADD) (Moss, Prosser, Costello, Simpson, & Patel, 1996; Moss et al., 1998) is a screening tool designed to identify possible comorbidity of psychiatric disorders in individuals with ID (Allen, Low, Matthews, & Anness, 2012) and is part of a three-tiered interview pack consisting of the PAS-ADD interview, the Mini PAS-ADD, and the PAS-ADD Checklist. The PAS-ADD is a semistructured interview that produces research diagnoses and involves interviewing both the patient and an informant (Moss et al., 1997). Moss et al. (1997) investigated the PAS-ADD interview and found that it possessed good validity in relation to psychotic symptoms and depressive symptoms. In addition, Moss et al. (1997) compared PAS-ADD interview scores to referrers’ diagnoses and found that, of the 58 diagnoses produced by the PAS-ADD, 44 were in agreement with the referrer. Last, the PAS-ADD has been shown to have a high degree of predictive validity (Hatton & Taylor, 2008).

The Mini PAS-ADD (Moss, 2002) is a 66-item questionnaire used to assess for psychopathology in individuals with ID. The authors specifically state that the Mini PAS-ADD is used for case identification rather than diagnosis (Devine, Taggart, & McLornian, 2010). The measure contains six subscales—Depression, Anxiety, Hypomania, Obsessive-Compulsive Disorder (OCD), Unspecified Disorder (including Dementia), and Autistic Spectrum Disorder—and each item has an accompanying probe to assist those informants who have less experience rating psychopathology (Moss, 2002). The authors also state that if an individual’s checklist score surpasses one of the thresholds, the subsequent clinical assessment will likely show that the individual meets ICD-10 criteria for a psychiatric disorder.

The revised version of the 25-item PAS-ADD Checklist yields 5 scores that are combined into 3 final subscales: Affective/Neurotic Disorder, Possible Organic Condition, and Psychotic Disorder, with threshold scores indicating a possible psychological diagnosis (Moss et al., 1998). These three subscales were derived by examining ICD-10 symptom clusters rather than an empirical factor analysis (Moss et al., 1998).

Psychopathology Instrument for Adults with Mental Retardation

The first scale for the assessment of psychopathology of individuals with ID was the Psychopathology Instrument for Adults with Mental Retardation (PIMRA) (Kazdin, Matson, & Senatore, 1983; Matson, Kazdin, & Senatore, 1984; Senatore, Matson, & Kazdin, 1985). The instrument matched the structure of popular interviews of those times, such as the Schedule for Affective Disorders and Schizophrenia (Endicott & Spitzer, 1978), and consisted of informant and self-report versions. The PIMRA consists of 56 items representing 7 classes of psychopathology based on the *DSM-III* criteria (i.e., Schizophrenia, Affective Disorder, Psychosexual Disorder, Adjustment Disorder, Anxiety Disorder, Somatoform Disorder, and Personality Disorder) and 1 additional subscale representing Inappropriate Mental Adjustment. Each of the eight subscales contains seven items that must be either endorsed or denied.

Furthermore, the PIMRA has been investigated internationally. Gustafsson and Sonnander (2002) established the inter-rater reliability, internal consistency, item grouping, criterion validity, and concurrent validity of the PIMRA using a

Swedish sample. The PIMRA has also been translated into other languages and evaluated in a multitude of countries, such as New Zealand (Aman, Watson, Singh, Turbott, & Wilsher, 1986), Great Britain (Sturmeley & Ley, 1990), Norway (Linaker, 1991; Linaker & Helle, 1994), the Netherlands (Minnen, Savelsberg, & Hoogduin, 1994), and Italy (Balboni, Battagliese, & Pedrabissi, 2000).

The PIMRA-II was developed to compensate for limitations of other instruments in the field of psychopathology with regard to individuals with IDs. Moreover, the PIMRA allows the investigation of the comorbidity of two or more Axis I disorders in individuals with IDs, information that is currently missing in the literature (Kozlowski, Matson, Sipes, Hattier, & Bamburg, 2011). The sample consisted of 307 adults aged 18–92 years ($M = 42.6$, $SD = 16.3$). The sample was collected from residential treatment centers for individuals with developmental disabilities and group homes in the southeast region of the United States. The PIMRA-II is a revised informant-report measure to assess for psychopathology in individuals with mild and moderate ID consisting of 88 items. A major goal of the PIMRA-II was to revise items from the original tool to reflect the *DSM-5* criteria. Other targets included the endorsement of a wider range of psychopathology, and efforts to ameliorate the comprehension level of items and increase the number of items. Factor analysis of the items led to the formation of 9 factors: depression (13 items), ADHD (9 items), ASD (8 items), psychosexual (9 items), somatic (8 items), anxiety (13 items), conduct (9 items), psychosis (9 items), and mania (7 items).

Reiss Screen for Maladaptive Behavior

The Reiss Screen for Maladaptive Behavior (RSMB) is one of the older and well-established scales evaluating psychopathology in individuals with ID. The RSMB (Havercamp & Reiss, 1997; Reiss, 1988) was developed to meet the need for a standardized screening instrument to be used by nonprofessionals for mental health disorders in persons with ID, not as a stand-alone diagnostic tool. The RSMB is completed by caregivers to rate an individual's severity of psychopathology on 36 items, and a high score indicates a need for referral for more detailed evaluation (Havercamp & Reiss, 1997). Reiss and Valenti-Hein (1994) investigated the RSMB by evaluating 583 children and adolescents with ID.

Walsh and Shenouda (1999) found strong convergent validity between the RSMB and the Aberrant Behavior Checklist (Aman, Singh, Stewart, & Field, 1985) using a sample of 284 individuals. Specifically, RSMB subscale scores correlated with Irritability, Lethargy, and Hyperactivity subscales on the Aberrant Behavior Checklist.

Gustafsson and Sonnander (2002) investigated the psychometric properties of the Swedish version of the RSMB. The authors found moderate-to-low interrater agreement and good internal consistency. Additionally, the authors found that mental health concerns most common in their sample included anxiety, depression, self-injurious behaviors, and adjustment problems (Gustafsson & Sonnander, 2002).

DEVELOPMENTAL PSYCHOPATHOLOGY

Developmental psychopathology focuses on the interaction between personality and environmental factors in the onset of mental disorders. Such factors include genotype–environmental interactions ($G \times E$), epigenetic encoding of life events (e.g., prenatal stress, early neglect or abuse) and their role in the development of neurobiological systems (Cicchetti, 2015; Hyde, 2015). Developmental psychopathology employs both categorical and dimensional approaches and embraces fundamental questions on continuities and discontinuities, as well as in the exploration of mediating mechanisms.

There has been no evidence that early adversity leads inevitably to pathology. Developmental psychopathologists have gradually become less focused on discrete causes of disorders alone. Instead greater emphasis has been placed on the understanding of what causes a change in developmental trajectories, and during what developmental periods opportunities for change arise. It is quite clear by now that early life stress can stunt development, with higher amounts of adversity linked to a diffuse array of developmental problems. “There is evidence that an important facet of risk for mental illness can be understood as altered neural processing of social stimuli which impairs regulatory processes” (Pollak, 2015).

Potential personality disorder precursors may be delineated from an explicit developmental trait approach. The Dimensional Personality Symptom Item Pool (DIPSI; de Clercq, de Fruyt, & Mervielde, 2003) is the first hierarchically organized and empirically based proposal for describing early personality difficulties. It includes developmental counterparts for each of the four adult higher-order dimensions of personality pathology.

The study of de Clercq, van Leeuwen, van den Noortgate, de Bolle, and de Fruyt (2009) extends this dimensional stability perspective toward an earlier developmental stage. Moreover, it describes with different indexes of stability the longitudinal behavior of basic childhood maladaptive trait dimensions in a community sample of 477 Flemish children. The results underscore structural, rank-order, and within-person stability for the disagreeableness, emotional instability, introversion, and compulsivity dimensions, and suggest a similar maturation principle as has been proposed for adults. Individual growth

curve analyses indicate that children's maladaptive trait scores generally decrease as they grow older, with a smaller decline for high-scoring individuals. Childhood maladaptive traits and general psychopathology dimensions show similar longitudinal patterns in terms of shape and change over time, supporting a spectrum conceptualization of Axis I-related pathology and personality disorder precursors at young age.

In this connection, it is important to investigate the extensive individual differences in people's responses to all forms of environmental adversity. In addition, it seems that although the main focus has been on response to stress, the main G×E is seen with maltreatment in early childhood and not acute stress. This suggests a biological pathway beginning early and extending into adult life where the psychopathology is progressively manifested (Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van Ijzendoorn, 2011).

Advances in mental health issues in infancy

Infant psychopathology during the first year of life is associated with the infant's ability to regulate behavioral and physiological states in response to unpredictable environmental challenges. Most infants develop self-soothing skills and are capable of regulating behavioral states in a variety of contexts. Problems with regulation are usually attributed to atypical neural regulation of physiological state. This atypical neural regulation is referred to as a *regulatory disorder* (RD). Greenspan (1994) developed clinical criteria for RD that consisted of behavioral patterns (e.g., sleep and feeding problems) and difficulty with sensory, sensory-motor, and organizational processing. DeGangi, Breinbauer, Doussard-Roosevelt, Porges, and Greenspan (2000) proposed that a diagnosis of RD be given to infants with poor self-regulation and hypersensitivities to touch and/or movement. Parental reports of difficult temperament were related to negative developmental outcomes only for infants with RD (DeGangi, Porges, Sichel, & Greenspan, 1993).

The manifestations of RD influence the quality of mother-child interactions. DeGangi, Sichel, Kaplan, and Wiener (1997) reported that in comparison to a control sample, infants with RD displayed more flat affect, aggressive, and noncontingent responses. The importance of understanding that individual factors lead to the infant's responsiveness to maternal approaches is consistent with the theory of Schneirla (1957), which can be applied to the developing child. According to Schneirla's model, whether the organism approaches or withdraws from the stimulation is determined by the intensity of stimulation (i.e., physical characteristics of the stimulus) and the ability of the autonomic nervous system (parasympathetic or sympathetic components) to regulate physiological and behavioral states (i.e., individual differences in physiological and behavioral regulation).

To gain better understanding on the relationship between the quality of maternal engagement strategies and infants' responses (Schneirla, 1957) developed the Approach-Withdrawal Interaction Coding System (AWICS; Doussard-Roosevelt, Porges, & Portales, 1995). The approach behaviors of each mother were coded according to type of approach. Physical approaches involved physical movement toward and/or contact with the infant. Social approaches involved the use of social cues to engage the infant (e.g., facial, gestural, vocal cues). Object approaches involved the use of an object to engage or sustain the attention of the infant. Both the social and object approaches were further subdivided depending on whether the mother was talking during the approach. Thus, there were six approach types (i.e., verbal social, nonverbal social, verbal object, nonverbal object, physical proximity, and physical contact) that were not mutually exclusive.

The Regulatory Disorders Checklist (RDC) conceptualize RD according to the framework of DeGangi et al. (2000). The RDC is a diagnostic checklist indicating regulatory disorder characteristics among infants completed by researchers from information provided by the parents and observed by the researchers during the developmental test. The RDC is scored according to available information from the Fussy Baby Questionnaire, Infant Characteristics Questionnaire, and Infant Behavior Questionnaire, along with the Infant Behavior Record, Mental Development Index, and Psychomotor Development Index of the Bayley Scales of Infant Development. The items in the RDC fall into the following domains: (1) self-regulation difficulties domain (i.e., difficulties in regulating emotional lability, self-consoling, change in routine, contact by others, feeding, and elimination); (2) hypersensitivities domain (i.e., specific sensory modalities, including hypersensitivity to tactile, oral-ingestive, olfactory, auditory, visual-spatial, and kinesthetic stimulation); and (3) other developmental concerns domain, which identifies difficulties in activity level, attention, sleep, muscle tone and stability, gross and fine motor activity, receptive and expressive language, and mental development. Based on these criteria, the infants were categorized into three groups: *no difficulties* (i.e., the infant did not meet the criteria for either the self-regulation difficulties or hypersensitivities domain), *one domain* (i.e., the infant met the criteria for either the self-regulation difficulties or hypersensitivities domain), and *RD* (i.e., the infant met the criteria for both the self-regulation difficulties and hypersensitivities domains).

There is an accumulating interest in the identification of emotional and behavioral problems in infants. First, advances in the formulation of developmental models have highlighted the importance of this early life period in later development

of psychopathology (e.g., Bronfenbrenner, 1989; Greenspan & Wieder, 2001; Zeanah, Boris, & Sheeringa, 1997). Second, a number of studies have recently revealed that problems in the first months or years of life may serve as precursors to mental health difficulties in later developmental stages (e.g., Skovgaard et al., 2008; Egger et al., 2006). Third, a number of studies have underscored the complex issues involved in clearly identifying psychopathology in infancy (Burnham, Goodlin-Jones, Gaylor, & Anders, 2002; Zeanah & Zeanah, 2009).

Infant behavior is commonly influenced by such factors as developmental level or cultural and family differences or expectations. Moreover, it has been suggested that this period of development involves such rapid shifts that they are hard to follow and measure reliability (Carter, Briggs-Gowan, & Davis, 2004). Infant mental health symptoms are “unstable and transient ... and (it is) often not possible to identify discrete diagnostic categories for disorders” (Angold & Egger, 2004, p. 125). Another key factor that differentiates infancy from later developmental periods is the strong dependence between infants and their caregivers (Roseblum, Dayton, & Muzik, 2009).

Issues Underlying Infant Mental Health Developmental Problems

First, it is hard to define and delineate the boundaries between “typical” as opposed to atypical for infants, taking into consideration the substantial variability during this period. However, some indicators can be useful in differentiating between transient problems and more persistent ones that might require intervention (Belden, Thomson, & Luby, 2008). Second, some symptoms may be a developmental adjustment to environmental stressors or psychosocial adversities, although others may persist and be indicative of problematic development (Greenspan & Wieder, 1997). Third, during this period there are hardly any independent risk factors associated with a disorder. Instead there is a multiplicity of factors that are often interrelated and that encompass genetic influences (Plomin & Rutter, 1998; Egger & Emde, 2011). The most common and influential factors are related to the family, such as marital discord, discipline methods, or maternal depression (e.g., Carter et al., 2004; Skovgaard et al., 2007). The fourth issue concerns total reliance on third parties. Third parties’ reports may be susceptible to bias and thus may be unreliable (Briggs-Gowan, Carter, & Schwab-Stone, 1996). Fifth, controversies surround the issue of whether infant can suffer of mental health disorders. It is a challenge to establish when (and whether) a child has the developmental ability for symptoms that derive from more developed cognitive capacities (Task Force on Research Diagnostic Criteria: Infancy Preschool, 2003).

Classification of Infant Mental Health Disorders

In recent years, there has been progress in classification systems of early childhood disorder and thus toward finer diagnoses of young children. They include the Research Diagnostic Criteria for Infants and Preschool Children (RDC), the Diagnostic Classification 0–3: Diagnostic Classification (DC) of developmental disorder in infancy and early childhood, DC: 0–3 (*Zero to Three: National Center for Clinical Infant Programs, 1994*) and its revised version, DC: 0–3R (*Zero to Three: National Center for Clinical Infant Programs, 2005*), and the *Diagnostic and Statistical Manual for Primary Care (DSM-PC)* (Wolraich, 1997). The *DSM* and *ICD* taxonomies are criticized for their lack of appropriate diagnostic criteria for infants’ and toddlers’ mental health problems (e.g., DelCarmen-Wiggins & Carter, 2001) and the lack of time frames to the age range 0–3 (Postert, Averbek-Holocher, Beyer, Muller, & Furniss, 2009).

Mental health difficulties in infancy have been classified to reflect developmental constructs and models involving several domains, such as social interaction and attachment, regulation of physical activities, and emotional states or affective expressions (Skovgaard et al., 2008). Examples include attachment disorders (Sroufe, Egeland, Carlson, & Collins, 2005), anxieties (Sheeringa & Zeanah, 2008), depression/affective disorders (Luby et al., 2003; Skovgaard et al., 2007), crying, sleeping, feeding difficulties, and their links with regulatory disorders (Johnson & Appleyard, 2010; von Kries, Kalies, & Papousek, 2006), disruptive and aggressive behaviors (Maughan & Rutter, 2008), and autism (Carr & Lord, 2009; Zwaigenbaum et al., 2005).

Preschool Psychopathology

Recent studies suggest that many preschoolers meet the diagnostic criteria for psychiatric disorder. It has been found that rates of psychopathology may be as prevalent in preschoolers as in school-age children (Egger & Angold, 2006). Despite these findings, there is considerable skepticism with regard to the validity of psychiatric diagnoses in preschoolers (Egger & Emde, 2011). Such skepticism is derived from a variety of sources: first, existing symptom scales, generally based on measures developed for older youths and adults, may not adequately distinguish developmentally normative behavior from psychopathology in young children (Briggs-Gowan, Carter, Bosson-Heenan, Guyer, & Horwitz, 2006). Second, preschool assessment can be complicated by the rapid developmental changes in language, cognition, emotion, and social behavior that characterize this period (Egger & Angold, 2006). Finally, there is a widespread belief that

young children will “grow out” of their problems, as well as concern that diagnoses will result in stigmatization (Egger & Emde, 2011).

Longitudinal studies are commonly used in the evaluation of validity of psychiatric diagnoses (Robins & Guze, 1970). However, most of these studies suffer from several limitations: first, most studies have investigated a limited range of disorders, with the majority focusing on externalizing problems (e.g., Keenan et al., 2011; Harvey et al., 2009). The findings demonstrate that externalizing disorders are moderately stable through school age. Moreover, these studies suggest that internalizing problems are less consistent than externalizing problems. A second limitation is that most longitudinal studies of preschool psychopathology have used parent rating scales rather than diagnostic interviews (e.g., Briggs-Gowan et al., 2006; Mian, Wainwright, Briggs-Gowan, & Carter, 2011). Measures do not provide details about the nature, duration, and clinical significance of symptoms and do not allow an evaluation of the prevalence or stability of diagnoses. Finally, previous studies are limited by relatively small samples, often considered high-risk or drawn from social service, psychiatric (Keenan et al., 2011; Speltz, McClellan, DeKlyen, & Jones, 1999), or primary care settings (Keenan et al., 2011).

In a recent investigation, Bufferd, Dougherty, Carlson, Rose, and Klein (2012) examined the continuity of specific psychiatric disorders in a large community sample of children 3–6 years of age. There was significant homotypic continuity from age 3 to age 6 for anxiety, ADHD, and oppositional defiant disorder (ODD), and heterotypic continuity between depression and anxiety, between anxiety and ODD, and between ADHD and ODD. These results indicate that preschool psychiatric disorders are moderately stable, with rates of disorders and patterns of homotypic and heterotypic continuity similar to those observed in older children.

Researchers have made strides in adopting a developmental approach to understanding preschool disruptive behavior—for example, Wakschlag et al.’s (2012, 2014) adopted multidimensional, developmental spectrum approach to preschool disruptive behavior.

A Multidimensional, Developmental Spectrum Approach to Preschool Psychopathology

Disruptive behavior (DB) disorder includes ODD and conduct disorder and represents one of the most common reasons for referral to treatment in preschool-aged children. Researchers have outstepped their boundaries in adopting a developmental approach to understanding preschool DBs. Largely influenced by work of Wakschlag et al. (2014), research on preschool DB has adopted a dimensional perspective that examines DB on a continuum from typically occurring, normative behaviors to nonnormative, clinical manifestations.

Wakschlag et al. (2012) proposed a four-dimensional developmentally informed model of DB in early childhood with four distinct dimensions linked to cardinal developmental processes of the preschool period (e.g., Wakschlag, Tolan, & Leventhal, 2010; Bufferd et al., 2012; Stringaris & Goodman, 2009; Burke, Hipwell, & Loeber, 2010; Drabick & Gadow, 2012; Wakschlag et al., 2012): temper loss and regulation of frustration, noncompliance and internalization of rules, aggression and capacity to modulate aggressive tendencies, and low concern for others and the emergence of empathy and conscience (Wakschlag et al., 2010, 2012).

Two years later, Wakschlag et al. (2014) used item response theory to test the four-dimensional developmentally informed model with a new measure, the Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB). To operationalize behaviors along the normal–abnormal spectrum for early childhood, the MAP-DB incorporates assessment of behavioral frequency, quality, and context. These parameters may provide more refined distinction between normative behaviors and clinically, concerning behaviors in this age period (Tremblay et al., 2004; Kochanska & Aksan, 2006).

Trajectories of Dysregulated Behavior Across Childhood

Dimensional temperament traits may be identified as early as infancy, manifesting as behavioral dysregulation, including increased irritability, excessive crying, and problems with feeding and sleeping (Hyde, O’Callaghan, Bor, Williams, & Najman, 2012). Children showing extremes of these traits have been characterized as being temperamentally difficult (Caspi & Silva, 1995; Schmid, Schreier, Meyer, & Wolke, 2010). Approximately 20% of all infants show symptoms of excessive crying, sleeping, or feeding problems in the first year of life (Hemmi, Wolke, & Schneider, 2011).

Mounting research demonstrates a strong link between infant and toddler regulatory problems (RPs) and behavioral problems in childhood (Hemmi et al., 2011). However, “the extent to which early RPs represent a developmental precursor of trait-like behavioral dysregulation over time is unclear” (p. 2). Thus, dysregulation may manifest as domain-related, age-appropriate constructs culminating in a mature phenotype (Shrout & Bolger, 2002). In the cognitive domain, early information-processing abilities appear to support cognitions across important developmental transformations, from the first year

of life to academic achievement in the second decade (Bornstein, Hahn, & Wolke, 2013). Similarly, early problems with behavioral regulation (e.g., persistent crying) may be the starting point for later domain-related self-regulation deficits in age-appropriate behaviors (e.g., the control of sustained attention, emotions, and behavior in challenging situations).

Childhood RPs have recently been classified as the *childhood dysregulation* syndrome (Althoff, Verhulst, Rettew, Hudziak, & van der Ende, 2010; Holtmann, Becker, Banaschewski, Rothenberger, & Roessner, 2011; Holtmann et al., 2011b). This profile characterizes children with affective, cognitive, and behavioral dysregulation, and has been operationalized by summing anxious/depressed, impulsive/aggressive, and attentional problem scales from the Child Behavior Checklist (CBCL-DP) (Holtmann et al., 2011b). The childhood dysregulation syndrome has been found to predict negative outcomes in adolescence and adulthood, including anxiety, mood, and disruptive behavior disorders; drug abuse (Althoff et al., 2010); suicidality (Holtmann et al., 2011b); and personality disorders (Halperin, Rucklidge, Powers, Miller, & Newcorn, 2011). Further, research suggests that the childhood dysregulation profile is a stable feature throughout childhood (at 7, 10, and 12 years) (Boomsma et al., 2006).

The biosocial model of BPD asserts that an inborn tendency toward emotional and behavioral dysregulation is effective across development, culminating in severe mental disorder (Beauchaine et al., 2007; Crowell, Beauchaine, & Linehan, 2009). Concurring with this theory, infant and toddler RPs may represent the earliest behavioral marker of dysregulation, in which there are direct (e.g., hypothalamic-adrenal-pituitary axis dysregulation) and indirect (e.g., determinant of infant caregiver interaction) influences on developmental outcome (Lester, 1984).

Childhood Interpersonal Adversity and Psychotic Phenomena

Childhood interpersonal adversities are associated with an increased risk for psychotic disorders and subclinical psychotic phenomena (Varese et al., 2012; Matheson, Shepherd, Pinchbeck, Laurens, & Carr, 2013; Velikonja, Fisher, Mason, & Johnson, 2015; van Winkel, Stefanis, & Myin-Germeys, 2008; Bentall et al., 2014; Sheinbaum & Barrantes-Vidal, 2015). The relation between psychosocial factors and psychotic disorders has received increasing attention in recent years. Considerable evidence has revealed that exposure to early life adversities or hardships, such as sexual physical or emotional abuse or neglect, is associated with a number of psychiatric outcomes (e.g., Kessler et al., 2010). Prospective studies have explored the association between childhood adversity and clinical/subclinical psychosis phenotypes (e.g., Fisher et al., 2013; Kelleher et al., 2013). Overall the results revealed the strength of the associations between adverse experiences and self-reported symptoms in psychotic disorder patients and nonclinical sample of volunteers (DeRosse, Nitzburg, Kompancaril, & Malhotra, 2014).

Childhood interpersonal adversity has been consistently linked to the presence of *insecure attachment styles* (IAS) (e.g., Read & Gumley, 2008; Fisher et al., 2010; Sheinbaum et al., 2015; Bifulco & Thomas, 2013; Toth, Gravener-Davis, Guild, & Cicchetti, 2013). IAS has been also associated with psychotic behavior in clinical and nonclinical samples (e.g., Korver-Nieberg, Berry, Meijer, & de Haan, 2014).

Attachment theory provides an integrative approach for understanding how early relational experiences become internalized and contribute to the unfolding of adaptive or maladaptive developmental pathways (Bowlby, 1973; Siegel, 2012). Adult attachment researchers typically focus on the construct of attachment style, which comprises cognitive, affective, and behavioral tendencies that are considered to result from a person's history of transactions with attachment figures (Mikulincer & Shaver, 2007). The attachment style construct is useful for conceptualizing different elements associated with vulnerability for schizophrenia-spectrum psychopathology, including dysfunctional self and other representations, problems in ER, and difficulties in interpersonal functioning (Read & Gumley, 2008; Berry, Barrowclough, & Wearden, 2007). Since the early studies in the 1990s demonstrated an association between insecure attachment styles and a diagnosis of schizophrenia (e.g., Dozier, Stevenson, Lee, & Velligan, 1991; Mickelson, Kessler, & Shaver, 1997), evidence has accumulated showing that different forms of attachment insecurity are related to clinical and subclinical psychotic phenomena (Korver-Nieberg et al., 2014). Research focusing on parent-child relationships has provided evidence linking perceived lack of parental care, as well as suboptimal parenting behaviors, with an increased likelihood of psychotic-like and schizophrenia-spectrum features (e.g., Janssen et al., 2005; Meins, Jones, Fernyhough, Hurndall, & Koronis, 2008; McCabe, Maloney, Stain, Loughland, & Carr, 2012).

A distinction is often made between anxious and avoidant attachment styles (Berry, Barrowclough, & Wearden, 2008). Individuals with high levels of anxious attachment need approval from others, are likely to experience separation anxiety, and engage in an interpersonal style characterized by focusing attention on distressing stimuli. Individuals with high levels of avoidant attachment tend to feel uncomfortable when close to others, value their autonomy, and divert attention from distressing stimuli and attachment-related thoughts and feelings (Berry et al., 2008; Fraley, Davis, & Shaver, 1998). Anxious and especially avoidant adult attachment are more salient in people with psychotic disorders (e.g., Gumley, Taylor, Schwannauer, & MacBeth, 2013) and are associated with poorer engagement with health care services and lower

therapeutic alliance and treatment adherence/compliance, and with social dysfunction (Gumley et al., 2013), and poorer recovery (Drayton, Birchwood, & Trower, 1998).

There is burgeoning interest in investigating the etiological relevance of environmental factors in the development of schizophrenia spectrum phenotypes (Brown, 2011; van Os, Kenis, & Rutten, 2010). Childhood adversity is a significant risk factor across a spectrum of severity ranging from schizotypy personality traits to permanent psychotic disorders (e.g., Matheson et al., 2013; Velikonja et al., 2015). In light of this evidence, research focuses on elucidating whether specific adverse experiences are responsible in evoking the development of specific symptom domains (Beards & Fisher, 2014; Bentall et al., 2014; Sheinbaum & Barrantes-Vidal, 2015).

The relationship between childhood adversities as a risk for schizophrenic phenomenology may contribute for issues of intervention and treatment options. The term *childhood adversity* has been used in the literature to cover an array of experiences, including, among others, different forms of abuse and neglect, bullying victimization, losses, and noninterpersonal events, such as accidents. In general, adverse childhood experiences have been more consistently linked to reality distortion than to negative/disorganized features (Velikonja et al., 2015; McCabe et al., 2012; Ruby et al., 2014). and available evidence appears to suggest that experiences characterized by an “intention to harm” are more strongly associated with psychotic symptoms than those without intent (Arseneault et al., 2011; van Nierop et al., 2014).

A shortcoming of several previous studies in the field relates to the assessment of childhood adversity. There is limited research employing comprehensive interview measures, and many studies have either covered a narrow range of adversities or relied on screening measures of adversity (Velikonja et al., 2015; Fisher & Craig, 2008). Furthermore, to our knowledge, it has yet to be examined whether the use of different techniques for assessing adverse experiences (interview vs. questionnaire) yields similar associations with psychosis symptom domains.

Another relevant issue that has been scarcely investigated concerns the association of different childhood adversities with symptoms assessed using momentary assessment approaches, such as the experience sampling methodology (ESM). ESM is a structured diary technique in which individuals are prompted randomly throughout the day to report on their current experiences, such as emotional states, cognitions, and symptoms. This approach offers several advantages compared to traditional assessment procedures, including enhanced ecological validity, minimization of retrospective bias, and the possibility of assessing the context of experiences (Conner, Tennen, Fleeson, & Barrett, 2009; De Vries, 1992; Hektner, Schmidt, & Csikszentmihalyi, 2007).

With regard to mechanistic processes, both theoretical and empirical work suggest that one way in which childhood adversity links to positive psychotic phenomena is through a sensitization process that renders individuals more reactive to subsequent minor stressors in everyday life (Myin-Germeys & van Os, 2007; van Winkel et al., 2008). ESM research has shown that childhood adversity is associated with heightened affective reactions to stress in individuals from the general population (Glaser, van Os, Portegijs, & Myin-Germeys, 2006; Wichers et al., 2009) and with increased affective and psychotic reactions to stress in patients with psychotic disorders (Lardinois, Lataster, Mengelers, van Os, & Myin-Germeys, 2011).

A study by Cristóbal-Narváez et al. (2016) sought to investigate associations between childhood adversity subtypes and psychosis symptom domains, as well as the stress sensitization hypothesis in a nonclinical sample of young adults. The data were collected as part of an ongoing longitudinal project exploring the psychosis risk and resilience in young adults. The participants were administered the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) and the Interview for Traumatic Events in Childhood (ITEC; Lobbestael, Arntz, Harkema-Schouten, & Bernstein, 2009; ITEC-2, Lobbestael & Arntz, 2010). Bullying by peers was assessed with questions from the Childhood Experience of Care and Abuse measure (CECA; Bifulco, Brown, & Harris, 1994); the general trauma subscale from the Early Trauma Inventory (ETI; Bremner, Vermetten, & Mazure, 2000), and ESM assessments, collected on personal digital assistants (PDAs). The results regarding the adversity–symptom links were in line with hypotheses. The finding that abuse, neglect, and bullying were associated with positive symptoms is consistent with recent metaanalyses (Varese et al., 2012; van Dam et al., 2012), and, importantly, provides evidence that these relations hold for symptoms experienced in the realm of daily life. The study also investigated whether associations of abuse and neglect with psychosis symptom domains were consistent across interview and self-report methods of assessment. It was found that analogous CTQ and ITEC scores were highly related and showed agreement in their associations with psychotic-like and paranoid symptoms.

Recent achievements in developmental psychopathology

Rutter (2013) in a comprehensive study provides a list of the most significant recent achievements of developmental psychopathology. The first areas of achievement lie in the field of attachment and attachment disorders (e.g., Rutter, Kreppner, & Sonuga-Barke, 2009). Developmental psychopathology highlights the need to extend measurement of attachment to

“disorganization” and to insecurity (Main & Solomon, 1986) and to employ a combination of quantitative and qualitative methods. More recently it was revealed that the pattern of social disinhibition notably involved social dysregulation more than insecure attachment (Bruce, Tarullo, & Gunnar, 2009; Rutter et al., 2009).

A second area of achievement is related to the domain of autism. In this case, developmental psychopathology acknowledges the need to move from a diagnostic approach to the examination of possible underlying mentalizing deficits (Johnstone, Firth, Crow, Husband, & Kreel, 1976). The heuristic power of trade-off and conflict thinking is illustrated by the *diametrical model of autism* and psychosis advanced by Crespi and Badcock (2008). According to the model, autism spectrum disorders (ASDs) and psychotic disorders (including schizophrenia and bipolar disorder) are pathological extremes of a continuum of individual variation. ASDs are characterized by hyperdeveloped *mechanistic cognition* (e.g., systemizing, visuospatial skills) and underdeveloped *mentalistic cognition* (e.g., empathy, theory of mind), whereas psychosis shows the opposite profile.

A third achievement is associated with general-population, longitudinal studies that show that schizophrenia (but not bipolar disorder or depression/anxiety) was associated with impairments in language and/or motor function in the preschool years and with impairments in intelligence over the whole period from early childhood onward (Cannon et al., 2002). The next finding was that schizophrenia was associated with minor psychotic-like features in late childhood/early adolescence (Poulton et al., 2000). Although these were surprisingly common in the general population (Laurens, Hobbs, Sunderland, Green, & Mould, 2012), they were associated with a substantially increased risk for future development of schizophrenia.

The fourth finding is related to the third. Findings from the Dunedin longitudinal study demonstrated that more than half of mental disorders that were diagnosed when the individuals were in their 20s and had resulted treatment had been manifested in childhood or early adolescence (Kim-Cohen et al., 2003). Although there was substantial (but minority) continuity in the type of disorder, oppositional defiant and conduct disorders were the most frequent antecedents of adult disorders (Kim-Cohen et al., 2003). That is to say, as would be expected from any developmental perspective, homotypic continuity was frequent, but what was new was the evidence of heterotypic continuity.

The fifth area of developmental achievements is related to the several different approaches in evaluating the environmental mediation of risks for psychopathology. It is well accepted by now that statistical associations, however strong, do not necessarily imply a causal effect. Nevertheless, specialists did not pay much attention to the possible ways in which the causal inference of environmental mediation might be tested. The situation changed with the recognition of the ways in which “natural experiments” that pulled apart variables that ordinarily went together could do much to strengthen or weaken the causal inference (Rutter, 2007, 2012a).

Alongside this recognition, but also part of it, was the appreciation that genetically sensitive designs could be highly informative. For example, Jaffee et al. (2004) used a multivariate twin analysis to compare the effects of physical abuse and of corporal punishment on psychopathology. The findings revealed that most of the effects of physical abuse were environmentally mediated, but most of the effects of corporal punishment were not. The implication was that the association between corporal punishment and mental disorders arose from the evocative effects of disruptive behavior in eliciting parental punishment.

The sixth achievement of developmental psychopathology concerns the gene–environment interplay (Rutter, 2012b). This involves at least three different types of interplay. First, the environment can alter the effects of genes through affecting gene expression from a developmental psychopathological perspective because it concerns a key mediating mechanism, which plays a central role in developmental psychopathology research. Second, another type of interplay concerns gene–environment correlations (*rGE*; Kendler & Baker, 2007). These are important because they constitute the mechanism by which environments can have genetically mediated effects (Plomin & Bergeman, 1991). However, they are also important because they indicate various ways in which behavior shapes and selects environments. The third type of interplay concerns gene–environment interaction (*G×E*). The initial reports of epidemiological evidence showing *G×E* in humans emphasized the environmental role of life events. As it has turned out, however, the evidence for *G×E* is much stronger in relation to maltreatment than it is for life adversities (Karg, Burmeister, Shedden, & Sen, 2011). The second *G×E* finding is that human experimental studies utilizing structural and functional brain imaging have shown that the *G×E* neural effects are evident in individuals who have already been screened for an absence of psychopathology (e.g., Hyde, Bogden, & Hariri, 2011).

The seventh developmental psychopathology achievement concerns the effects in relation to intellectual and language functioning. Two important findings suggest that unilateral brain damage in the dominant hemisphere leads to aphasia in adults but generalized intellectual impairment in infancy (Rutter, 1993). Severe intellectual disorder is frequently associated with major pathogenic genes, but a mild disorder is not to the same extent (Einfeld & Emerson, 2008). Thus, Down syndrome is a major cause of severe intellectual retardation but is much less often associated with mild ID.

The eighth developmental psychopathology achievement concerns the effects of mentally ill parents on the children. For example, [Silberg, Maes, and Eaves \(2012\)](#), using an extended children of twins design to study the genetic environmental mediation of transgenerational transmission, found that parental antisocial disorders had an environmentally mediated effect on child depression, a genetically mediated effect on ADHD, and a combined G×E effect on conduct disorder. A different approach involved the examination of the effects of intervention on the treatment of mentally ill parents with respect to the benefits for the children.

A metaanalysis showed that preventive interventions (with cognitive, behavioral, and psychoeducational components) were effective for preventing both behavioral and emotional problems in the children ([Siegenthaler, Munder, & Egger, 2012](#)). Using longitudinal analyses, other research showed that changes in the level of maternal depression were accompanied by parallel trajectories with respect to child symptoms, with the main effect appearing to be from parent to child but also including some bidirectional effects ([Garber, Ciesla, McCauley, Diamond, & Schloedt, 2011](#); [Garber & Cole, 2010](#); [Kouros & Garber, 2010](#)).

The ninth developmental psychopathology achievement relates to research aiming to explore mediation effects in relation to the association between the experience of stress and vulnerability to depression. Several research studies have found that stress is associated with depression, but the suggested mechanisms are very variable. Thus, three main models have been proposed. First, there is *stress sensitization*, meaning that a sensitivity to stressors increases with the number of stress experiences. Second, there is the *stress inoculation model*; that is, stress experiences have a diminishing effect over the course of repeated stress experiences. Third, there is *diathesis-stress model*, that is, a vulnerability to stress associated with continuing biological features. Using longitudinal data, Garber and colleagues found little support for the stress inoculation model but evidence in favor of both the stress sensitization and diathesis-stress models ([Morris, Ciesla, & Garber, 2010](#)).

The tenth developmental psychopathology achievement relates to the association between ethnicity and schizophrenia. There is strong evidence that the incidence of schizophrenia (and other psychoses) is substantially increased in individuals of Black Caribbean or Black African origin living in the United Kingdom as compared with that of individuals of similar ethnicity living in the Caribbean and that of indigenous, White individuals living in the United Kingdom ([Fearon et al., 2006](#); [Jones & Fung, 2005](#)). The findings indicated that the effects were particularly mediated by social disadvantage in adult life and separation from parents ([Morgan et al., 2009](#)). Other research ([Schafer & Fisher, 2011](#)) has shown the role of childhood trauma in psychosis and that the developmental psychopathology relevance lies in the focus on both continuities across diverse social risks and the importance of these in an illness that involves strong genetic influences. Continuities are strongly evident with respect to antisocial behavior, depression, and ADHD, but even with these, there is also discontinuity. ADHD is ordinarily thought of as a clinical disorder, but it is evident that the genetic liability operates across a dimensional range and not just on an extreme representing disorder ([Thapar, Harrington, Ross, & McGuffin, 2000](#)). Classification has traditionally dealt with subcategories in terms of whether it is predominantly inattention or predominantly hyperactivity/impulsivity or some combined pattern. At any one point in time these appear rather different, but it is clear that the differences between them are not stable over time and there are systematic changes in pattern with increasing age. Attention deficits tend to increase and hyperactivity/impulsivity tends to decrease ([Larsson, Dilshad, Lichtenstein, & Barker, 2011](#)).

An eleventh developmental psychopathology achievement concerns [Wakschlag et al.'s \(2012, 2014\)](#) efforts in understanding preschoolers' disruptive behavior. By adopting a multidimensional developmental approach, the authors examined disruptive behavior on a continuum from typically occurring, normative to nonnormative clinical manifestations of disruptive behaviors. Specifically, [Wakschlag et al. \(2014\)](#) identified four domains of disruptive behavior: *loss of temper*, *noncompliance*, *aggression*, and *low concern for others*, as well as dimensions of severity across domains. For example, because temper tantrums during this period are normative behavior, they must occur at a greater frequency or intensity in developmentally inappropriate contexts to be clinically valid. In contrast, animal torture, a nonnormative behavior during this age period, suggests pathology.

Moreover, [Wakschlag et al. \(2014\)](#) developed two assessment measures to empirically examine their multidimensional developmental approach: Multidimensional Assessment of Preschool Disruptive Behavior (MAPDB) ([Wakschlag et al., 2014](#)), a parent report measure, and the Disruptive Behavior Diagnostic Observation Schedule (DBDOS; [Wakschlag et al., 2008](#)), an observational measure of children's oppositional behavior.

Assessment methods of infants and preschoolers

Over the past few years several methods have been developed to assess emotional, social, and behavioral problems and the competences of infantile and preschooler through observations, questionnaires, interviews, or checklists. Nevertheless, it is important to place all methods of infant mental health assessment in context and be realistic (and cautious) about their

roles and results. The setting and circumstances of the assessment may have a significant impact on outcomes (more so than with older children). The use of measurements poses some challenges, too, as infants show very rapid and multimodal developmental shifts in several areas, and limitations in one developmental area may significantly affect assessment in a different area.

The choice of instrument would depend on several factors, such as cost, time taken to undertake it (by the practitioner and parent), parental literacy, staffing constraints, the not uncommon need to be trained so that it can be applied reliably, and ease of scoring and interpreting (Carter, Godoy, Marakovitz, & Briggs-Gowan, 2009). Several of the instruments were developed for research, have predominantly been applied to research settings rather than in routine practice, and need extensive and costly training to use them, and some are not available for use in the community at large. Tools for clinical settings need to be brief and easy to use. Furthermore, there are some screening instruments that not only cover relevant infant clinical and developmental areas but also have excellent psychometric properties (e.g., ITSC, BITS, BITSEA, ASQ-SE, and TBSI). Both the ASQ-SE and BITSEA in particular are sufficiently sensitive to detect social-emotional/behavioral problems in community samples (Carter et al., 2004) and have been designed to be completed by a range of individuals, including primary care health workers and caregivers.

However, classification and identification of infant mental health problems, and the evaluation of emotional difficulties very early on, can assist in formulating and implementing intervention strategies of interventions. Appropriate interventions, such as video interaction guidance (Svanberg, Mennet, & Spieker, 2010), parenting programs (Hiscock et al., 2008), and home-based interventions (Olds, Sadler, & Kitzman, 2007), could be directed to families with infants whose behavior is challenging, who have a difficult temperament, or who cry excessively and/or are difficult to soothe (Douglas & Hill, 2011). Instruments that could potentially be used by practitioners (as such instruments are commonly employed for research purposes) include structured and unstructured observational methods, structured questionnaires, checklists, and screening tools.

Observational Methods

Observational methods provide descriptive, qualitative data and can be broadly divided into naturalistic, semistructured, and structured (Clark, 1985). Naturalistic home infant observation may serve as a valuable source of information regarding an infant's behavior and the quality of the relationship with parents or caregivers (e.g., Reid, 1997). Semistructured observations can help in understanding and assessing an infant's emotional and behavioral development within the family context (e.g., Pollock & Horrocks, 2009). As observational methods are usually time consuming and restrictive in terms of setting, it has been proposed (e.g., DeGangi & Greenspan, 2001) that they should be used in combination with other measures.

The *Functional Emotional Assessment Scale* (FEAS; DeGangi & Greenspan, 2001) is a semistructure observational coding method to assess infants 7–48 months old and their caregivers, with 6 different checklists to cover various age ranges. It examines problems of attachment, interaction, communication, and self-regulation. The FEAS was standardized on a sample of 468 infants with and without developmental difficulties. Adequate psychometric properties were found in terms of discriminant validity and interrater reliability (Bagner, Rodriguez, Blake, Linares, & Carter, 2012).

A number of structured observational methods have been developed mainly for research purposes, such as the identification of risk and protective factors (Clark, Tluczek, & Gallaguer, 2004). The methods are not regularly used in clinical practice due to practical difficulties, including the need of equipment such as video or digital media and the extensive time required for training to code (Benham, 2000). Some structured or semistructured observational tools have been designed for potential clinical use. The Parent–Child Early Relational Assessment, PCE-RA (Clark, 1985, 1999) evaluates the quality of caregiver–infant (0–60 months) interaction, with an emphasis on the behavioral and affective aspects of the relationship (Miron, Lewis, & Zeanah, 2009). Observations take place during 4 videotaped 5-min situations that vary according to infant's age (involving feeding, free play, structured task, and separation–reunion), a technique that brings the method close to day-to-day activities.

High interrater reliability (85%) and adequate internal consistency (alphas in the range of .78–.91) have been reported (Clark, 1999; Clark et al., 2004) and convergent validity has been shown with the “Parenting Stress Index,” a measure of parent–child dyadic functioning (Bagner et al., 2012).

The Care Index (Crittenden, 2003) evaluates maternal sensitivity toward infants (0–15 months). While promoted as a strategy to identify maladaptive parenting, it also includes scales describing infant behaviors. A 3–5-min video is made of parent and child playing, and 7 scales are scored, 3 about the mother/caregiver (sensitivity, control, responsiveness) and 4 about the infant (cooperativeness, compulsivity, difficultness, passivity). The Care Index has been used in many studies (e.g., Pajulo et al., 2012), and good interrater reliability was reported in a study that included mothers with postnatal depression (Sidor, Kunz, Schweyer, Eickhorst, & Cierpka, 2011).

Structured Instruments

Structured instruments have been primarily designed to investigate normative and delayed social and emotional development and to screen for possible disorders (Berger, Hopkins, Bae, Hella, & Strickland, 2010). Such instruments are more commonly used in practice as they are easy to administer (Carter et al., 2009) and can complement clinical observations. Reliability is significantly lower in comparison to instruments designed for older children due to rapid developmental shifts (Gilliam & Mayes, 2004).

There is more often evidence of content or face validity in such tools. Until recently, there had been a lack of valid and reliable, low-cost, user-friendly, and age-appropriate instruments to assess infants who might be at risk of developing emotional and behavioral difficulties, but a small number are now available.

Some of the most promising structured questionnaires are the following:

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000) can be employed as an interview tool. There are parent and teacher versions. The CBCL provides useful scales of both adaptive functioning and impairment (Huffman & Nichols, 2004, p. 474). The CBCL/1.5–5 was normed on a large ($N = 700$) sample of 18–71-month-old children (Achenbach & Rescorla, 2000). An 8-day test–retest reliability yielded correlations of .68–.92 in a different nonreferred smaller sample ($N = 68$), and there has been support for convergent validity (Bagner et al., 2012) with measures, such as the Infant-Toddler Social and Emotional Assessment (ITSEA) (Carter, Briggs-Gowan, Margaret, Jones, & Little, 2003).

The Infant-Toddler Symptom Checklist (ITSC) (DeGangi, Poisson, Sickel, & Wiener, 1995) consists of 58 items and is defined as a screening diagnostic tool for infants 7–30 months. It is completed by a parent or caregiver. It assesses potential symptoms of regulatory, attentional, and sensory problems but also some aspects of emotional and behavioral functioning.

The ITSC has 5 versions for different age groups and takes about 10 min to complete. It has cutoff scores to determine which children are considered at risk of developing a particular problem. The tool has acceptable validity (Skovgaard et al., 2007) and good predictive value with 78% of children identified early using the ITSC clinically diagnosed at 3 years of age using other validated measures, such as the CBCL/2–3 (DeGangi et al., 2000).

The Toddler Behavioral Screening Inventory (TBSI) (Mouton-Simien, McCain, & Kelley, 1997) was designed as a screening instrument to be used in baby clinics for children ages 1–3 years. It examines two dimensions (frequency of problems and problem perception) and assesses infant behavior within the prior month. The TBSI consists of 40 items. In a study of 581 mothers of 1–3-year-olds (Mouton-Simien et al., 1997), internal validity was found to be good. The 2 scales showed good internal consistency (both .90), and there was good test–retest reliability after a 2-week interval. Concurrent validity was evaluated against the CBCL/2–3 (Achenbach, Edelbrock, & Howell, 1987) and a relatively strong correlation was obtained ($r = .70$) for the frequency scale but less so for the problem scale, suggesting that the “two scales should be used together” (Huffman & Nichols, 2004).

The Infant-Toddler Social and Emotional Assessment (ITSEA) (Carter et al., 2003) and the Brief Infant-Toddler Social and Emotional Assessment (BITSEA) (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004) are two associated, well-validated, and psychometrically sound measures (e.g., Briggs-Gowan & Carter, 2007). They both assess social-emotional behavioral problems, delays, and competence in infants 1–3 years. They endorse symptoms as outlined in the DC-0–3 (Zero to Three: National Center for Clinical Infant Programs, 2005). The ITSEA consists of 139 items that cover internalizing and externalizing behaviors and provide profiles of an infant’s strengths and weaknesses during behavior regulation. The ITSEA covers competence (e.g., emotional awareness) and indexes of clinically significant maladaptive behavior (e.g., head banging), aiming at reducing response set biases (Huffman & Nichols, 2004).

The BITSEA comprises 42 items that were extracted from the original ITSEA version. They were selected according to clinical importance, professional judgment, and empirical considerations (Huffman & Nichols, 2004). It includes 2 scales: problems (31 items) and competence (11 items). The standardization sample was large ($N = 1605$). Criterion validity with the CBCL/1.5–5 was good. There was also good discriminant validity with a vocabulary checklist that assessed language delay (Fenson et al., 1993).

Finally, empirical evidence supports BITSEA as a valid and reliable brief screener of socioemotional difficulties and delays in competence (Kruizinga, Jansen, Carter, & Raat, 2011).

The Ages and Stages Questionnaires–Social Emotional version (ASQ-SE) (Squires, Bricker, & Twombly, 2002) is another promising screening measure of social-emotional-behavioral competencies and problems that covers the age range of 0–66 months. The ASQ-SE consists of 22–36 items (depending on age) and is completed by the parent or caregiver. It provides information on such domains as self-regulation, compliance, and affect, among others. Each age-band has been independently validated on a large, representative US population ($N = 3014$), although some ethnic groups were under-represented (e.g., African Americans). The measure has good test–retest reliability for 1–3 week intervals, interrater reliability (.95), concurrent validity (.81–.95), and sensitivity (.75–.89) in detecting children with developmental delay and

socioemotional problems that needed a referral (Bagner et al., 2012). It also has good specificity and internal consistency (Squires et al., 2002).

The Brigance Infant and Toddler Screen–II (BITS) (Brigance & Glascoe, 2002) is an upgraded version of the Brigance Inventory of Early Development (BIED) (Brigance, 1991) for children 2–8 years old. The BITS has infant (0–11 months) and toddler (12–23 months) versions, each containing 81–85 items. The BITS was standardized on 408 children ages 0–24 months. Parents completed a parent version and examiner completed and scored the direct elicitation/observation version. High internal consistency retest and interrater reliability is reported for both versions (Glascoe, 2002).

Regulation disorders of sensory processing are a diagnostic category unique to DC: 0–3R (Zero to Three: National Center for Clinical Infant Programs, 2005) and thus it is not included in traditional taxonomies, such as the *DSM-5* and ICD-10. DC: 0–3R describes three types of regulation disorders:

1. Hypersensitive (subtypes: fearful/cautious and negative/defiant)
2. Hypersensitive/underresponsive
3. Sensory stimulation seeking/impulsive

Regulation disorders may affect one or more areas of development and may range in severity from mild to severe. Regulation disorders are commonly diagnosed in infants >6 months because of transient difficulties with sensory responsivity (e.g., eating or sleeping problems) in younger infants. Currently little is known of the psychometric properties of regulation disorders (Dunst, Storck, & Snyder, 2006; Emde & Wise, 2003). Limited research can be attributed to the comorbidity between regulation disorders and other diagnostic categories during that period, such as ADHD (Egger & Emde, 2011).

Child to Adult Continuities of Psychopathology

Three of the most commonly found childhood disorders are ADHD, ASD, and ODD.

ADHD and ASD are childhood-onset neurodevelopmental disorders, triggered from irregular brain development affecting specific cognitive or social abilities (Gillberg, 1995). Deficient executive control of attention, activity, and emotional regulation skills have been proposed as essential cognitive mechanisms behind the ADHD phenotype (Nigg & Casey, 2005), while deficits in the cognitive-emotional integration of social interaction (empathy), communication skills, and flexibility form core features of ASD (Nigg & Casey, 2005). The conceptualization of ADHD and ASD as persistent alterations of mental functions with early childhood onset may correspond with personality disorder and personality traits. In adults, ADHD has been associated with the Cluster B (dramatic) personality disorders, such as BPD (Rutter, Kim-Cohen, & Maughan, 2006; van Dijk, Lappenschaar, Kan, Verkes, & Buitelaar, 2012) and antisocial personality disorder (APD).

Kerekes et al. (2013) examined the associations between ADHD and ASD and personality in a population-based sample of 1886 twins age 9–12 years recruited from the Child and Adolescence Twin Study in Sweden (CATSS). Parents were interviewed over the phone using the Autism-Tics, ADHD, and other comorbidities (A-TAC) inventory, and they rated their children according to the Junior Temperament and Characteristic Inventory (JTCI). The results demonstrated that ADHD was strongly correlated with novelty seeking whereas ASD was correlated positively with harm avoidance. The associations between neurodevelopmental disorder personalities are at least partly attributed to genetic effects influencing both conditions.

Controversy surrounds the question of whether childhood externalizing psychopathology (e.g., ODD, conduct disorders, externalizing behavior, and aggressive behavior) predicts adult unipolar depression. Compared to conduct problems with later onset, childhood-onset conduct problems are associated with (1) higher levels of aggressive and antisocial behavior, (2) a more persistent course, (3) more cognitive, verbal, and neuropsychological deficits, (4) higher levels of comorbid conditions, and (5) greater impairment in occupational and interpersonal functioning across developmental periods (e.g., Colman et al., 2009; Frick & Viding, 2009; Moffitt & Caspi, 2001). The affective instability seen in childhood externalizing disorder also has been conceptualized as a possible contributing mechanism to later-life mood disorder (Burke, Loeber, Lahey, & Rathouz, 2005).

Given the controversies surrounding the predictive validity of childhood externalizing psychopathology on adult depression, Loth, Drabick, Leibenluft, and Hulvershorn (2014) performed a metaanalysis to examine the association between childhood externalizing symptoms or disorders and the development of adult depression across cohorts. The study included varying informants, rating scales and interviews, sample demographics, analytic designs, and follow-up assessments. In the study, 79% of the variance could be explained by differences among the studies in terms of sample, study design, and other potential covariates. The method of characterizing externalizing disorders influenced the degree of association between childhood externalizing behavior and adult depression. In exploratory analyses, the authors found a trend whereby when *DSM* diagnoses were used to define externalizing disorders the prediction to adult depression was slightly stronger than when dimensional, symptom-based approaches were employed.

EXPLORING THE PSYCHOSIS CONTINUUM

The possibility that psychosis may be part of a continuum alongside mental health has been suggested throughout the history of psychiatry (Beer, 1996). During the past 2 decades there have been systematic efforts in elucidating the concept of a *psychosis continuum*. The psychosis continuum endorses a full range of psychotic symptom expressions from “subclinical” or “subsyndromal” manifestations to the clinically significant psychotic symptoms typically observed in individuals diagnosed with a psychiatric disorder. Overall, subclinical psychotic symptoms are distinguishable from clinically significant psychotic symptoms based on features of the symptoms, such as severity, frequency, and conviction (van Os, Rutten, & Poulton, 2008).

Contemporary approaches to the study of the psychosis continuum derive from two primary models. These models are distinguished according to their capacity to predict the frequency of subclinical symptoms across the full population. The Quasi-Dimensional Model (QDM) derives mostly from the work of Meehl (1962, 1989), who suggested that a “dominant autosomal schizogene” produced an aberration in synaptic signal selectivity that resulted in a defect in neurointegrative processes that he called “schizotaxia.” Thus this model posits a psychosis continuum ranging from aberrant personality traits (i.e., magical thinking) to the clinically significant psychotic symptoms (i.e., hallucinations or delusions). Meehl’s QDM is partly supported by data derived from studies of schizotypal personality (Kwapil & Barrantes-Vidal, 2015).

Conversely, the Fully Dimensional Model (FDM) derives primarily from the work of Claridge (1972, 1987). Claridge argues that psychotic symptoms exist along a continuum across the full population. According to Claridge (1987), psychotic symptoms may be adaptive or deleterious depending on simultaneous variation along some other dimensional characteristic (e.g., intelligence). For example, he noted that highly creative individuals displayed many symptoms characteristic of schizophrenia (i.e., withdrawal, emotional instability, eccentricity, etc.). However, although very creative healthy individuals may be predisposed to schizophrenia, they do “not become clinically psychotic because high general intelligence confers some immunity in the form of adequate intellectual and personality reserves” (Claridge, 1987).

The question of whether psychotic symptoms lie on a continuum with subclinical psychotic-like experiences (PLEs) in the general population has gained increased attention (David, 2010; Lawrie, Hall, McIntosh, Owens, & Johnstone, 2010). Debate on this issue was stimulated by studies of schizotypal traits in healthy individuals (Chapman & Chapman, 1980; Claridge, 1990) and by the discovery that a large number of individuals experience psychotic symptoms (van Os, Hanssen, Bijl, & Ravelli, 2000). Recent evidence has revealed that the risk for psychosis is highly polygenic due to a large variety of risk factors (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009).

Although some taxometric investigations on psychometric measures of psychotic symptoms indicated a taxonomy of 10% of individuals at high risk of psychosis (Lenzenweger, 2010), other studies have supported a dimensional model (Daneluzzo et al., 2009). Shevlin, McElroy, Bentall, Reininghaus, and Murphy (2017) suggest that if PLEs lie on a continuum with psychotic illness they should have a similar structure to psychotic symptoms in patients. There are few studies that have examined the validity of a bifactor model in relation to PLEs. For example, Preti et al. (2015) administered the Schizotypal Personality Questionnaire (SPQ; Raine, 1991) and the Temperament Evaluation of Memphis, Pisa, Paris & San Diego (TEMPS-A; Akiskal et al., 2005) and found that a bifactor model with independent subdomains of positive and negative schizotypal traits and an extra subdomain of affective traits was the best fit to the data.

Shevlin et al. (2017), to improve the understanding of the latent structure of psychosis, tested a large number of competing factor-analytic models of psychosis, including hierarchical, general, and specific dimensions, using data from a large general population sample. Results indicated that bifactor models consisting of general and specific dimensions provided superior model fit to unidimensional, correlated traits and hierarchical models, regardless of the number of specific factors included in the model. The best-fitting factor structure in the present study consisted of a general psychosis factor and five specific factors of positive, negative, disorganization, mania, and depression. Similar structures have been identified in previous factor-analytic studies utilizing clinical samples (Reininghaus, Priebe, & Bentall, 2013; Reininghaus et al., 2016). Indeed, the results of this study suggest that a transdiagnostic psychosis factor underlies the affective and nonaffective symptoms that are reflected in putatively distinct disorders, such as schizophrenia and bipolar disorder. While the general psychosis factor appears relatively robust, the precise nature of this factor remains unclear.

One possible explanation is that the general psychosis factor reflects elements of etiology (e.g., genetic vulnerability) that are shared among the psychotic disorders. For example, recent epidemiological research has suggested that a single psychopathological factor may underlie and account for comorbidity between all psychiatric disorders (Caspi et al., 2014; Lahey et al., 2012). It has been speculated that this factor, known as the general pathology factor *p*, may reflect a genetic predisposition to experience any and all psychiatric disorders, and that specific factors of psychopathology (broad domains of internalizing, externalizing, and psychosis) may reflect nonshared environmental factors that ultimately differentiate between what were traditionally viewed as distinct diagnoses (Caspi et al., 2014; Lahey et al., 2012). Alternatively, it is

possible that the general psychosis factor could be capturing emotional and behavioral outcomes that are common facets of discrete psychotic disorders (Preti et al., 2015).

The factor structure of psychotic symptoms in clinical and general population samples serves as a key argument of the continuum hypothesis; if a continuum exists, it is logical to assume that the psychotic symptoms would cluster together in similar ways at both the clinical and subclinical levels.

The factor structure identified in this study was broadly similar to that identified in the clinical samples (Reininghaus et al., 2013, 2016). This suggests that psychotic symptoms tend to cluster together in similar ways at both clinical and subclinical levels. This adds further support to the hypothesis that psychosis reflects an extended phenotype, with clinically relevant psychoses such as schizophrenia representing the extreme upper end of a continuum that occurs naturally within the general population.

Childhood adversities and psychosis: the traumagenic neurodevelopmental model

A recent metaanalysis (Varese et al., 2012) found that individuals who had experienced childhood adversities were significantly more likely to develop psychosis than those who had not. The metaanalysis also found a dose–response relationship in 9 of the 10 studies that tested for it. For example, a UK survey of 8580 individuals found that those subjected to 2 types of adversity (e.g., sexual abuse and bullying) were 5 times more likely to be diagnosed with a psychotic disorder compared with 30 times more likely for 3 adversities (Shevlin, Houston, Dorahy, & Adamson, 2008). A prospective study found (after controlling for multiple factors, including a family history of psychosis) that adults abused as children were 9.3 times more likely to have “pathology-level psychosis.” Research is now focusing on several processes whereby childhood adversities can lead to psychotic symptoms. Such processes include attachment, dissociation, dysfunctional cognitive processes, defense mechanisms, inadequate coping strategies, inability to access social support, behavioral sensitization, and revictimization (Bebbington, 2009; Morrison, 2009; Read, Fink, Rudegeair, Felitti, & Whitfield, 2008; Read, 2013; Read & Sanders, 2010).

The traumagenic neurodevelopmental model (TNM) (Read, Perry, Moskowitz, & Connolly, 2001) attempts to integrate biological and psychological processes in explaining psychotic disorders. Childhood traumatic experiences may alter brain functioning and increase sensitivity to stress, which may in turn contribute to the development of psychosis. Brain alterations include overactivity of the hypothalamic-adrenal-pituitary axis; dopamine, serotonin, and norepinephrine abnormalities; and structural differences, such as hypothalamic damage, cerebral atrophy, ventricular enlargements, and reversed cerebral asymmetry. The model proposes a dissociative response to childhood trauma to be a potential pathway to the positive symptoms of psychosis (Read, van Os, Morrison, & Ross, 2005). A dissociative tendency, measured using the Dissociative Experiences Scale (DES), has been found to mediate the association between childhood trauma and hallucinatory experiences (Muenzenmaier et al., 2015; Varese et al., 2012), and could be a potential explanatory factor for the association between childhood trauma and visual hallucinations in this study.

A recent Norwegian study (Solesvik et al., 2016) examined the prevalence of visual hallucination and childhood trauma in a first-episode psychosis sample. The patients ($N = 204$) were classified according to hallucination severity (none, mild, and psychotic hallucinations) and were administered the Positive and Negative Symptoms Scale (PANSS). The prevalence of psychotic visual hallucinations was 26.5%. Childhood trauma has been implicated in the etiology of psychosis and hallucinations in general.

EXISTENTIAL ANXIETY AND UNUSUAL SUBJECTIVE EXPERIENCE

Samuel Beckett’s reflection of anxiety in his German notebook of August 11, 1936 (Nixon, 2011), highlights the overlap between subjective pathology and the ontological condition, and the suggestion that the root of all anxiety originates in “a more fundamental anxiety whose object is precisely an unfathomable and unbearable nothingness” (Smith, 2010, p. 194). This nothingness or nonbeing is experienced as an existence characterized by meaninglessness in which death is programmed from birth. Beckett denotes the basic anxiety of the human conditions as existing amid the void.

Death anxiety as a transdiagnostic construct

There is growing interest in the role that transdiagnostic constructs play in the development, course, and maintenance of psychopathology. A transdiagnostic approach to psychopathology emphasizes symptoms and predispositions that occur across multiple diagnostic categories of mental disorders. These tendencies are thought to increase vulnerability to the development of any mental disorder, as well as the maintenance of these disorders. For example, perfectionism is regarded

as both a risk and a maintaining factor for a range of negative psychological outcomes, including anxiety disorders, depression, obsessive-compulsive disorder, and eating disorders (Egan, Wade, & Shafran, 2011; Lo & Abbott, 2013; Sassaroli et al., 2008). Similarly, rumination, or the tendency to engage in negative perseverative cognitions, has been linked to emotional distress and the presence of anxiety disorders, depression, and obsessive-compulsive disorder (Kim, Yu, Lee, & Kim, 2012; McEvoy, Watson, Watkins, & Nathan, 2013; McLaughlin & Nolen-Hoeksema, 2011). Other transdiagnostic constructs that are thought to enhance psychological vulnerability and risk for a range of mental disorders include behavioral inhibition and avoidance (Dozois, Seeds, & Collins, 2009), low positive affect (Brown & Barlow, 2009), perceived lack of control (Gallagher, Naragon-Gainey, & Brown, 2014), intolerance of uncertainty (Mahoney & McEvoy, 2012), and magical ideation (Einstein & Menzies, 2006).

There are cognitive behavioral models designed to describe the contribution of transdiagnostic constructs to the development and maintenance of psychopathology (Egan et al., 2011; Lo & Abbott, 2013; McEvoy et al., 2013). These models can guide the assessment and treatment of mental disorders, and also shed light on the high rate of comorbidity frequently found across disorders (Egan et al., 2011; Harvey, Watkins, Mansell, & Shafran, 2004; McEvoy et al., 2013; Pollack & Forbush, 2013; Titov, Gibson, Andrews, & McEvoy, 2009). Evidence suggests that targeting these maladaptive transdiagnostic constructs in treatment, regardless of diagnostic profile, may improve outcomes and prevent the development of comorbid disorders (Abbott & Rapee, 2004; Dudley, Kuyken, & Padesky, 2011; Egan et al., 2011; McLaughlin & Nolen-Hoeksema, 2011; Titov et al., 2009).

Awareness of mortality and fear of death have been part of the human condition throughout recorded history (Eshbaugh & Henninger, 2013; Yalom, 2008). Fear of death can also produce a sense of lack of fulfillment and happiness (Yalom, 2008), as well as induce pathological modes of coping (Kastenbaum, 2000; Yalom, 2008).

The transdiagnostic nature of death anxiety can be seen across several mental disorders. For example, fear of death features heavily in somatic symptom and related disorders. In a similar manner, individuals with panic disorder frequently consult with doctors regarding fear of dying from a heart attack (Fleet & Beitman, 1998). Many compulsive patients often name chronic, life-threatening diseases (e.g., HIV) as being linked to their anxiety and behavioral responses to threat cues (St Clare, Menzies, & Jones, 2008), and compulsive checkers also report that scrutiny over power points and stoves is designed to prevent fire and death to self and loved ones (Vaccaro, Jones, Menzies, & St Clare, 2010).

In addition, many of the specific phobias are associated with fear of objects or situations that carry the potential for harm or death (e.g., flying, heights, animals, blood), with avoidance used to reduce the likelihood of feared outcomes (e.g., by avoiding flying, heights, spiders, dogs). Research also suggests that death anxiety may be featured in the experience of separation anxiety disorder and agoraphobia (Fleischer-Mann, 1995; Foa, Steketee, & Young, 1984). For instance, one of the defining features of separation anxiety disorder is persistent worry about losing major attachment figures, including loss through death (American Psychiatric Association, 2013). Likewise, individuals with agoraphobia often report that avoidance of unfamiliar places and avoiding being isolated from security figures or objects are specifically designed to prevent such outcomes (Marks, 1987).

Terror management theory (TMT) is the leading and most influential approach to death anxiety, also known as mortality salience or heightened death-thought accessibility (Burke, Martens, & Faucher, 2010; Greenberg, 2012). According to Arndt and Vess (2008), TMT is a “social psychological theory that draws from existential, psychodynamic and evolutionary perspectives to understand the often patent influence that deeply rooted concerns about mortality can have on our sense of self and social behavior” (p. 909). According to TMT, cultural worldviews and self-esteem are considered to function as anxiety buffers to manage existential fear of death (e.g., Hayes, Schimel, Arndt, & Faucher, 2010; Routledge, 2012).

Existential anxiety and the phenomenon of psychotic-like experiences

C. G. Jung had an interesting view on the treatment of mental disorders. Jung (1907/2014) posits that we should not try to eliminate a neurosis or even a psychosis. Instead we should experience it and try to understand why it happened and what it means. We should even be grateful for it, as this experience provides us with the opportunity of getting to know ourselves; we should not cure it—it cures us (1907/2014).

Stating with a critique of the concepts of psychopathology and (ab)normality and the meaningfulness of a psychiatric diagnosis, Richard House introduced other causes of mental illness:

- A struggle toward making meaning (Howarth-Williams, 1977; Bannister, 1985; Barham, 1993)
- A meaningful process (Lukoff & Everest, 1985; Jenner, Monterio, Zagalo-Cardoso, & Cunha-Oliveira, 1993).

Along similar lines, Levin (1987) posits that “seemingly psychotic experiences are better understood as crises related to the person’s efforts to break out of the standard ego-bounded identity: trials of the soul on its spiritual journey” (p. 16).

A constructivist, postmodern perspective views “(ab)normality” much more as a fear-induced, socioemotionally rooted linguistic category whose major function is to reduce anxiety in the face of the other’s radical difference, rather than as an objective description of an independent reality.

Sannella (1992), a psychiatrist and ophthalmologist, has reviewed the existing literature and evidence on the kundalini awakening experience, particularly to its relation to psychosis. Thus there appears to be a difficulty in distinguishing between “psychotic,” “unusual,” and “mystical/transpersonal” experiences.

Unusual subjective experience (USE), according to the ideology of modernity (House, 1999), is medicalized. An individual’s attitude toward their USE may significantly affect whether USE is manifested as a mystical-transformative or a “psychotic” experience. As Grof (1987) writes, “while a mystic keeps the process internalized and does not relate to the external world until the experiences are completed and well integrated, a psychotic resists the process, projects its elements on the external world and confuses the inner and outer reality” (p. 476). Sannella (1992) points out that kundalini awakening experiences, with all their “psychotic”-like symptoms, “seem pathological only because the symptoms are not understood in relation to outcome: a psychically transformed human being” (p. 7). This echoes the argument made by Rosenberg (1984) that we only call behaviors ‘psychotic’ when we are unable to understand their logic or point of view—in which case we tend to jump to the conclusion that the limitation lies with the sanity of the other, rather than with our own limited framework of understanding.

An interesting explanation with regard to the underlying causes of schizophrenia has been proposed by Paris Williams. Williams (2012) discovered increasing evidence that psychosis is not caused by a disease of the brain, but is perhaps best described as being a desperate attempt to transcend an intolerable situation or dilemma. The emerging recovery research and continuous lack of substantiation of any of the various brain disease hypotheses have cast serious doubts about the validity of the brain disease theory. First, regarding the anomalous brain structures or brain chemistry that is sometimes found in people diagnosed with schizophrenia, these are found in only a small minority of cases, and even in these cases, there is no significant evidence that these are caused by anything other than unusual life circumstances (e.g., trauma, nutritional deficiencies, and substance abuse) or by the use of psychiatric drugs themselves. Second, the research is clear that, in contrast to well-established diseases of the brain (such as Alzheimer’s, Parkinson’s, Huntington’s, and multiple sclerosis), many people diagnosed with schizophrenia/psychosis make full and lasting medication-free recoveries. Third, many of those who experience full recoveries do not just return to their prepsychotic condition, but experience profound healing and positive growth.

In one of the best-known such studies, R. D. Laing, a Scottish psychiatrist renowned for his pioneering research on schizophrenia and his clinical work with those so diagnosed, closely studied the social circumstances surrounding more than 100 cases of individuals diagnosed with schizophrenia, and he concluded that “without exception the experience and behavior that gets labeled schizophrenic is a special strategy that a person invents to live in an unlivable situation” (Laing, 1967, pp. 114–115). Bertram Karon, a widely known clinician specializing in psychotherapy for individuals diagnosed with psychotic disorders, stated that any one of us would also likely experience psychosis if we were to have to live through the same set of circumstances as those of his psychotic clients (Karon & VandenBos, 1996).

The expression “psychotic-like experiences” (PLEs) is generally used to define unusual subjective experiences with some degree of affinity with psychotic symptoms, which can be found in the general population in the absence of illness. Research in this area has shown that PLEs may be associated with an increased risk of psychosis (Kelleher & Cannon, 2011). PLEs are distributed in a dimensional fashion in the general population, with only a small proportion of these experiences contributing to the development of psychosis (Allardyce, Suppes, & van Os, 2007; van Os et al., 2009). This view is supported by a wealth of epidemiologic research showing that unusual subjective experiences and beliefs are relatively widespread in the general population, and the prevalence of hallucinatory and delusion-like experiences and beliefs largely exceeds what would be expected on the basis of known prevalence of psychotic disorders (Stip & Letourneau, 2009; van Os et al., 2009).

However, the prevalence of PLEs is largely estimated through frequencies of occurrences assessed with self-report questionnaires, is often considered as an estimate of psychosis proneness, and may be overstated if considered only in terms of occurrence frequencies. Past research has pointed to the important role played by the appraisal of psychotic experiences in exacerbating and consolidating psychotic symptoms in those individuals who are experiencing psychosis for the first time (Brett et al., 2007). Similarly, emotional problems associated with psychosis symptoms onset have been associated with more severe onset and severity (e.g., Cella, Dymond, & Cooper, 2009). On a broader level, these findings suggest that the role of associated features may be as important as the symptom per se in determining the severity and, to an extent, the prognosis of the disorder. In keeping with the continuous hypothesis of the psychotic phenotype, the relationship between subthreshold psychotic symptoms and associated features would be expected at the nonclinical level, too. Results in this sense may help us understand the psychopathological relevance of PLEs and may produce empirical data in support of a stage model of psychosis development (Fig. 11.1).

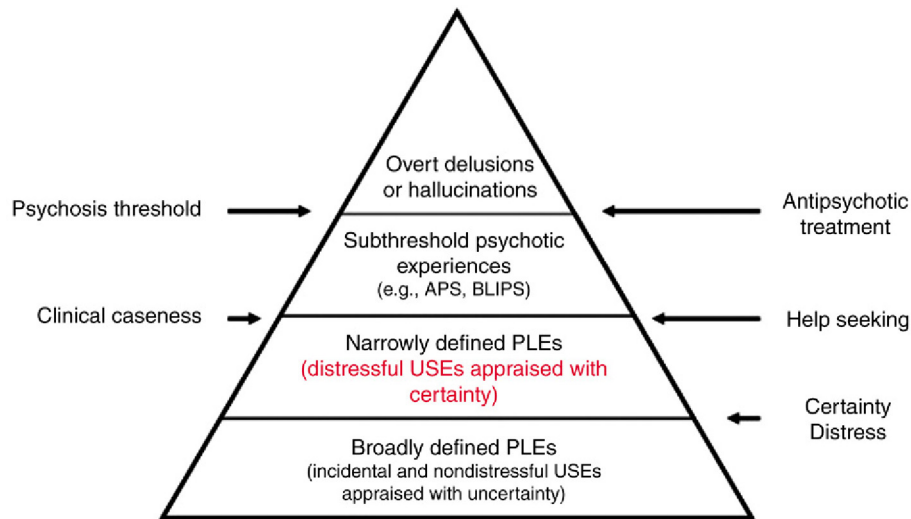


FIGURE 11.1 A pyramid model of the risk of psychosis, defined according to different types of unusual subjective experiences. The degree of certainty or distress raised by the experience or belief distinguishes between broadly and narrowly defined psychotic-like experiences. Clinically relevant distress prompts help seeking and arrival at the treatment setting; antipsychotic compounds are generally prescribed when subthreshold psychotic experiences are recognized as causing disability (i.e., they are diagnosed as hallucinations or delusions). *APS*, Attenuated psychotic symptoms; *BLIPS*, brief limited intermittent psychotic symptoms; *PLEs*, psychotic-like experiences; *USEs*, unusual subjective experiences. (Reprinted from Preti, A., Cella, M., Raballo, A., & Vellante, M. (2012). *Psychotic-like or unusual subjective experiences? The role of certainty in the appraisal of the subclinical psychotic phenotype*. *Psychiatry Research*, 200(2–3), 669–673, with permission. Copyright 2012 by Elsevier.)

The multidimensional features of USEs may be more accurate indicators of psychosis proneness than simple frequency count. Preti et al. (2012) tested whether subjective certainty or uncertainty of the occurrence of USEs can influence perceived well-being. Five hundred and four undergraduate students completed measures of delusion and hallucination proneness, general health, and emotional processing. Participants' responses on the delusion and hallucination proneness scales were dichotomized on the basis of their certainty level. Results showed that USEs rated with certainty were associated with poor self-perceived health and difficult emotional processing, while those rated with uncertainty were not. Certainty of USEs was associated with increased distress and may be important in characterizing psychopathological significance. Specific characteristics associated with USEs may be more important than their frequency in predicting psychosis risk.

RECENT ADVANCES IN SCHIZOPHRENIA SPECTRUM DISORDERS AND OTHER PSYCHOTIC DISORDERS

The neurological substrate of psychiatric disorders

Schizophrenia is a highly prevalent disorder affecting about 1% of the population worldwide. It is the 14th leading cause of disability among all diseases in the world (WHO, 2008; Bilder, 2014a). It is now recognized that many of the difficulties in rehabilitation can be attributed to pervasive and severe neuropsychological deficits. The diagnosis of schizophrenia according to the *DSM-5* (American Psychiatric Association, 2013) is based on the observation of the following symptoms: delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, and negative symptoms (e.g., affective flattening, avolition, or anhedonia).

There must also be a significant deterioration in work, interpersonal relations, or self-care compared with premorbid levels, and symptoms must have persisted for at least 6 months.

Considerable interest in schizophrenia research has centered on attempts to identify the pathological substrates of the disease. It has been shown that individuals with schizophrenia demonstrate significant deficits of executive and learning memory functions. Additionally, functional neuroimaging experiments have consistently demonstrated that patients either fail to approximately activate relevant frontal and limbic regions or show excessive activation in these regions (which has been interpreted as inefficiency of the relevant neural networks). From the neuropsychological perspective, it may be noted that there is usually little correlation between delusions and hallucinations and the level of pattern of deficit observed on neuropsychological testing. On the contrary, prominent disorganization and negative symptoms have revealed moderate correlations with neuropsychological impairment. Furthermore, neuropsychological assessment plays an important role

in assessing the nature of deterioration and the degree to which cognitive function is involved. Bilder (2014b) maintains that although neuropsychological assessment is not critical to differential diagnosis of schizophrenia, it is significant in excluding other possible causes of psychosis. The neuropsychological evaluation of schizophrenia is particularly useful for highlighting the cognitive strengths and weaknesses that contribute to the choice of treatment, educational, or vocational planning. Given these goals, a comprehensive evaluation should include the assessment of general intellectual abilities and academic skills in combination with the assessment of more specific neuropsychological abilities, such as learning-memory, executive, attentional, visuospatial, and psychomotor abilities.

Moreover, neuropsychological assessment, apart from its role in excluding comorbidity with other disorders, can provide more detailed assessment of lateralized sensory and motor functions. Furthermore, language assessment may contribute in eliminating variants of aphasia.

The role of schizotypy in the schizophrenia spectrum disorder

Schizotypy serves as a useful means in the understanding of schizophrenia spectrum disorder (SSD). Schizotypy is associated with elevated risk for the development of psychotic disorders (Kwapil, Gross, Silvia, & Barrantes-Vidal, 2013) and constitutes as useful framework in the study of etiological factors of SSDs. Numerous terms referring to the psychopathological space between mental health and psychosis have been proposed as alternatives to schizotypy. Subclinical manifestations of symptom-like experiences (e.g., PLEs and clinical conditions) are closed to psychosis but vary in terms of severity, frequency, and duration (e.g., schizotypal personality disorders, prodromal or at-risk mental states, and attenuated psychotic symptoms syndromal). Barrantes-Vidal, Grant, and Kwapil (2015) propose that PLEs be thought of as manifestations of positive schizotypy.

Schizotypy offers several advantages for conceptualizing the etiology, development, and expression of SSD: first, it integrates a broad range of conditions, including schizophrenia and related disorders, spectrum personality disorders, the prodrome and at-risk mental states, subclinical manifestations, and normal individuals' differences, allowing for a dynamic developmental approach. Second, schizotypy offers a multidimensional structure that endorses the heterogeneity in the etiology, development, and expression of schizophrenia spectrum psychopathology. Furthermore, this multidimensional level should illuminate the overlap and differentiation between affective and nonaffective psychosis. Finally, studying continuities between schizotypy and SSDs should illuminate possible risk factors involved and contribute in the identification of protective factors.

Personality disorders and schizotypal traits in daily life

Schizophrenia-spectrum personality disorders include *DSM-5* Section II Cluster A “odd or eccentric” personality disorders: paranoid, schizoid, and schizotypal. Many objections have been leveled against categorical personality disorder diagnoses concerning the overlap among personality disorders' comorbidity with other disorders and confounding boundaries between personality and psychopathology (e.g., Widiger, 2011). *DSM-5* Section III proposes an alternative hybrid dimensional-categorical classification system for personality disorders. In addition to the inclusion of trait ratings, Section III proposed the discarding of dependent, histrionic, narcissistic, paranoid, and schizoid personality disorders (Kotov et al., 2011).

Chun, Barrantes-Vidal, Sheinbaum, and Kwapil (2017) examined the expression of the *DSM-5* schizotypal, schizoid, and paranoid personality disorder traits in daily life using experience sampling methodology. Specifically, this study aimed to (1) examine the independent associations of these traits with daily life outcomes (experiences measured using ESM), such as affect, cognition, stress, interpersonal experiences, and psychotic-like, paranoid, and negative symptoms; (2) compare the expression of schizophrenia-spectrum personality disorder traits; (3) examine schizophrenia spectrum personality disorder traits in the framework of a multidimensional model of psychopathology; and (4) examine whether certain personality disorder traits and schizotypy dimensions may moderate the associations between daily life outcomes.

Cross-level interactions examined whether personality disorder traits and schizotypy dimensions would moderate the associations between daily life outcomes. As hypothesized, schizotypal and paranoid personality disorder traits moderated associations of momentary negative affect and symptoms with the experience of stress and social stress, thereby demonstrating stress sensitivity. The results indicate that these personality disorder traits provide unique information about daily life symptoms and impairment and suggest they are useful constructs for clinical work and research. Daily life outcomes differentiated among schizophrenia-spectrum disorders. The assignment of Cluster A personality traits to positive, negative, paranoid, and disorganized dimensions provided an alternative to the traditional personality disorder diagnoses. Positive, disorganized, and paranoid schizotypy were associated with elevated stress reactivity, whereas negative schizotypy was associated with diminished reactivity in daily life. The current diagnostic model is limited by the considerable overlap

among the personality disorder traits. Nonetheless, experience sampling methodology is sensitive enough to detect differences in day-to-day impairment and can be a powerful research tool for the examination of dynamic constructs, such as personality pathology.

Meanwhile, the *positive symptoms* refer to an excessive or distorted functioning of a “normal” process. Interestingly, in clinical practice and in taxonomic criteria, continuing the tradition of Schneider, greater weight is usually given to the assessment of the positive symptoms (e.g., hallucinations and delusions), perhaps in part because of the greater ease in identifying them and for diagnostic accuracy (as cited in [Elis, Caponigro, & Kring, 2013](#)).

Cognitive assessment in schizophrenia

The idea of including cognitive impairment in *DSM-5* was refused because of its lack of diagnostic specificity and the limited information about the impact of such a change ([Barch & Keefe, 2010](#)). However, cognitive impairment was considered a key aspect of psychotic spectrum disorders and is recommended as one major dimension to be assessed across patients with a psychotic disorder ([American Psychiatric Association, 2013](#)).

In recent years, increasing understanding of the causes and manifestations of cognitive impairments in schizophrenia as well as a growing recognition of the central role of cognition have attracted the attention of researchers and clinicians. Cognitive deficits have been recognized as being fundamentally intertwined with functional outcomes ([Kahn & Keefe, 2013](#)). In a review, [Green \(1996\)](#) revealed that several neurocognitive deficits were highly associated with specific functional outcomes in schizophrenia. The strongest evidence showed that verbal memory correlated with all measures of functional outcome. Negative symptoms were associated with social problem solving. After more than a hundred years of research, it is now well established that cognitive impairment is a core feature of schizophrenia. According to [Fusar-Poli et al. \(2012\)](#), IQ may be an indicator of the prodromal phase of schizophrenia.

Although widespread agreement exists that cognitive deficits are a key feature of schizophrenia, different investigators have emphasized different areas of cognition when studying this disorder. When the National Institute of Mental Health (NIMH) undertook the Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) project, the investigators wanted to identify distinct, separable cognitive domains commonly affected in patients with schizophrenia ([Nuechterlein et al., 2004](#)). [Nuechterlein et al. \(2004\)](#) reviewed numerous studies of cognitive impairment in schizophrenia and identified seven distinct domains that were replicated across studies. The identified domains were incorporated into the MATRICS Consensus Cognitive Battery (MCCB) ([Nuechterlein et al., 2004](#)).

Processing speed. One measure of cognition is the speed with which an individual is able to perform perceptual or motor tasks. This domain includes verbal fluency.

Attention/vigilance. Attention and vigilance influence an individual’s ability to complete tasks requiring sustained focus.

Working memory. The domain of working memory concerns the individual’s ability to temporarily retain information for immediate recall and manipulation.

Verbal learning and memory. Tests of verbal learning and memory require encoding and recalling verbal information, such as word lists or short narratives.

Visual learning and memory. Tests of visual learning and memory assess an individual’s immediate or delayed ability to recall visual information, such as faces or scenes, or the ability to reproduce simple images, such as line drawings.

Reasoning and problem solving. The domain of reasoning and problem solving is often referred to as part of executive functioning. Reasoning and problem solving reflect an individual’s ability to complete verbal and nonverbal tasks that require complex planning or decision-making skills.

Social cognition. The subtest used in the battery focuses on the emotional management aspect of social cognition. However, theory of mind and social and emotional perception are also considered part of this domain and have been linked to deficits in schizophrenia ([Nuechterlein et al., 2004](#); [Keefe & Harvey, 2012](#)).

This list does not include every aspect of cognition affected by schizophrenia. Verbal comprehension is also a fundamental area of deficit in schizophrenia, but researchers decided it would not be useful to include in the cognitive battery due to patients’ resistance to change.

The following instruments are commonly used in a comprehensive cognitive assessment of schizophrenia.

MATRICS Consensus Cognitive Battery

The 7 cognitive domains are represented by 10 tests in the MATRICS Consensus Cognitive Battery (MCCB) ([Nuechterlein et al., 2008](#)). The psychometric study that was employed to validate the MCCB included a beta battery with at least two tests per domain. The number of separable cognitive dimensions in schizophrenia has been a source of heated debate.

McCleery et al. (2015) conducted a confirmatory factor analysis of the beta battery of the MCCB to compare the fit of the MATRICS consensus seven-domain model to other models in the current literature on cognition in schizophrenia. Multiple fit indexes indicated that the seven correlated factors model was the best fit for the data and provided significant improvement in model fit beyond the comparison models. Thus these analyses support the assessment of these cognitive dimensions in clinical trials of interventions to ameliorate cognition in schizophrenia.

Wechsler Adult Intelligence Scale and Wechsler Memory Scale

The Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 2008) and the Wechsler Memory Scale (WMS) (Wechsler, 2009) were developed for use in healthy populations and are the most frequently used tools for assessing intelligence and memory in healthy individuals. Since the length of the original scales may strain individuals with schizophrenia, shortened versions have become an ideal option for assessing intelligence and memory in place of the full versions. Velthorst et al. (2013) shortened the WAIS by creating a version that included only select items from 3 subtests and can be administered in 15 min. In a study of individuals with schizophrenia, they found their shortened version to provide as reliable an estimate of intelligence as measured by the full WAIS and to effectively differentiate between individuals with schizophrenia and healthy controls (Velthorst et al., 2013).

CROSS-CULTURAL PERSPECTIVES AND ADVANCES IN MENTAL ILLNESS

The cultural context of psychopathology

Culture is a quality that is environmentally acquired, and should be viewed as containing beliefs, principles, standards, activities, and symbols (Eshun & Gurung, 2009). It reflects mutual societal experiences, is conveyed cross-generationally, and is time sensitive. Culture is also self-sufficient, and consists of concrete and abstract components. Furthermore, a population's survival and adaptation are dependent on culture. Many aspects of culture, such as cultural principles, affect the manner in which people perceive and react (Eshun & Gurung, 2009).

Culture affects psychopathology through the patient's subjective experience of distress. Furthermore, patients exhibit symptoms of distress in accordance with the standards and context defined by their cultures. The expression of the manner in which symptoms are exhibited is then interpreted by a clinician and diagnosed accordingly. Understanding the cultural dynamics at play, with regard to symptom manifestation, determines treatment options and has an influence on prognostic factors (Castillo, 1997). Language is also influenced by culture, thereby influencing the way in which illness is understood. Both the experience of illness and the conceptual understanding of illness depend on language (Hahn, 1995).

While there is currently an emphasis on a biopsychosocial model of psychopathology, Trujillo (2008) proposes that this model should be relabeled *biopsychosocial-sociocultural*. A study by Hassim and Wagner (2013) reviewed literature that focused on the dynamic influence of culture in psychopathology.

A question that should be clarified when considering culture-related psychopathology is whether a pathological phenomenon is *culturally induced*, *culturally modified*, or *culturally labeled* (Tseng, 2006). Culture-related disorders are activated from cross-cultural psychopathology by exerting *pathogenic*, *psychoselective*, *psychoplastic*, *pathoelaborating*, *psychofacilitating*, and *psychoreactive* influences. According to Tseng (2006), the pathogenic effect refers to culture's potential to affect the course of the disorder.

Hassim and Wagner (2013) propose that the pathogenic effect be appreciated as the way in which culture "habituates" psychopathology. The psychoselective effect refers to the way in which cultural variables enable the person to tolerate stressors. Of equal importance is the psychoplastic effect, which elaborates the manner in which culture modulates the expression of psychopathology. Structured manifestation of this modulation, as implied in mainstream categories as well as culture-specific illnesses, suggests culture's pathoelaborating effect. However, as psychopathological experiences often relate to the personalized experience of psychological disturbances, the psychoreactive effect explores the subjective reaction to the disturbance (Tseng, 2001).

Mio, Barker-Hackett, and Tumaming (2006) suggest that there are four recurring frameworks that address the way in which psychopathology is influenced by culture: the *sociobiological approach*, the *ecocultural approach*, the *biopsychosocial approach*, and *multiculturalism*. From a *sociobiological* point of view, evolutionary and biological features affect culture, and culture evolves to sustain the survival of society. The *ecocultural* approach focuses on the relationship between ecology and culture, specifically the manner in which actions and opinions affect the environment and vice versa. The *biopsychosocial* view considers the interaction between biological, psychological, and social factors. This approach interprets the influence of culture on psychopathology through a *trimodal framework* (*bio-psycho-social*) and its dynamic interplay

on social interaction. *Multiculturalism* is a postmodernism-endorsed approach and highlights the significance of equity between and approval of all cultural views.

Cross-cultural epidemiological and clinical studies have documented significant variations in the modes of expression, explanation, and personal and social response to psychological distress and dysfunction (Tanaka-Matsumi & Draguns, 1997). Studies of migrant populations and diverse ethnocultural communities have provided compelling evidence of the importance of cultural influences on the social determinants of mental health and illness (Marsella & Yamada, 2007).

The new “cross-cultural psychiatry” marked a move from group differences toward a more ethnographically informed view of psychopathology as encompassed in local social worlds (e.g., López & Guarnaccia, 2000). According to this perspective, each individual should be viewed within a social and cultural context. There is now a rich literature on embodied, situated, and enactive cognition that illuminates some of the ways that culture shapes experience and provides potential frameworks for elaborating a cultural neurophenomenology of psychopathology (Colombetti, 2013; Zatti & Zarbo, 2015).

A growing number of studies move away from the notion of culture as stereotype and individual traits to a more ecological view of the person in a dynamic interaction with local social contexts (Kirmayer, 2015). According to Kirmayer and Ryder (2016), “we need approaches that unpack culture in terms of specific developmental and contextual processes and their interactions at individual and social levels” (p. 143). One promising development in recent years is the emergence of interdisciplinary fields, such as cultural neuroscience and neuroanthropology, concerned with the interrelation of culture and the brain, which offer new methods to examine how patterns of brain activity associated with psychopathology are influenced by culturally determined developmental experiences, as well as the demands of cultural contexts, roles, and tasks (Han et al., 2013; Kim & Sasaki, 2014; Hyde, Tompson, Creswell, & Falk, 2015).

Research on gene-by-culture interactions increasingly demonstrates the importance of social context, and many of these interactions are potentially relevant to mental health (Ishii, Kim, Sasaki, Shinada, & Kusumi, 2014; Luo & Han, 2014; Kohrt et al., 2015). Further research should elucidate whether a particular mental disorder or psychopathological construct is culturally universal (often assumed to be the case because it is “biological”) or culturally relative (because it is seen to be dependent on specific social contexts). Causadias (2013) argues that the systemic-interactional models are needed to relate specific aspects of culture and the context to particular psychopathological processes. Even core symptoms like “anhedonia” and “depressed mood” may be shaped by cultural norms regarding pleasure and sadness (Chentsova-Dutton, Choi, Ryder, & Reyes, 2015).

Culture influences the form and symptomatic expression of anxiety disorders, including obsessive-compulsive disorder, PTSD, and social anxiety disorder (Hofmann & Hinton, 2014; Clark & Inozu, 2014). A number of recent studies have documented higher levels of self-reported shyness and social anxiety in East Asian samples, despite earlier findings showing lower levels of diagnosed social anxiety disorder in these societies. This seeming discrepancy may be attributable to a higher threshold of severity before shyness is perceived or experienced as problematic, as well as to cultural variations in certain symptoms.

Sophisticated studies on mediators contribute to the understanding of the cognitive, emotional, and social factors that influence symptom experience and expression. The tendency of Chinese patients to make “somatized” clinical presentations appears limited to depression; people with anxiety disorders actually may be more likely to present somatically in North America than in China (Dere et al., 2013).

Integrating Culture in the DSM-5

The transition from the *DSM-IV* to the *DSM-5* has seen greater effort to modify diagnostic criteria to take into account potential cultural variations (Lewis-Fernández et al., 2014). *DSM-5* also replaces the overused notion of “culture-bound syndromes” with three different types of cultural concepts of distress, each of which may be related to folk diagnostic categories: *cultural syndromes* (clusters of symptoms that may be related to but need not be “bound” or limited to local cultures), *causal explanations or attributions* (e.g., “fright illness” or “susto”), and *cultural idioms of distress* (everyday ways of talking about distress that cut across syndromes (e.g., “nerves”). These distinctions, based on the ways that people actually use local concepts of illness, may offer researchers and clinicians a useful set of conceptual tools to make sense of cultural variations in illness experience (Kirmayer & Ban, 2013).

Moreover, in a potentially important advance, the *DSM-5* also includes a new clinical tool, the Cultural Formulation Interview, which aims to refine diagnostic assessment by helping clinicians gather information about the social and cultural dimensions of illness experience (Lewis-Fernández, Aggarwal, Hinton, Hinton, & Kirmayer, 2015). These studies demonstrate that use of the Cultural Formulation Interview can lead to changes in the diagnosis of psychosis, increased recognition of adjustment disorders and other problems in adaptation, and enhanced collaboration in multidisciplinary teams (Kirmayer, Guzder, & Rousseau, 2014; Bäärnhielm, Wistedt, & Rosso, 2015; Adeponle, Groleau, & Kirmayer, 2015).

Among the crucial areas for future research on culture and psychopathology is the impact of changing configurations of culture, which include the emergence of new forms of cultural hybridity made possible by globalization, transnational migration, and electronic communications (Kirmayer & Ryder, 2016). The social determinants of mental health associated with urbanization, forced migration, climate change, war, and political violence are all key to understanding the vulnerability of contemporary populations. New information technologies and social media are also changing the meanings of culture and community, giving rise to new forms of identity and new kinds of psychopathology (Gold & Gold, 2015). Integrating knowledge of cultural influences on psychopathology into clinical practice requires a similar shift to a more social-contextual view of the person (Kirmayer, 2015; Ryder & Chentsova-Dutton, 2015). A social-contextual view can provide a conceptual framework for culturally competent knowledge translation and adaptation of models, measures, and interventions.

The role of culture in the development of specific disorders

Koelkebeck, Uwatoko, Tanaka, and Kret (2016) present important findings of symptom pattern variations between cultures for (major) mental disorders.

Psychotic Disorders

While the prevalence of schizophrenia has been shown to maintain a constant rate across cultures, the course of the disorder has been shown to vary (Siegert, 2001). For example, patients with schizophrenia in developing countries seem to recover faster (Sass, 1997), with familial interdependency serving as a protective factor (Singh, Harley, & Suhail, 2013). In Western patients, religious delusions and delusional guilt (Tateyama, Asai, Hashimoto, Bartels, & Kasper, 1998), delusions of grandeur (Stompe et al., 1999) as well as of persecution (Minsky, Vega, Miskimen, Gara, & Escobar, 2003; Veling, Hoek, Selten, & Susser, 2011) have been shown to occur more frequently than in Asian and African cultures. Specific delusional contents can refer to *political background* (e.g., espionage in South Korea (Kim et al., 1993, 2001), *societal characteristics* (e.g., strong will to avoid *shame* in Japan (Tateyama et al., 1993, 1998), or *cultural beliefs* (e.g., fox demon possession in Japan; Omata, 1985). Tactile hallucinations seem to occur frequently in patients from Africa and the Middle East, while in European countries visual hallucinations have been described as being most frequent (Ndetei & Vadher, 1984). Hallucinations have been found to be more persistent in African countries, while Latin Americans report more somatic concerns (Bauer et al., 2011).

Affective Disorders

The prevalence of affective disorders varies across countries (Weissman et al., 1996) and there is evidence for culture-specific symptomatology (Kleinman & Good, 1985). Cultural concepts of loss of control and attributional bias toward the self may impact depressive mood differently (Kirmayer & Groleau, 2001). Again, language may have an effect on the symptom dimensions of depression, as cultures have different idioms of distress (Kirmayer & Groleau, 2001). For example, individuals from Eastern, collectivistic cultures have been shown to report their symptoms in somatic and interpersonal terms, whereas Westerners use affective, existential, cognitive, and somatic terminology (Marsella, 1980). Feelings of guilt and self-reproach also seem to vary at different investigation sites, with the highest rates in Switzerland and Japan (Jablensky, Sartorius, Gulbinat, & Ernberg, 1981). In Japan, for instance, individuals are encouraged to attribute failure to themselves and success to the group (DeVos, 1985; Markus & Kitayama, 1991). In a European study, Italian patients scored higher on ratings of hypochondria, motor retardation, hopelessness, loss of interest, and dissatisfaction, while Swedish patients suffered from the inability to feel, weight loss, tachycardia, and agitation (Perris et al., 1981). In British clinics, patients of African origin presented more often with manic symptoms and Afro-Caribbeans had more mood-incongruent symptoms (Kirov & Murray, 1999).

Culture-Bound Syndromes

Culture-bound syndromes are clinical presentation forms of symptoms that are culturally distinctive (Kirmayer, 2001). These syndromes offer insights into disorders that depend strongly on the sociocultural background of the individual. A classic culture-bound syndrome is *koro*, which is common in Southeast Asia and in China (Cheng, 1996). It implies the strong conviction that the male sexual organ is retracted inside the body (Freudenmann & Schonfeldt-Lecuona, 2005). A similar phenomenon has been described in India, with male patients fearing loss of power due to losing their semen through premature ejaculation or from passing semen in their urine (*Dhat syndrome*; Sumathipala, Siribaddana, & Bhugra, 2004). *Taijin kyofusho* is a phenomenon characterized by excessive nervousness and fear in social situations. While it has been

described as a subtype of social anxiety disorder (Kirmayer, 1991), it is particularly characterized by the fear to offend or harm others. This type of anxiety has been related to the Japanese culture with its specific value of consideration for others in social situations (Suzuki, Takei, Kawai, Minabe, & Mori, 2003). Another recently described phenomenon in Japan is *hikikomori*, which is defined as social withdrawal for more than 6 months. It is suggested that *hikikomori* may be a representation of chronic schizophrenia, as patients sometimes show a strong immersion in personal interests (Teo & Gaw, 2010). Cases with no subjective psychological distress have also been described. In these cases, patients have an apathetic lifestyle with no interest in hobbies of any sort (Kondo et al., 2013). Lifelong financial dependency seems relatively acceptable in Japan, which is why a strong impact on the development of *hikikomori* has been proposed. However, recent reports suggest that the so-called modern type of depression is also a form of *hikikomori* (Kato, Shinfuku, Sartorius, & Kanba, 2011).

Empirical Findings

Little data is available on cross-cultural differences in the perception of social stimuli in patient groups, although abnormalities in self–other perception may form a model for the functioning of culture-based social cognition and vice versa (Fabrega, 1989). It has been shown that ER deficits in schizophrenia are similar across cultures (Lee, Lee, Kweon, Lee, & Lee, 2010). In contrast, schizophrenia patients of American Caucasian origin have been shown to be more highly skilled at the perception of emotions as compared to samples of African Americans and Latin Americans (Brekke, Nakagami, Kee, & Green, 2005). In a study of American, German, and Indian patients with schizophrenia (Habel et al., 2000), Indian patients performed significantly worse than the other groups on an emotion discrimination task using Caucasian faces. A study using both Caucasian and African American facial stimuli demonstrated that patients with schizophrenia were more likely to recognize same-race than other-race faces (Pinkham et al., 2008). In two studies that assessed social cognition in relation to depressed mood in Greek (Bernieri & Gillis, 1993) and North American (Gillis & Bernieri, 1993) college students, dyadic interaction videos were presented. College students with depressed symptoms were found to track female interaction partners to judge interactional contents. In a sample of Asian immigrants to the United States, these immigrants tended to focus more strongly on affective components of depression than on somatic components (Chen, Guarnaccia, & Chung, 2003). Furthermore, the level of self-attention has been identified as a mediator of cultural effects on depression.

COPING AND PSYCHOPATHOLOGY

Models of coping

It is by now widely accepted that to understand the development of psychopathology, in addition to considering the intensity and duration of stressful events, it is necessary to take into account individuals' appraisal of stress, their coping strategies, their feelings of efficacy in coping with the stressful situation, and their personal and social resources for coping (e.g., Taylor & Stanton, 2007).

Coping is often aimed at regulating emotional experiences, either by changing one's own responses or by modifying the stressor that prompted the emotional reaction (Compas et al., 2014). Overall, emotion dysregulation, usually assessed via measures originally designed to assess coping, is thought to be a core feature of many forms of psychopathology (e.g., Aldao & Nolen-Hoeksema, 2010, 2012; Aldao et al., 2010; Webb et al., 2012). Because of the clear conceptual and methodological overlaps, research on ER and the dysregulation of negative affect and their links to psychopathology seem to be equally important to studies of stress and coping, allowing some conclusions about coping and psychopathology to be drawn from such work.

There are at least four kinds of general models that delineate the role of coping and its associated processes: the first model views coping as a moderator, mediator, and mechanism. This model posits that all kinds of coping are moderators that minimize, buffer, or deteriorate the negative effects of stress on adjustment or on the onset or relapse of psychopathology (Aldwin, 2007). Coping can be thought of as a stabilizing or destabilizing factor that helps maintain positive psychological adjustment during stressful periods or may explain why stressors lead to psychopathology.

A second model conceptualizes coping as a mediator or an adaptive process that is embedded in or shaped by stress, and the primary pathway through which stress affects adjustment or psychopathology (Aldwin, 2007). According to this model, one of the reasons that adversity has deleterious effects is that stressful life events trigger maladaptive coping in children and adolescents, which then puts them at risk for the development of psychopathology. For example, avoidant coping, often assessed as denial or withdrawal, has been found to mediate between stressful circumstances and distress on one hand and concurrent or later adjustment on the other.

The third model views coping as a mechanism through which protective factors exert their impact. Protective factors include social resources like social support, as well as personal resources like optimism, personal control or mastery,

self-esteem, or coping efficacy, which are hypothesized to proffer their protective effects at least in part by promoting constructive coping and discouraging reliance on maladaptive coping responses (Taylor & Stanton, 2007).

The fourth model views coping as part of a set of reciprocal processes that connect it to psychopathology. According to this model, stress, coping, and psychopathology have bidirectional or reciprocal effects, whereby stress interferes with coping processes and contributes to maladjustment or psychopathological outcomes; at the same time, maladjustment and psychopathology generate later experiences of stress and undermine the development of coping responses and resources (Conway, Hammen, & Brennan, 2012).

Coping strategies

Problem solving is an adaptive coping strategy that enhances mental health in the face of stress or adversity. For example, in research studies with adolescents and young adults, help seeking (Gould et al., 2004), planning (Aldridge & Roesch, 2008), and positive reinterpretation (Stewart et al., 1997), as well as problem solving (Khurana & Romer, 2012) were each associated with greater competence and fewer mental health problems.

On the other hand, *aggressive* and *ruminative coping* are inappropriate and unfavorable strategies in enhancing mental health. For example, Sandstrom (2004) found that both of these types of coping were associated with more internalizing symptoms. Other studies have found that *behavioral disengagement*, often assessed as helplessness, is a risk factor for elevated depressive symptoms (e.g., Kaminsky, Robertson, & Dewey, 2006).

The term *temporal distancing* typically refers to the act of mentally envisioning negative experiences from a broader future-time perspective (Trope & Liberman, 2003, 2010). Such a perspective can be achieved by imagining how someone will perceive a present negative event in the distant future. Recent experimental research indicates that “perspective broadening” strategies play a key role in emotion regulation. Perspective broadening strategies are theorized to be helpful because they facilitate new and adaptive insights about negative experiences (Kross & Ayduk, 2011). According to cognitive behavioral therapy, distanced observation of one’s thoughts and feelings can reduce distress by enabling people to identify and challenge irrational beliefs (Beck, 1970). Likewise, mindfulness training highlights the importance of “decentering” (e.g., Sauer & Baer, 2010).

The Temporal Distancing Questionnaire (TDQ; Bruehlman-Senecal, Ayduk, & John, 2016) is a new measure of individual differences in the tendency to place negative experiences into a broader future-time perspective and to focus on their impermanent aspects.

Resilience and self-compassion

Resilience can be defined as a concept that describes and explains positive outcomes, despite high risk of maladjustment when exposed to stressful psychosocial events. It is a multidimensional concept variously defined as a personal trait protective against mental disorder or as a dynamic process of adaptation to unpredictable events and unusual life conditions. Main characteristics of resilience include positive outcomes despite high-risk status, constant competence under stress, and recovery from a severe blow.

One possible resilience mechanism in the relationship between positive mental health and psychopathology is *self-compassion*. Self-compassion is a relatively new concept in Western psychology that is the self-directed equivalent to other-oriented compassion. It refers to a warm-hearted, caring, empathic, and nonjudgmental orientation toward the self during times of suffering and failure, accompanied by a motivation to cope with these feelings (Gilbert, 2009). The most applied conceptualization of self-compassion (Neff, 2003a, 2003b) includes three facets: (1) *self-kindness*, the ability to be friendly and understanding toward the self during stress and failure as opposed to being self-criticizing, (2) *common humanity*, the ability to recognize one’s suffering as part of the common, shared human experience in which failure and imperfections form part of normality as opposed to viewing suffering as personal and isolated, and (3) *mindfulness*, the ability to take an open, accepting, and nonjudgmental stance toward the self and suffering, as opposed to overidentification and fusion with the self.

Studies have revealed that self-compassion is positively associated with such factors as positive affect, life satisfaction, optimism, happiness, wisdom, and personal initiative (Barnard & Curry, 2011; Zessin, Dickh, & Garbade, 2015). Interventional studies examining the effectiveness of compassion-focused therapy and compassionate mind training (e.g., Gilbert, 2009) found reductions in depression and anxiety in nonclinical populations (e.g., Braehler et al., 2013). Diedrich, Grant, Hofmann, Hiller, and Berking (2014) investigated whether self-compassion functions as a resilience mechanism and adaptive ER strategy that protects against psychopathology for those with high levels of positive mental

health. Participants from the general population provided measures at one time point on positive mental health, self-compassion, psychopathology, and negative affect. Self-compassion significantly mediated the negative relationship between positive mental health and psychopathology. Furthermore, higher levels of self-compassion deflated the relationship between state negative affect and psychopathology. Findings suggest that especially individuals with high levels of positive mental health possess self-compassion skills that promote resilience against psychopathology. These might function as an adaptive ER strategy and protect against the activation of schema related to psychopathology following state negative affective experiences. Enhancing self-compassion is a promising positive intervention for clinical practice.

The Self-Compassion Scale

The vast majority of research on self-compassion has been conducted using the Self-Compassion Scale (SCS) (Neff, 2003a), which assesses trait levels of self-compassion. The scale was developed to evaluate the thoughts, emotions, and behaviors associated with the various components of self-compassion. It includes items that measure how often people respond to feelings of inadequacy or suffering with *self-kindness* (e.g., “I try to be loving toward myself when I’m feeling emotional pain”), *self-judgment* (e.g., “I’m disapproving and judgmental about my own flaws and inadequacies”), *common humanity* (e.g., “I try to see my failings as part of the human condition”), *isolation* (e.g., “When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world”), *mindfulness* (e.g., “When something painful happens I try to take a balanced view of the situation”), and *overidentification* (e.g., “When I’m feeling down I tend to obsess and fixate on everything that’s wrong”). Responses are given on a 5-point scale from “Almost never” to “Almost always.”

Confirmatory factor analyses were used to confirm that scale items fit as intended with the proposed a priori theoretical model (Furr & Bacharach, 2008). An initial confirmatory factor analysis found an adequate fit to a six-factor intercorrelated model, and a second confirmatory factor analysis found a marginal fit to a single higher-order factor that could explain the intercorrelations between subscales. The factor structure of the scale was cross-validated in a second student sample. These findings were interpreted as evidence that the subscales could be examined separately or else that a total score could be used, depending on the interest of the researcher.

There is ample evidence for the reliability and validity of the SCS. The internal reliability of the SCS has been found to be consistently high in studies across a wide variety of populations, suggesting that all SCS items are intercorrelated in a satisfactory manner (e.g., Allen, Goldwasser, & Leary, 2012; Neff & Pommier, 2013; Werner et al., 2012).

The scale demonstrates good convergent validity. For instance, therapists’ ratings of how “self-compassionate” individuals were (using a single item) after a brief interaction were significantly correlated with self-reported SCS scores (Neff, Kirkpatrick, & Rude, 2007).

New empirical evidence is provided using a bifactor analysis, which indicates that at least 90% of the reliable variance in SCS scores can be explained by an overall self-compassion factor in five different populations, justifying the use of a total scale score. Support for a six-factor structure to the SCS was also found, however, suggesting that the scale can be used in a flexible manner depending on the interests of researchers.

SUMMARY

This chapter has explored a multiplicity of issues that are associated with the domain of psychopathology. The chapter starts with a large section on emotion regulation and its role in psychopathology. A topic of interest that has not been extensively investigated is the psychopathology of intellectual disabilities. A list of instruments is introduced that test psychopathology in individuals with intellectual disabilities. Developmental psychopathology demarcates an integral part of this chapter and endorses three major periods of developmental: infancy, preschool, and childhood. Accumulating evidence demonstrates a strong link between infant and toddler regulatory problems and behavioral problems in childhood.

Some significant recent achievements of developmental psychopathology include the diametrical model of autism, language impairments and motor problems as early precursors of schizophrenia, the association between corporal punishment and mental disorders, and gene–environmental interplay. Further, the chapter discusses various assessment methods and traces the trajectories from child to adult psychopathology.

There is increasing evidence that psychotic symptoms lie on a continuum with subclinical psychotic-like experiences in the general population. There is growing interest in the role that transdiagnostic constructs play in the development course and maintenance of psychopathology. The chapter deals with recent advances in schizophrenia-spectrum personality disorders and in particular the role of cognition in assessment and treatment. The chapter closes with examining cross-cultural perspectives and advances in mental illness and the role of coping strategies and resilience in mental illness.

REFERENCES

- Abbott, M. J., & Rapee, R. M. (2004). Post-event rumination and negative self-appraisal in social phobia before and after treatment. *Journal of Abnormal Psychology, 113*(1), 136–144.
- Achenbach, T. M., Edelbrock, C., & Howell, C. T. (1987). Empirically based assessment of the behavioral/emotional problems of 2- and 3-year-old children. *Journal of Abnormal Child Psychology, 15*(4), 629–650.
- Achenbach, T. M., & Rescorla, L. (2000). *Manual for the ASEBA preschool forms and profiles*. Burlington, VT: University of Vermont.
- Adeponle, A. B., Groleau, D., & Kirmayer, L. J. (2015). Clinician reasoning in the use of cultural formulation to resolve uncertainty in the diagnosis of psychosis. *Culture, Medicine, and Psychiatry, 39*(1), 16–42.
- Akiskal, H. S., Mendlowicz, M. V., Jean-Louis, G., Rapaport, M. H., Kelsoe, J. R., Gillin, J. C., & Smith, T. L. (2005). TEMPS-A: validation of a short version of a self-rated instrument designed to measure variations in temperament. *Journal of Affective Disorders, 85*(1), 45–52.
- Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: a transdiagnostic examination. *Behaviour Research and Therapy, 48*(10), 974–983.
- Aldao, A., & Nolen-Hoeksema, S. (2012). When are adaptive strategies most predictive of psychopathology? *Journal of Abnormal Psychology, 121*(1), 276–281.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: a meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237.
- Aldridge, A. A., & Roesch, S. C. (2008). Developing coping typologies of minority adolescents: a latent profile analysis. *Journal of Adolescence, 31*(4), 499–517.
- Aldwin, C. M. (2007). *Stress, coping, and development: An integrative perspective*. New York, NY: Guilford Press.
- Allardyce, J., Suppes, T., & van Os, J. (2007). Dimensions and the psychosis continuum. *International Journal of Methods in Psychiatric Research, 16*(1), 34–40.
- Allen, A. B., Goldwasser, E. R., & Leary, M. R. (2012a). Self-compassion and well-being among older adults. *Self and Identity, 11*(4), 428–453.
- Allen, D., Lowe, K., Matthews, H., & Anness, V. (2012b). Screening for psychiatric disorders in a total population of adults with intellectual disability and challenging behavior using the PAS-ADD checklist. *Journal of Applied Research in Intellectual Disabilities, 25*(4), 342–349.
- Althoff, R. R., Verhulst, F. C., Rettew, D. C., Hudziak, J. J., & van der Ende, J. (2010). Adult outcomes of childhood dysregulation: a 14-year follow-up study. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(11), 1105–1116.
- Aman, M. G. (1991). *Assessing psychopathology and behavior problems in persons with mental retardation: A review of available instruments*. Rockville, MD: US Department of Health and Human Services.
- Aman, M. G., Singh, N. N., Stewart, A. W., & Field, C. J. (1985). The aberrant behavior checklist: a behavior rating scale for the assessment of treatment effects. *American Journal of Mental Deficiency, 89*(5), 485–491.
- Aman, M. G., Tassé, M. J., Rojahn, J., & Hammer, D. (1996). The Nisonger CBRF: a child behavior rating form for children with developmental disabilities. *Research in Developmental Disabilities, 17*(1), 41–57.
- Aman, M., Watson, J. E., Singh, N., Turbott, S. H., & Wilsher, C. P. (1986). Psychometric and demographic characteristics of the psychopathology instrument for mentally retarded adults. *Psychopharmacology Bulletin, 22*(4), 1072–1076.
- American Psychiatric Association. (2013). *DSM-5: Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.
- Angold, A., & Egger, H. L. (2004). Psychiatric diagnosis in preschool children. In R. DelCarmen-Wiggins, & A. Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (pp. 123–139). New York, NY: Oxford University Press.
- Arndt, J., & Vess, M. (2008). Tales from existential oceans: Terror Management Theory and how the awareness of our mortality affects us all. *Social and Personality Psychology Compass, 2*(2), 909–928.
- Arseneault, L., Cannon, M., Fisher, H. L., Polanczyk, G., Moffitt, T. E., & Caspi, A. (2011). Childhood trauma and children's emerging psychotic symptoms: a genetically sensitive longitudinal cohort study. *American Journal of Psychiatry, 168*(1), 65–72.
- Augustine, A. A., & Hemenover, S. H. (2009). On the relative effectiveness of affect regulation strategies: a meta-analysis. *Cognition and Emotion, 23*(6), 1181–1220.
- Bäärnhielm, S., Wistedt, A. Å., & Rosso, M. S. (2015). Revising psychiatric diagnostic categorisation of immigrant patients after using the cultural formulation in *DSM-IV*. *Transcultural Psychiatry, 52*(3), 287–310.
- Bagner, D. M., Rodriguez, G. M., Blake, C. A., Linares, D., & Carter, A. S. (2012). Assessment of behavioural and emotional problems in infancy: a systematic review. *Clinical Child and Family Psychological Review, 15*(2), 113–128.
- Balboni, G., Battagliese, G., & Pedrabissi, L. (2000). The Psychopathology Inventory for Mentally Retarded Adults: factor structure and comparisons between subjects with or without dual diagnosis. *Research in Developmental Disabilities, 21*(4), 311–321.
- Bannister, D. (1985). The psychotic disguise. In W. Dryden (Ed.), *Therapists' dilemmas* (pp. 167–179). London, England: Harper & Row.
- Barch, O. M., & Keefe, R. S. (2010). Anticipating *DSM-V*: opportunities and challenges for cognition and psychosis. *Schizophrenia Bulletin, 36*, 43–47.
- Barham, P. (1993). *Schizophrenia and human value: Chronic schizophrenia, science and society*. London, England: Free Association Books.
- Barnard, L. K., & Curry, J. F. (2011). Self-compassion: conceptualizations, correlates, & interventions. *Review of General Psychology, 15*(4), 289–303.
- Barrantes-Vidal, N., Grant, P., & Kwapil, T. R. (2015). The role of schizotypy in the study of the etiology of schizophrenia spectrum disorders. *Schizophrenia Bulletin, 41*(2), 408–416.
- Basabe, N., Paez, D., Valencia, J., Gonzalez, J. L., Rimé, B., & Diener, E. (2002). Cultural dimensions, socioeconomic development, climate, and emotional hedonic level. *Cognition and Emotion, 16*(1), 103–125.

- Bauer, S. M., Schanda, H., Karakula, H., Olajossy-Hilkesberger, L., Rudaleviciene, P., Okribelashvili, N., & Stompe, T. (2011). Culture and the prevalence of hallucinations in schizophrenia. *Comprehensive Psychiatry*, *52*(3), 319–325.
- Beards, S., & Fisher, H. L. (2014). The journey to psychosis: an exploration of specific psychological pathways. *Social Psychiatry and Psychiatric Epidemiology*, *49*(10), 1541–1544.
- Beauchaine, T. P., Gatzke-Kopp, L., & Mead, H. K. (2007). Polyvagal theory and developmental psychopathology: emotion dysregulation and conduct problems from preschool to adolescence. *Biological Psychology*, *74*(2), 174–184.
- Beauchaine, T. P., & Thayer, J. F. (2015). Heart rate variability as a transdiagnostic biomarker of psychopathology. *International Journal of Psychophysiology*, *98*(2), 338–350.
- Bebbington, P. (2009). Childhood sexual abuse and psychosis: aetiology and mechanism. *Epidemiologia e Psichiatria Sociale*, *18*(4), 284–293.
- Beck, A. T. (1970). Cognitive therapy: nature and relation to behavior therapy. *Behavior Therapy*, *1*(2), 184–200.
- Beer, M. D. (1996). Psychosis: a history of the concept. *Comprehensive Psychiatry*, *37*(4), 273–291.
- Belden, A. C., Thomson, N. R., & Luby, J. L. (2008). Temper tantrums in healthy versus depressed and disruptive preschoolers: defining tantrum behaviors associated with clinical problems. *Journal of Pediatrics*, *152*(1), 117–122.
- Belva, B. C. (2014). *Examining the psychometrics of the psychopathology inventory for mentally retarded adults-II for adults with mild and moderate intellectual disabilities*. Unpublished doctoral dissertation, Louisiana State University, Baton Rouge, LA.
- Benham, A. L. (2000). The observation and assessment of young children including use of the Infant-Toddler Mental Status Exam. In C. H. Zeanah, Jr. (Ed.), *Handbook of infant mental health* (2nd ed., pp. 249–265). New York, NY: Guilford Press.
- Bentall, R. P., de Sousa, P., Varese, F., Wickham, S., Sitko, K., Haarmans, M., & Read, J. (2014). From adversity to psychosis: pathways and mechanisms from specific adversities to specific symptoms. *Social Psychiatry and Psychiatric Epidemiology*, *49*(7), 1011–1022.
- Ben-Zur, H. (2009). Coping styles and affect. *International Journal of Stress Management*, *16*(2), 87–101.
- Berger, S. P., Hopkins, J., Bae, H., Hella, B., & Strickland, J. (2010). Infant assessment. In J. G. Bremner, & T. D. Wachs (Eds.), *The Wiley-Blackwell handbook of infant development* (pp. 226–256). (Vol. 2). Chichester, England: Wiley.
- Berking, M., & Schwarz, J. (2013). The affect regulation training. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 529–547). New York, NY: Guilford Press.
- Bernieri, F. J., & Gillis, J. S. (1993). Depressed mood and social perception: a cross-cultural replication. *Perceptual and Motor Skills*, *77*(1), 154.
- Bernstein, D. P., & Fink, L. (1998). *Childhood Trauma Questionnaire: A retrospective self-report manual*. San Antonio, TX: Psychological Corporation.
- Berry, K., Barrowclough, C., & Wearden, A. A. (2007). A review of the role of adult attachment style in psychosis: unexplored issues and questions for further research. *Clinical Psychology Review*, *27*(4), 458–475.
- Berry, K., Barrowclough, C., & Wearden, A. (2008). Attachment theory: a framework for understanding symptoms and interpersonal relationships in psychosis. *Behaviour Research and Therapy*, *46*(12), 1275–1282.
- Bifulco, A., Brown, G. W., & Harris, T. O. (1994). Childhood Experience of Care and Abuse (CECA): a retrospective interview measure. *Journal of Child and Psychology Psychiatry*, *35*(8), 1419–1435.
- Bifulco, A., & Thomas, G. (2013). *Understanding adult attachment in family relationships: research, assessment, and intervention*. Abingdon, England: Routledge.
- Bilder, R. M. (2014a). Finding pieces to the puzzle of brain structure in schizophrenia. *Biological Psychiatry: A Journal of Psychiatric Neuroscience and Therapeutics*, *79*(6), 432–433.
- Bilder, R. M. (2014b). Schizophrenia. In M. W. Parsons, T. A. Hammeke, & P. J. Snyder (Eds.), *Clinical neuropsychology: A pocket handbook for assessment* (3rd ed., pp. 552–571). Washington, DC: American Psychological Association.
- Bjoreberg, J., Ljótsson, B., Tull, M. T., Hedman, E., Sahlin, H., Lundh, L. G., & Gratz, K. L. (2016). Development and validation of a brief version of the Difficulties in Emotion Regulation Scale: the DERS-16. *Journal of Psychopathology and Behavioral Assessment*, *38*(2), 284–296.
- Bontempo, D. E., Hofer, S. M., Mackinnon, A., Piccinin, A. M., Gray, K., Tonge, B., & Einfeld, S. (2008). Factor structure of the Developmental Behavior Checklist using confirmatory factor analysis of polytomous items. *Journal of Applied Measurement*, *9*(3), 265–280.
- Boomsma, D. I., Rebollo, I., Derks, E. M., van Beijsterveldt, T. C. E. M., Althoff, R. R., Rettew, D. C., & Hudziak, J. J. (2006). Longitudinal stability of the CBCL-juvenile bipolar disorder phenotype: a study in Dutch twins. *Biological Psychiatry*, *60*(9), 912–920.
- Bornstein, M. H., Hahn, C. S., & Wolke, D. (2013). Systems and cascades in cognitive development and academic achievement. *Child Development*, *84*(1), 154–162.
- Bowlby, J. (1973). *Attachment and loss: Vol. 2. Separation: Anxiety and anger*. New York, NY: Basic Books.
- Bowlby, J. (2013). *Personality and mental illness*. London, England: Routledge.
- Braehler, C., Gumley, A., Harper, J., Wallace, S., Norrie, J., & Gilbert, P. (2013). Exploring change processes in compassion focused therapy in psychosis: results of a feasibility randomized controlled trial. *British Journal of Clinical Psychology*, *52*(2), 199–214.
- Brekke, J. S., Nakagami, E., Kee, K. S., & Green, M. F. (2005). Cross-ethnic differences in perception of emotion in schizophrenia. *Schizophrenia Research*, *77*(2–3), 289–298.
- Bremner, J. D., Vermetten, E., & Mazure, C. M. (2000). Development and preliminary psychometric properties of an instrument for the measurement of childhood trauma: the Early Trauma Inventory. *Depression and Anxiety*, *12*(1), 1–12.
- Brett, C. M., Peters, E. P., Johns, L. C., Tabraham, P., Valmaggia, L. R., & McGuire, P. (2007). Appraisals of Anomalous Experiences Interview (AANEX): a multidimensional measure of psychological responses to anomalies associated with psychosis. *British Journal of Psychiatry*, *191*(51), 23–30.
- Brigance, A. H. (1991). *Revised Brigance diagnostic inventory of early development*. North Billerica, MA: Curriculum Associates.
- Brigance, A. H., & Glascoe, F. P. (2002). *Brigance infant and toddler screen*. North Billerica, MA: Curriculum Associates.

- Briggs-Gowan, M. J., & Carter, A. S. (2007). Applying the Infant-Toddler Social & Emotional Assessment (ITSEA) and Brief-ITSEA in early intervention. *Infant Mental Health Journal, 28*(6), 564–583.
- Briggs-Gowan, M. J., Carter, A. S., Bosson-Heenan, J., Guyer, A. E., & Horwitz, S. M. (2006). Are infant-toddler social-emotional and behavioral problems transient? *Journal of the American Academy of Child & Adolescent Psychiatry, 45*(7), 849–858.
- Briggs-Gowan, M. J., Carter, A. S., Irwin, J. R., Wachtel, K., & Cicchetti, D. V. (2004). The brief infant-toddler social and emotional assessment: screening for social-emotional problems and delays in competence. *Journal of Paediatric Psychology, 29*(2), 143–155.
- Briggs-Gowan, M. J., Carter, A. S., & Schwab-Stone, M. (1996). Discrepancies among mother, child, and teacher reports: examining the contributions of maternal depression and anxiety. *Journal of Abnormal Child Psychology, 24*(6), 749–765.
- Bronfenbrenner, U. (1989). Ecological systems theory. *Annals of Child Development, 6*, 187–249.
- Brown, A. S. (2011). The environment and susceptibility to schizophrenia. *Progress in Neurobiology, 93*(1), 23–58.
- Brown, T. A., & Barlow, D. H. (2009). A proposal for a dimensional classification system based on the shared features of the *DSM-IV* anxiety and mood disorders: implications for assessment and treatment. *Psychological Assessment, 21*(3), 256–271.
- Bruce, J., Tarullo, A. R., & Gunnar, M. R. (2009). Disinhibited social behavior among internationally adopted children. *Development and Psychopathology, 21*(1), 157–171.
- Buehlman-Senecal, E., Ayduk, Ö., & John, O. P. (2016). Taking the long view: implications of individual differences in temporal distancing for affect, stress reactivity, and well-being. *Journal of Personality and Social Psychology, 111*(4), 610–635.
- Bufferd, S. J., Dougherty, L. R., Carlson, G. A., Rose, S., & Klein, D. N. (2012). Psychiatric disorders in preschoolers: continuity from ages 3 to 6. *American Journal of Psychiatry, 169*(11), 1157–1164.
- Burke, J. D., Hipwell, A. E., & Loeber, R. (2010a). Dimensions of oppositional defiant disorder as predictors of depression and conduct disorder in pre-adolescent girls. *Journal of the American Academy of Child & Adolescent Psychiatry, 49*(5), 484–492.
- Burke, J. D., Loeber, R., Lahey, B. B., & Rathouz, P. J. (2005). Developmental transitions among affective and behavioral disorders in adolescent boys. *Journal of Child Psychology and Psychiatry, 46*(11), 1200–1210.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010b). Two decades of Terror Management Theory: a meta-analysis of mortality salience research. *Personality and Social Psychology Review, 14*(2), 155–195.
- Burnham, M. M., Goodlin-Jones, B. L., Gaylor, E. E., & Anders, T. F. (2002). Nighttime sleep-wake patterns and self-soothing from birth to one year of age: a longitudinal intervention study. *Journal of Child Psychology and Psychiatry, 43*(6), 713–725.
- Butler, E. A. (2011). Temporal interpersonal emotion systems: the “TIES” that form relationships. *Personality and Social Psychology Review, 15*(4), 367–393.
- Butler, E. A. (2012). Emotion regulation in cultural context: implications for wellness and health. In S. Barnow, & N. Balkir (Eds.), *Cultural variations in psychopathology: From research to practice* (pp. 93–114). Cambridge, MA: Hogrefe.
- Cannon, M., Caspi, A., Moffitt, T. E., Harrington, H., Taylor, A., Murray, R. M., & Poulton, R. (2002). Evidence for early-childhood, pan-developmental impairment specific to schizophrenic disorder: results from a longitudinal birth cohort. *Archives of General Psychiatry, 59*(5), 449–456.
- Cappadocia, M., Desrocher, M., Pepler, D., & Schroeder, J. H. (2009). Contextualizing the neurobiology of conduct disorder in an emotion dysregulation framework. *Clinical Psychology Review, 29*(6), 506–518.
- Carr, T., & Lord, C. (2009). Autism spectrum disorders. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (3rd ed., pp. 301–317). New York, NY: Guilford Press.
- Carter, A. S., Briggs-Gowan, M. J., & Davis, N. O. (2004). Assessment of young children’s social-emotional development and psychopathology: recent advances and recommendations for practice. *Journal of Child Psychology and Psychiatry, 45*(1), 109–134.
- Carter, A. S., Briggs-Gowan, M. J., Margaret, J., Jones, S. M., & Little, T. D. (2003). The Infant-Toddler Social and Emotional Assessment (ITSEA): factor structure, reliability, and validity. *Journal of Abnormal Child Psychology, 31*(5), 495–514.
- Carter, A. S., Godoy, L., Marakovitz, S. E., & Briggs-Gowan, M. J. (2009). Parent reports and infant-toddler mental health assessment. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (pp. 233–251). (Vol. 1). London, England: Guilford Press.
- Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., & Moffitt, T. E. (2014). The p factor: one general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science, 2*(2), 119–137.
- Caspi, A., & Silva, P. A. (1995). Temperamental qualities at age three predict personality traits in young adulthood: longitudinal evidence from a birth cohort. *Child Development, 66*(2), 486–498.
- Castillo, R. J. (1997). *Culture & mental illness: A client-centered approach*. Belmont, CA: Thomson Brooks/Cole.
- Causadias, J. M. (2013). A roadmap for the integration of culture into developmental psychopathology. *Development and Psychopathology, 25*(4pt2), 1375–1398.
- Cella, M., Dymond, S., & Cooper, A. (2009). Impairment in flexible emotion-based learning in hallucination- and delusion-prone individuals. *Psychiatry Research, 170*(1), 70–74.
- Chapman, L. J., & Chapman, J. P. (1980). Scales for rating psychotic and psychotic-like experiences as continua. *Schizophrenia Bulletin, 6*(3), 476–489.
- Chen, H., Guarnaccia, P. J., & Chung, H. (2003). Self-attention as a mediator of cultural influences on depression. *International Journal of Social Psychiatry, 49*(3), 192–203.
- Cheng, S. T. (1996). A critical review of Chinese *koro*. *Culture, Medicine and Psychiatry, 20*(1), 67–82.
- Chentsova-Dutton, Y. E., Choi, E., Ryder, A. G., & Reyes, J. (2015). “I felt sad and did not enjoy life”: cultural context and the associations between anhedonia, depressed mood, and momentary emotions. *Transcultural Psychiatry, 52*(5), 616–635.
- Chun, C. A., Barrantes-Vidal, N., Sheinbaum, T., & Kwapił, T. R. (2017). Expression of schizophrenia-spectrum personality traits in daily life. *Personality Disorders: Theory, Research, and Treatment, 8*(1), 64–74.

- Cicchetti, D. (2015). *Developmental psychopathology* (3rd ed.). New York, NY: Wiley.
- Claridge, G. (1972). The schizophrenias as nervous types. *British Journal of Psychiatry*, *121*(560), 1–17.
- Claridge, G. (1987). “The schizophrenias as nervous types” revisited. *British Journal of Psychiatry*, *151*(6), 735–743.
- Claridge, G. S. (1990). Can a disease model of schizophrenia survive? In R. P. Bentall (Ed.), *Reconstructing schizophrenia* (pp. 157–183). London, England: Routledge.
- Clark, R. (1985). *The parent-child early relational assessment*. Madison, WI: Department of Psychiatry, University of Wisconsin Medical School.
- Clark, R. (1999). The parent-child early relational assessment: a factorial validity study. *Educational and Psychological Measurement*, *59*(5), 821–846.
- Clark, D. A., & Inozu, M. (2014). Unwanted intrusive thoughts: cultural, contextual, covariational, and characterological determinants of diversity. *Journal of Obsessive-Compulsive and Related Disorders*, *3*(2), 195–204.
- Clark, R., Tluczek, A., & Gallager, K. C. (2004). Assessment of parent-child early relational disturbances. In R. DelCarmen-Wiggins, & A. Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (1st ed., pp. 25–60). New York, NY: Oxford University Press.
- Clarke, A. R., Tonge, B. J., Einfeld, S. L., & Mackinnon, A. (2003). Assessment of change with the Developmental Behavior Checklist. *Journal of Intellectual Disability Research*, *47*(3), 210–212.
- Colman, I., Murray, J., Abbott, R. A., Maughan, B., Kuh, D., Croudace, T. J., & Jones, P. B. (2009). Outcomes of conduct problems in adolescence: 40 year follow-up of national cohort. *British Medical Journal*, *338*, a2981.
- Colombetti, G. (2013). Psychopathology and the enactive mind. In W. Fulford, T. Thornton, & G. Graham (Eds.), *Oxford handbook of philosophy of psychiatry* (pp. 1083–1102). Oxford, England: Oxford University Press.
- Compas, B. E., Jaser, S. S., Dunbar, J. P., Watson, K. H., Bettis, A. H., Gruhn, M. A., & Williams, E. K. (2014). Coping and emotion regulation from childhood to early adulthood: points of convergence and divergence. *Australian Journal of Psychology*, *66*(2), 71–81.
- Conner, T. S., Tennen, H., Fleeson, W., & Barrett, L. F. (2009). Experience sampling methods: a modern idiographic approach to personality research. *Social and Personality Psychological Compass*, *3*(3), 292–313.
- Conway, C. C., Hammen, C., & Brennan, P. A. (2012). Expanding stress generation theory: test of a transdiagnostic model. *Journal of Abnormal Psychology*, *121*(3), 754–766.
- Cooper, S. A., Smiley, E., Morrison, J., Williamson, A., & Allan, L. (2007). Mental ill-health in adults with intellectual disabilities: prevalence and associated factors. *British Journal of Psychiatry*, *190*(1), 27–35.
- Crespi, B., & Badcock, C. (2008). Psychosis and autism as diametrical disorders of the social brain. *Behavioral and Brain Sciences*, *31*(3), 241–261.
- Cristóbal-Narváez, P., Sheinbaum, T., Ballepí, S., Mitjavila, M., Myin-Germeys, I., Kwapil, T. R., & Barrantes-Vidal, N. (2016). Impact of adverse childhood experiences on psychotic-like symptoms and stress reactivity in daily life in nonclinical young adults. *PLoS One*, *11*(4), e0153557.
- Crittenden, P. (2003). *Care Index for Infants and Toddlers—Coding manual*. Miami, FL: Family Relations Institute.
- Crowell, S. E., Baucom, B. R., Yaptangco, M., Bride, D., Hsiao, R., McCauley, E., & Beauchaine, T. P. (2014). Emotion dysregulation and dyadic conflict in depressed and typical adolescents: evaluating concordance across psychophysiological and observational measures. *Biological Psychology*, *98*, 50–58.
- Crowell, S. E., Beauchaine, T. P., & Linehan, M. M. (2009). A biosocial developmental model of borderline personality: elaborating and extending Linehan’s theory. *Psychological Bulletin*, *135*(3), 495–510.
- Daneluzzo, E., Stratta, P., Di Tommaso, S., Pacifico, R., Riccardi, I., & Rossi, A. (2009). Dimensional, non-taxonic latent structure of psychotic symptoms in a student sample. *Social Psychiatry and Psychiatric Epidemiology*, *44*(11), 911–916.
- David, A. S. (2010). Why we need more debate on whether psychotic symptoms lie on a continuum with normality. *Psychological Medicine*, *40*(12), 1935–1942.
- de Clercq, B., de Fruyt, F., & Mervielde, I. (2003). *Construction of the Dimensional Personality Symptom Item Pool (DIPSI)*. Ghent, Belgium: Ghent University.
- de Clercq, B., van Leeuwen, K., van den Noortgate, W., de Bolle, M., & de Fruyt, F. (2009). Childhood personality pathology: dimensional stability and change. *Development and Psychopathology*, *21*(3), 853–869.
- De Vries, M. (1992). *The experience of psychopathology: Investigating mental disorders in their natural settings*. Cambridge, NY: Cambridge University Press.
- Deb, S., Thomas, M., & Bright, C. (2001). Mental disorder in adults with intellectual disability. I: prevalence of functional psychiatric illness among a community-based population aged between 16 and 64 years. *Journal of Intellectual Disability Research, Mental Health and Intellectual Disability: IX*, *45*(6), 495–505.
- DeGangi, G. A., Breinbauer, C., Doussard-Roosevelt, J., Porges, S., & Greenspan, S. I. (2000). Prediction of childhood problems at three years in children experiencing disorders of regulation during infancy. *Infant Mental Health Journal*, *21*(3), 156–175.
- DeGangi, G., & Greenspan, S. I. (2001). Current status of assessment tools for social and emotional functioning. In S. I. Greenspan, G. DeGangi, & S. Wieder (Eds.), *The Functional Emotional Assessment Scale (FEAS) for infancy & early childhood: Clinical & Research Applications* (pp. 135–166). Bethesda, MD: Interdisciplinary Council on Developmental and Learning Disorders.
- DeGangi, G. A., Poisson, S., Sickel, R. Z., & Wiener, A. S. (1995). *The Infant-Toddler Symptom Checklist*. Tucson, AZ: Therapy Skill Builders.
- DeGangi, G. A., Porges, S. W., Sickel, R. Z., & Greenspan, S. I. (1993). Four-year follow-up of a sample of regulatory disorder infants. *Infant Mental Health Journal*, *14*(4), 330–343.
- DeGangi, G. A., Sickel, R. Z., Kaplan, E. P., & Wiener, A. S. (1997). Mother-infant interactions in infants with disorders of self-regulation. *Physical & Occupational Therapy in Pediatrics*, *17*(1), 17–44.
- DelCarmen-Wiggins, R., & Carter, A. S. (2001). Assessment of infant and toddler mental health: advances and challenges (introduction). *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(1), 8–10.

- Dere, J., Sun, J., Zhao, Y., Persson, T. J., Zhu, X., Yao, S., & Ryder, A. G. (2013). Beyond “somatization” and “psychologization”: symptom-level variation in depressed Han Chinese and Euro-Canadian outpatients. *Frontiers in Psychology, 4*(377), 1–13.
- DeRosse, P., Nitzburg, G. C., Kompancaril, B., & Malhotra, A. K. (2014). The relation between childhood maltreatment and psychosis in patients with schizophrenia and non-psychiatric controls. *Schizophrenia Research, 155*(1), 66–71.
- Devine, M., Taggart, L., & McLornian, P. (2010). Screening for mental health problems in adults with learning disabilities using the Mini PAS-ADD Interview. *British Journal of Learning Disabilities, 38*(4), 252–258.
- DeVos, G. (1985). Dimensions of the self in Japanese culture. In A. J. Marsella, G. DeVos, & F. L. K. Hsu (Eds.), *Culture and self: Asian and Western perspectives* (pp. 141–184). New York, NY: Tavistock.
- Diedrich, A., Grant, M., Hofmann, S. G., Hiller, W., & Berking, M. (2014). Self-compassion as an emotion regulation strategy in major depressive disorder. *Behaviour Research and Therapy, 58*, 43–51.
- Douglas, P., & Hill, P. (2011). Managing infants who cry excessively in the first few months of life. *British Medical Journal, 343*(7836), 1–6.
- Doussard-Roosevelt, J. A., Porges, S. W., & Portales, A. L. (1995). *Approach-Withdrawal Interaction Coding System (AWICS): A behavioral coding system with a physiological foundation*. Unpublished measure, University of Maryland, College Park.
- Dozier, M., Stevenson, A. L., Lee, S. W., & Velligan, D. I. (1991). Attachment organization and familiar overinvolvement for adults with serious psychopathological disorders. *Developmental Psychopathology, 3*(4), 475–489.
- Dozois, D. J. A., Seeds, P. M., & Collins, K. A. (2009). Transdiagnostic approaches to the prevention of depression and anxiety. *Journal of Cognitive Psychotherapy, 23*(1), 44–59.
- Drabick, D., & Gadow, K. (2012). Deconstructing oppositional defiant disorder: clinic-based evidence for an anger/irritability phenotype. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(4), 384–393.
- Drayton, M., Birchwood, M., & Trower, P. (1998). Early attachment experience and recovery from psychosis. *British Journal of Clinical Psychology, 37*(3), 269–284.
- Dudley, R., Kuyken, W., & Padesky, C. A. (2011). Disorder specific and trans-diagnostic case conceptualisation. *Clinical Psychology Review, 31*(2), 213–224.
- Dunst, C. J., Storck, A., & Snyder, D. (2006). Identification of infant and toddler social-emotional disorders using the DC: 0–3 diagnostic classification system. *Cornerstones, 2*(2), 1–21.
- Dvorak, R. D., Sargent, E. M., Kilwein, T. M., Stevenson, B. L., Kuvaas, N. J., & Williams, T. J. (2014). Alcohol use and alcohol-related consequences: associations with emotion regulation difficulties. *American Journal of Drug and Alcohol Abuse, 40*(2), 125–130.
- Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: a clinical review. *Clinical Psychology Review, 31*(2), 203–212.
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry, 47*(3–4), 313–337.
- Egger, H. L., & Emde, R. N. (2011). Developmentally sensitive diagnostic criteria for mental health disorders in early childhood: the *Diagnostic and Statistical Manual of Mental Disorders-IV*, the research diagnostic criteria–preschool age, and the diagnostic classification of mental health and developmental disorders of infancy and early childhood–revised. *American Psychologist, 66*(2), 95–106.
- Egger, H. L., Erkanli, A., Keeler, G., Potts, E., Walter, B. K., & Angold, A. (2006). Test-retest reliability of the Preschool Age Psychiatric Assessment (PAPA). *Journal of the American Academy of Child & Adolescent Psychiatry, 45*(5), 538–549.
- Ehring, T., Fischer, S., Schnulle, J., Bøsterling, A., & Tuschen-Caffier, B. (2008). Characteristics of emotion regulation in recovered depressed versus never depressed individuals. *Personality and Individual Differences, 44*(7), 1574–1584.
- Ehring, T., Tuschen-Caffier, B., Schnulle, J., Fischer, S., & Gross, J. J. (2010). Emotion regulation and vulnerability to depression: spontaneous versus instructed use of emotion suppression and reappraisal. *Emotion, 10*(4), 563–572.
- Einfeld, S., & Emerson, E. (2008). Intellectual disability. In M. Rutter, D. Bishop, D. Spine, S. Scott, J. Stevenson, E. Taylor, & A. Thapar (Eds.), *Rutter’s child and adolescent psychiatry* (pp. 820–840). Oxford, England: Blackwell.
- Einfeld, S. L., & Tonge, B. J. (1992). *Manual for the Developmental Behaviour Checklist (DBC) (Primary Carer Version)*. Melbourne, Australia: Monash University Centre for Developmental Psychiatry.
- Einstein, D. A., & Menzies, R. G. (2006). Magical thinking in obsessive-compulsive disorder, panic disorder and the general community. *Behavioural and Cognitive Psychotherapy, 34*(3), 351–357.
- Ellis, B. J., Boyce, W. T., Belsky, J., Bakermans-Kranenburg, M., & van Ijzendoorn, M. H. (2011). Differential susceptibility to the environment: an evolutionary-neurodevelopmental theory. *Development and Psychopathology, 23*(1), 7–28.
- Elis, O., Caponigro, J. M., & Kring, A. M. (2013). Psychosocial treatments for negative symptoms in schizophrenia: current practices and future directions. *Clinical Psychology Review, 33*(8), 914–928.
- Emde, R. N., & Wise, B. K. (2003). The cup is half full: initial clinical trials of DC:0–3 and a recommendation for a revision. *Infant Mental Health Journal, 24*, 437–446.
- Endicott, J., & Spitzer, R. L. (1978). A diagnostic interview: the schedule for affective disorders and schizophrenia. *Archives of General Psychiatry, 35*(7), 873–943.
- English, T., & John, O. P. (2013). Understanding the social effects of emotion regulation: the mediating role of authenticity for individual differences in suppression. *Emotion, 13*(2), 314–329.
- Eshbaugh, E., & Henninger, W. (2013). Potential mediators of the relationships between gender and death anxiety. *Individual Differences Research, 11*(1), 22–30.
- Eshun, S., & Gurung, A. R. (2009). Introduction to culture and psychopathology. In S. Eshun, & A. R. Gurung (Eds.), *Culture and mental health: Socio-cultural influences, theory, and practice* (pp. 1–17). Hoboken, NJ: Wiley.

- Fabrega, H., Jr. (1989). The self and schizophrenia: a cultural perspective. *Schizophrenia Bulletin*, 15(2), 277–290.
- Farmer, A. S., & Kashdan, T. (2014). Affective and self-esteem instability in the daily lives of people with generalized social anxiety disorder. *Clinical Psychological Science*, 2(2), 187–201.
- Fearon, P., Kirkbride, J. B., Morgan, C., Dazzan, P., Morgan, K., Lloyd, T., & Jones, P. B. (2006). Incidence of schizophrenia and other psychoses in ethnic minority groups: results from the MRC AESOP Study. *Psychological Medicine*, 36(11), 1541–1550.
- Fenson, L., Dale, P. S., Reznick, J. S., Thal, D., Bates, E., Hartung, J. P., & Reilly, J. S. (1993). *The MacArthur Communicative Development Inventories: User's Guide and Technical Manual*. San Diego, CA: Singular Publishing Group.
- Fergus, T. A., Bardeen, J. R., & Orcutt, H. K. (2013). Experiential avoidance and negative emotional experiences: the moderating role of expectancies about emotion regulation strategies. *Cognitive Therapy and Research*, 37(2), 352–362.
- Fisher, H. L., & Craig, T. (2008). Childhood adversity and psychosis. In C. Morgan, K. McKenzie, & P. Fearon (Eds.), *Society and psychosis* (pp. 95–111). Cambridge, NY: Cambridge University Press.
- Fisher, H. L., Jones, P. B., Fearon, P., Craig, T. K., Dazzan, P., Morgan, K., & Morgan, C. (2010). The varying impact of type, timing and frequency of exposure to childhood adversity on its association with adult psychotic disorder. *Psychological Medicine*, 40(12), 1967–1978.
- Fisher, H. L., Schreier, A., Zammit, S., Maughan, B., Munafò, M. R., Lewis, G., & Wolke, D. (2013). Pathways between childhood victimization and psychosis-like symptoms in the ALSPAC birth cohort. *Schizophrenia Bulletin*, 39(5), 1045–1055.
- Fleet, R. P., & Beitman, B. D. (1998). Cardiovascular death from panic disorder and panic-like anxiety: a critical review of the literature. *Journal of Psychosomatic Research*, 44(1), 71–80.
- Fleischer-Mann, J. (1995). Exploration of attachment-separation, fear of death and separation anxiety in agoraphobia. *Dissertation Abstracts International, Section B: The Sciences and Engineering*, 56, 2370.
- Foa, E. B., Steketee, G., & Young, M. C. (1984). Agoraphobia: phenomenological aspects, associated characteristics, and theoretical considerations. *Clinical Psychology Review*, 4(4), 431–457.
- Folk, J. B., Zeman, J. L., Poon, J. A., & Dallaire, D. H. (2014). A longitudinal examination of emotion regulation: pathways to anxiety and depressive symptoms in urban minority youth. *Child and Adolescent Mental Health*, 19(4), 243–250.
- Fossati, A., Feeney, J., Maffei, C., & Borroni, S. (2014). Thinking about feelings: affective state mentalization, attachment styles, and borderline personality disorder features among Italian nonclinical adolescents. *Psychoanalytic Psychology*, 31(1), 41–67.
- Fraley, R. C., Davis, K. E., & Shaver, P. R. (1998). Dismissing-avoidance and the defensive organization of emotion, cognition, and behavior. In J. A. Simpson, & W. A. Rholes (Eds.), *Attachment theory and close relationships* (pp. 249–279). New York, NY: Guilford Press.
- Freudenmann, R. W., & Schonfeldt-Lecuona, C. (2005). Das Syndrom der genitalen Retraktion aus Sicht der transkulturellen Psychiatrie: Chinesisches *Suo yang*, indonesisches *Koro* und nichtasiatische Formen (*Koro*-ähnliche Symptome) [The syndrome of genital retraction from a transcultural psychiatric point of view: Chinese *suo yang*, Indonesian *koro* and non-Asian forms (*koro*-like symptoms)]. *Der Nervenarzt*, 76(5), 569–580.
- Frick, P. J., & Viding, E. (2009). Antisocial behavior from a developmental psychopathology perspective. *Developmental Psychopathology*, 21(4), 1111–1131.
- Furr, R. M., & Bacharach, V. R. (2008). *Psychometrics: An introduction*. Thousand Oaks, CA: Sage.
- Fusar-Poli, P., Deste, G., Smieskova, R., Barlati, S., Yung, A. R., Howes, O., & Borgwardt, S. (2012). Cognitive functioning in prodromal psychosis: a meta-analysis. *Archives of General Psychiatry*, 69(6), 562–571.
- Gallagher, M. W., Naragon-Gainey, K., & Brown, T. A. (2014). Perceived control is a transdiagnostic predictor of cognitive-behavior therapy outcome for anxiety disorders. *Cognitive Therapy and Research*, 38(1), 10–22.
- Garber, J., Ciesla, J. A., McCauley, E., Diamond, G., & Schloedt, K. A. (2011). Remission of depression in parents: links to healthy functioning in their children. *Child Development*, 82(1), 226–243.
- Garber, J., & Cole, D. A. (2010). Intergenerational transmission of depression: a launch and grow model of change across adolescence. *Development and Psychopathology*, 22(4), 819–830.
- Garnefski, N., & Kraaij, V. (2007). The Cognitive Emotion Regulation Questionnaire: psychometric features and prospective relationships with depression and anxiety in adults. *European Journal of Psychological Assessment*, 23(3), 141–149.
- Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences*, 30(8), 1311–1327.
- Garnefski, N., Kraaij, V., & Spinhoven, P. (2002a). *Manual for the use of the Cognitive Emotion Regulation Questionnaire*. Leiderdorp, The Netherlands: DATEC.
- Garnefski, N., van den Kommer, T., Kraaij, V., Teerds, J., Legerstee, J., & Onstein, E. (2002b). The relationship between cognitive emotion regulation strategies and emotional problems. *European Journal of Personality*, 16(5), 403–420.
- Gilbert, P. (2009). *The compassionate mind*. London, England: Constable & Robinson.
- Gillberg, C. (1995). *Clinical child neuropsychiatry*. Cambridge, NY: Cambridge University Press.
- Gilliam, W. S., & Mayes, L. C. (2004). Integrating clinical and psychometric approaches: developmental assessment and the infant mental health evaluation. In R. DelCarmen-Wiggins, & A. Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (1st ed., pp. 185–203). New York, NY: Oxford University Press.
- Gillis, J. S., & Bernieri, F. J. (1993). Effects of depressed mood on social perception. *Perceptual and Motor Skills*, 76(2), 674.
- Glascoc, F. P. (2002). The Brigance Infant and Toddler Screen: standardization and validation. *Journal of Developmental and Behavioral Pediatrics*, 23(3), 145–150.
- Glaser, J. P., van Os, J., Portegijs, P. J., & Myin-Germeys, I. (2006). Childhood trauma and emotional reactivity to daily life stress in adult frequent attenders of general practitioners. *Journal of Psychosomatic Research*, 61(2), 229–236.

- Gold, J., & Gold, I. (2015). *Suspicious minds: How culture shapes madness*. New York, NY: Simon & Schuster.
- Gould, M. S., Velting, D., Kleinman, M., Lucas, C., Thomas, J. G., & Chung, M. (2004). Teenagers' attitudes about coping strategies and help-seeking behavior for suicidality. *Journal of the American Academy of Child & Adolescent Psychiatry*, 43(9), 1124–1133.
- Grafton, B., & MacLeod, C. (2014). Enhanced probing of attentional bias: the independence of anxiety-linked selectivity in attentional engagement with and disengagement from negative information. *Cognition and Emotion*, 28(7), 1287–1302.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54.
- Gratz, K. L., & Tull, M. T. (2010). The relationship between emotion dysregulation and deliberate self-harm among inpatients with substance use disorders. *Cognitive Therapy and Research*, 34(6), 544–553.
- Gray, K. M., & Tonge, B. J. (2005). Screening for autism in infants and preschool children with developmental delay. *Australian and New Zealand Journal of Psychiatry*, 39(5), 378–386.
- Gray, K. M., Tonge, B. J., Sweeney, D. J., & Einfeld, S. L. (2008). Screening for autism in young children with developmental delay: an evaluation of the Developmental Behaviour Checklist: Early Screen. *Journal of Autism and Developmental Disorders*, 38(6), 1003–1010.
- Green, M. F. (1996). What are the functional consequences of neurocognitive deficits in schizophrenia? *American Journal of Psychiatry*, 153(3), 321–330.
- Greenberg, J. (2012). Terror management theory: from genesis to revelations. In P. R. Shaver, & M. Mikulincer (Eds.), *Meaning, mortality, and choice: The social psychology of existential concerns* (pp. 17–35). Washington, DC: American Psychological Association.
- Greenspan, S. I. (1994). *Diagnostic Classification 0–3: Diagnostic classification of mental health and developmental disorders of infancy and early childhood*. Washington, DC: Zero to Three: National Center for Infants, Toddlers, and Families.
- Greenspan, S. I., & Wieder, S. (1997). Developmental patterns and outcomes in infants and children with disorders in relating and communicating: a chart review of 200 cases of children with autistic spectrum diagnoses. *Journal of Developmental and Learning Disorders*, 1, 87–141.
- Greenspan, S. I., & Wieder, S. (2001). Developmentally based diagnostic classification of emotional disorders in infancy and early childhood. In S. I. Greenspan, G. DeGangi, & S. Wieder (Eds.), *The functional emotional assessment scale (FEAS) for infancy & early childhood—clinical & research applications* (pp. 269–309). Bethesda, MD: Interdisciplinary Council on Developmental and Learning Disorders.
- Grof, S. (1987). Psychodynamic factors in depression and psychosis: observations from modern consciousness research. In D. M. Levin (Ed.), *Pathologies of the modern self* (pp. 439–478). New York, NY: New York University Press.
- Gross, J. J. (1998). Antecedent and response-focused emotion regulation: divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, 74(1), 224–237.
- Gross, J. J. (2001). Emotion regulation in adulthood: timing is everything. *Current Directions in Psychological Science*, 10(6), 214–219.
- Gross, J. J. (2015). Emotion regulation: current status and future prospects. *Psychological Inquiry*, 26(1), 1–26.
- Gross, J. J., & Munoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science and Practice*, 2(2), 151–164.
- Gross, J. J., Richards, J. M., & John, O. P. (2006). Emotion regulation in everyday life. In D. K. Snyder, J. A. Simpson, & J. N. Hughes (Eds.), *Emotion regulation in families: Pathways to dysfunction and health* (pp. 13–35). Washington, DC: American Psychological Association.
- Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 3–24). New York, NY: Guilford Press.
- Gruber, J., Kogan, A., Quoidbach, J., & Mauss, I. B. (2013). Happiness is best kept stable: positive emotion variability is associated with poorer psychological health. *Emotion*, 13(1), 1–6.
- Gumley, A. I., Taylor, H. E. F., Schwannauer, M., & MacBeth, A. (2013). A systematic review of attachment and psychosis: measurement, construct validity and outcomes. *Acta Psychiatrica Scandinavica*, 129(4), 257–274.
- Gustafsson, C., & Sonnander, K. (2002). Psychometric evaluation of a Swedish version of the Reiss Screen for Maladaptive Behavior. *Journal of Intellectual Disability Research*, 46(3), 218–229.
- Gyurak, A., Gross, J. J., & Etkin, A. (2011). Explicit and implicit emotion regulation: a dual-process framework. *Cognition and Emotion*, 25(3), 400–412.
- Habel, U., Gur, R. C., Mandal, M. K., Salloum, J. B., Gur, R. E., & Schneider, F. (2000). Emotional processing in schizophrenia across cultures: standardized measures of discrimination and experience. *Schizophrenia Research*, 42(1), 57–66.
- Hahn, R. A. (1995). *Sickness and healing: An anthropological perspective*. New Haven, CT: Yale University Press.
- Hakamata, Y., Lissek, S., Bar-Haim, Y., Britton, J. C., Fox, N. A., Leibenluft, E., & Pine, D. S. (2010). Attention bias modification treatment: a meta-analysis toward the establishment of novel treatment for anxiety. *Biological Psychiatry*, 68(11), 982–990.
- Halperin, J. M., Rucklidge, J. J., Powers, R. L., Miller, C. J., & Newcorn, J. H. (2011). Childhood CBCL bipolar profile and adolescent/young adult personality disorders: a 9-year follow-up. *Journal of Affective Disorders*, 130(1), 155–161.
- Han, S., Northoff, G., Vogeley, K., Wexler, B. E., Kitayama, S., & Varnum, M. E. (2013). A cultural neuroscience approach to the biosocial nature of the human brain. *Annual Review of Psychology*, 64, 335–359.
- Harvey, P. D., Helldin, L., Bowie, C. R., Heaton, R. K., Olsson, A. K., Hjärthag, F., & Patterson, T. L. (2009). Performance-based measurement of functional disability in schizophrenia: a cross-national study in the United States and Sweden. *American Journal of Psychiatry*, 166, 821–827.
- Harvey, A., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. Oxford, England: Oxford University Press.
- Hassim, J., & Wagner, C. (2013). Considering the cultural context in psychopathology formulations. *South African Journal of Psychiatry*, 19(1), 4–10.
- Hastings, R. P., Beck, A., Daley, D., & Hill, C. (2005). Symptoms of ADHD and their correlates in children with intellectual disabilities. *Research in Developmental Disabilities*, 26(5), 456–468.
- Hatton, C., & Taylor, J. L. (2008). Factor structure of the PAS-ADD Checklist with adults with intellectual disabilities. *Journal of Intellectual & Developmental Disability*, 33(4), 330–336.

- Havercamp, S. M., & Reiss, S. (1997). The Reiss Screen for Maladaptive Behavior: confirmatory factor analysis. *Behavior Research and Therapy*, 35(10), 967–971.
- Hayes, J., Schimel, J., Arndt, J., & Faucher, E. H. (2010). A theoretical and empirical review of the death-thought accessibility concept in terror management research. *Psychological Bulletin*, 136(5), 699–739.
- Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Thousand Oaks, CA: Sage.
- Hemmi, M. H., Wolke, D., & Schneider, S. (2011). Associations between problems with crying, sleeping and/or feeding in infancy and long-term behavioural outcomes in childhood: a meta-analysis. *Archives of Disease in Childhood*, 96(7), 622–629.
- Hiscock, H., Bayer, J. K., Price, A., Ukoumunne, O. C., Rogers, S., & Wake, M. (2008). Universal parenting programme to prevent early childhood behavioural problems: cluster randomised trial. *British Medical Journal*, 336(7639), 318–321.
- Hofmann, S. G., & Hinton, D. E. (2014). Cross-cultural aspects of anxiety disorders. *Current Psychiatry Reports*, 16(6), 1–5.
- Hofmann, S. G., Sawyer, A. T., Fang, A., & Asnaani, A. (2012). Emotion dysregulation model of mood and anxiety disorders. *Depression and Anxiety*, 29(5), 409–416.
- Hofstede, G., & Hofstede, G. J. (2005). *Culture and organizations. Intercultural cooperation and its importance for survival, software of the mind*. London, England: McGraw-Hill.
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd ed.). London, England: McGraw-Hill.
- Hollenstein, T., Lichtwarck-Aschoff, A., & Potworowski, G. (2013). A model of socioemotional flexibility at three time scales. *Emotion Review*, 5(4), 397–405.
- Holtmann, M., Becker, A., Banaschewski, T., Rothenberger, A., & Roessner, V. (2011a). Psychometric validity of the Strengths and Difficulties Questionnaire—dysregulation profile. *Psychopathology*, 44(1), 53–59.
- Holtmann, M., Buchmann, A. F., Esser, G., Schmidt, M. H., Banaschewski, T., & Laucht, M. (2011b). The Child Behavior Checklist—Dysregulation Profile predicts substance use, suicidality, and functional impairment: a longitudinal analysis. *Journal of Child Psychology and Psychiatry*, 52(2), 139–147.
- House, R. (1999). Limits to therapy and counselling: deconstructing a professional ideology. *British Journal of Guidance and Counselling*, 27(3), 377–392.
- Howarth-Williams, M. (1977). *R. D. Laing: His work and its relevance for sociology*. London, England: Routledge and Kegan Paul.
- Huffman, L. C., & Nichols, M. (2004). Early detection of young children's mental health problems in primary care settings. In R. DelCarmen-Wiggins, & A. Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (1st ed., pp. 467–489). New York, NY: Oxford University Press.
- Hyde, L. W. (2015). Developmental psychopathology in an era of molecular genetics and neuroimaging: a developmental neurogenetics approach. *Development and Psychopathology*, 27(2), 587–613.
- Hyde, L. W., Bogden, R., & Hariri, A. R. (2011). Understanding risk for psychopathology through imaging gene–environment interactions. *Trends in Cognitive Sciences*, 15(9), 417–427.
- Hyde, R., O'Callaghan, M., Bor, W., Williams, G., & Najman, J. (2012). Long-term outcomes of infant behavioral dysregulation. *Pediatrics*, 130(5), 1243–1251.
- Hyde, L. W., Tompson, S., Creswell, J. D., & Falk, E. B. (2015). Cultural neuroscience: new directions as the field matures. *Culture and Brain*, 3(2), 75–92.
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., & Wang, P. (2010). Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, 167(7), 748–751.
- Ishii, K., Kim, H. S., Sasaki, J. Y., Shinada, M., & Kusumi, I. (2014). Culture modulates sensitivity to the disappearance of facial expressions associated with serotonin transporter polymorphism (5-HTTLPR). *Culture and Brain*, 2(1), 72–88.
- Jablensky, A., Sartorius, N., Gulbinat, W., & Ernberg, G. (1981). Characteristics of depressive patients contacting psychiatric services in four cultures: a report from the WHO collaborative study on the assessment of depressive disorders. *Acta Psychiatrica Scandinavica*, 63(4), 367–383.
- Jaffee, S. R., Caspi, A., Moffitt, T. E., Polo-Tomas, M., Price, T. S., & Taylor, A. (2004). The limits of child effects: evidence for genetically mediated child effects on corporal punishment but not only physical maltreatment. *Developmental Psychology*, 40(6), 1047–1058.
- Janssen, I., Krabbendam, L., Hanssen, M., Bak, M., Vollebergh, W., de Graaf, R., & van Os, J. (2005). Are apparent associations between parental representations and psychosis risk mediated by early trauma? *Acta Psychiatrica Scandinavica*, 112(5), 372–375.
- Jenner, F. A., Monterio, A. C. D., Zagalo-Cardoso, J. A., & Cunha-Oliveira, J. A. (1993). *Schizophrenia: A disease or some ways of being human?* Sheffield, England: Sheffield Academic Press.
- Jermann, F., Van der Linden, M., d'Acremont, M., & Zermatten, A. (2006). Cognitive Emotion Regulation Questionnaire (CERQ): confirmatory factor analysis and psychometric properties of the French translation. *European Journal of Psychological Assessment*, 22(2), 126–131.
- Johnson, M. R., & Appleyard, K. (2010). Infant psychosocial disorder. In J. G. Bremner, & T. D. Wachs (Eds.), *The Wiley-Blackwell handbook of infant development* (pp. 280–307). (Vol. 2). Chichester, England: Wiley-Blackwell.
- Johnstone, E. C., Frith, C. D., Crow, T. J., Husband, J., & Kreef, L. (1976). Cerebral ventricular size and cognitive impairment in chronic schizophrenia. *Lancet*, 308(7992), 924–926.
- Jones, P. B., & Fung, W. L. A. (2005). Ethnicity and mental health: the example of schizophrenia in the African-Caribbean population in Europe. In M. Rutter, & M. Tienda (Eds.), *Ethnicity and causal mechanisms* (pp. 227–261). New York, NY: Cambridge University Press.
- Jung, C. G. (2014). *The psychogenesis of mental disease* (Vol. 3). London, England: Routledge (Original work published 1907).
- Kahn, R. S., & Keefe, R. S. (2013). Schizophrenia is a cognitive illness: time for a change in focus. *JAMA Psychiatry*, 70(10), 1107–1112.

- Kaminsky, L., Robertson, M., & Dewey, D. (2006). Psychological correlates of depression in children with recurrent abdominal pain. *Journal of Pediatric Psychology, 31*(9), 956–966.
- Karademas, E. C. (2007). Positive and negative aspects of well-being: common and specific predictors. *Personality and Individual Differences, 43*(2), 277–287.
- Karg, K., Burmeister, M., Shedden, K., & Sen, S. (2011). The serotonin transporter promoter variant (5-HTTLPR), stress, and depression meta-analysis revisited: evidence of genetic moderation. *Archives of General Psychiatry, 68*(5), 444–454.
- Karon, B. P., & VandenBos, G. (1996). *Psychotherapy of schizophrenia: The treatment of choice*. Lanham, MD: Rowman & Littlefield.
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review, 30*(4), 865–878.
- Kastenbaum, R. (2000). *The psychology of death* (3rd ed.). New York, NY: Springer.
- Kato, T. A., Shinfuku, N., Sartorius, N., & Kanba, S. (2011). Are Japan's *hikikomori* and depression in young people spreading abroad? *Lancet, 378*(9796), 1070.
- Kaufman, E. A., Cundiff, J. M., & Crowell, S. E. (2015a). The development, factor structure, and validation of the self-concept and identity measure (SCIM): a self-report assessment of clinical identity disturbance. *Journal of Psychopathology and Behavioral Assessment, 37*(1), 122–133.
- Kaufman, E. A., Xia, M., Fosco, G., Yaptangco, M., Skidmore, C. R., & Crowell, S. E. (2015b). The Difficulties in Emotion Regulation Scale Short Form (DERS-SF): validation and replication in adolescent and adult samples. *Journal of Psychopathology and Behavioral Assessment, 38*(3), 443–455.
- Kazdin, A. E., Matson, J. L., & Senatore, V. (1983). Assessment of depression in mentally retarded adults. *American Journal of Psychiatry, 140*(8), 1040–1043.
- Keefe, R. S., & Harvey, P. D. (2012). Cognitive impairment in schizophrenia. In M. A. Geyer, & G. Gross (Eds.), *Novel antischizophrenia treatments* (pp. 11–37). New York, NY: Springer.
- Keenan, K., Boeldt, D., Chen, D., Coyne, C., Donald, R., Duax, J., & Humphries, M. (2011). Predictive validity of *DSM-IV* oppositional defiant and conduct disorders in clinically referred preschoolers. *Journal of Child Psychology and Psychiatry, 52*(1), 47–55.
- Kelleher, I., & Cannon, M. (2011). Psychotic-like experiences in the general population: characterizing a high-risk group for psychosis. *Psychological Medicine, 41*(1), 1–6.
- Kelleher, I., Keeley, H., Corcoran, P., Ramsay, H., Wasserman, C., Carli, V., & Cannon, M. (2013). Childhood trauma and psychosis in a prospective cohort study: cause, effect, and directionality. *American Journal of Psychiatry, 170*(7), 734–741.
- Kendler, K. S., & Baker, J. H. (2007). Genetic influences on measures of the environment: a systematic review. *Psychological Medicine, 37*(5), 615–626.
- Kerekes, N., Brändström, S., Lundström, S., Rastam, M., Nilsson, T., & Anckarsäter, H. (2013). ADHD, autism spectrum disorder, temperament, and character: phenotypical associations and etiology in a Swedish childhood twin study. *Comprehensive Psychiatry, 54*(8), 1140–1147.
- Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Benjet, C. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *British Journal of Psychiatry, 197*(5), 378–385.
- Khurana, A., & Romer, D. (2012). Modeling the distinct pathways of influence of coping strategies on youth suicidal ideation: a national longitudinal study. *Prevention Science, 13*(6), 644–654.
- Kim, K., Hwu, H., Zhang, L. D., Lu, M. K., Park, K. K., Hwang, T. J., & Park, Y. C. (2001). Schizophrenic delusions in Seoul, Shanghai and Taipei: a transcultural study. *Journal of Korean Medical Science, 16*(1), 88–94.
- Kim, K. I., Li, D., Jiang, Z., Cui, X., Lin, L., Kang, J. J., & Kim, C. K. (1993). Schizophrenic delusions among Koreans, Korean-Chinese and Chinese: a transcultural study. *International Journal of Social Psychiatry, 39*(3), 190–199.
- Kim, H. S., & Sasaki, J. Y. (2014). Cultural neuroscience: biology of the mind in cultural contexts. *Annual Review of Psychology, 65*, 487–514.
- Kim, S., Yu, B. H., Lee, D. S., & Kim, J. -H. (2012). Ruminative response in clinical patients with major depressive disorder, bipolar disorder, and anxiety disorders. *Journal of Affective Disorders, 136*(1–2), 77–81.
- Kim-Cohen, J., Caspi, A., Moffitt, T. E., Harrington, H., Milne, B. J., & Poulton, R. (2003). Prior juvenile diagnoses in adults with mental disorder: developmental follow-back of a prospective-longitudinal cohort. *Archives of General Psychiatry, 60*(7), 709–717.
- Kirmayer, L. J. (1991). The place of culture in psychiatric nosology: *Taijin kyofusho* and *DSM-III-R*. *Journal of Nervous and Mental Disease, 179*(1), 19–28.
- Kirmayer, L. J. (2001). Cultural variations in the clinical presentation of depression and anxiety: implications for diagnosis and treatment. *Journal of Clinical Psychiatry, 62*(13), 22–28.
- Kirmayer, L. J. (2015). Re-visioning psychiatry: toward an ecology of mind in health and illness. In L. J. Kirmayer, R. Lemelson, & C. A. Cummings (Eds.), *Re-visioning psychiatry: Cultural phenomenology, critical neuroscience, and global mental health* (pp. 622–660). Cambridge, England: Cambridge University Press.
- Kirmayer, L. J., & Ban, L. (2013). Cultural psychiatry: research strategies and future directions. In R. D. Alarcón (Ed.), *Cultural psychiatry* (pp. 97–114). (Vol. 33). Basel, Switzerland: Karger.
- Kirmayer, L. J., & Groleau, D. (2001). Affective disorders in cultural context. *Cultural Psychiatry: International Perspectives, 24*(3), 465–478.
- Kirmayer, L. J., Guzder, J., & Rousseau, C. (2014). *Cultural consultation: Encountering the other in mental health care*. New York, NY: Springer.
- Kirmayer, L. J., & Ryder, A. G. (2016). Culture and psychopathology. *Current Opinion in Psychology, 8*, 143–148.
- Kirov, G., & Murray, R. M. (1999). Ethnic differences in the presentation of bipolar affective disorder. *European Psychiatry, 14*(4), 199–204.
- Kleinman, A. M., & Good, B. (1985). *Culture and depression*. Berkeley, CA: University of California Press.
- Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality, 74*(6), 1587–1617.
- Koelkebeck, K., Uwatoko, T., Tanaka, J., & Kret, M. E. (2016). How culture shapes social cognition deficits in mental disorders: a review. *Social Neuroscience, 1*–11.

- Kohrt, B. A., Worthman, C. M., Ressler, K. J., Mercer, K. B., Upadhaya, N., Koirala, S., & Binder, E. B. (2015). Cross-cultural gene–environment interactions in depression, post-traumatic stress disorder, and the cortisol awakening response: FKBP5 polymorphisms and childhood trauma in South Asia: G×E interactions in South Asia. *International Review of Psychiatry*, 27(3), 180–196.
- Kondo, N., Sakai, M., Kuroda, Y., Kiyota, Y., Kitabata, Y., & Kurosawa, M. (2013). General condition of *hikikomori* (prolonged social withdrawal) in Japan: psychiatric diagnosis and outcome in mental health welfare centres. *International Journal of Social Psychiatry*, 59(1), 79–86.
- Konstantareas, M. M., & Hewitt, T. (2001). Autistic disorder and schizophrenia diagnostic overlaps. *Journal of Autism and Developmental Disorders*, 31(1), 19–28.
- Koole, S. L., & Veenstra, L. (2015). Does emotion regulation occur only inside people’s heads? Toward a situated cognition analysis of emotion-regulatory dynamics. *Psychological Inquiry*, 26(1), 61–68.
- Korver-Nieberg, N., Berry, K., Meijer, C. J., & de Haan, L. (2014). Adult attachment and psychotic phenomenology in clinical and non-clinical samples: a systematic review. *Psychology and Psychotherapy: Theory, Research and Practice*, 87(2), 127–154.
- Kotov, R., Ruggero, C. J., Krueger, R. F., Watson, D., Yuan, Q., & Zimmerman, M. (2011). New dimensions in the quantitative classification of mental illness. *Archives of General Psychiatry*, 68(10), 1003–1011.
- Kouros, C. D., & Garber, J. J. (2010). Dynamic associations between maternal depressive symptoms and adolescents’ depressive and externalizing symptoms. *Journal of Abnormal Child Psychology*, 38(8), 1069–1081.
- Koval, P., Butler, E. A., Hollenstein, T., Lanteigne, D., & Kuppens, P. (2015). Emotion regulation and the temporal dynamics of emotions: effects of cognitive reappraisal and expressive suppression on emotional inertia. *Cognition and Emotion*, 29(5), 831–851.
- Koval, P., Kuppens, P., Allen, N. B., & Sheeber, L. B. (2012). Getting stuck in depression: the roles of rumination and emotional inertia. *Cognition and Emotion*, 26(8), 1412–1427.
- Kozłowski, A. M., Matson, J. L., Sipes, M., Hattier, M. A., & Bamburg, J. W. (2011). The relationship between psychopathology symptom clusters and the presence of comorbid psychopathology in individuals with severe to profound intellectual disability. *Research in Developmental Disabilities*, 32, 1610–1614.
- Kross, E., & Ayduk, O. (2011). Making meaning out of negative experiences by self-distancing. *Current Directions in Psychological Science*, 20(3), 187–191.
- Kruizinga, I., Jansen, W., Carter, A. S., & Raat, H. (2011). Evaluation of an early detection tool for social-emotional and behavioral problems in toddlers: the Brief Infant Toddler Social and Emotional Assessment—a cluster randomized trial. *BMC Public Health*, 11(1), 494.
- Kuo, J. R., Khoury, J. E., Metcalfe, R., Fitzpatrick, S., & Goodwill, A. (2015). An examination of the relationship between childhood emotional abuse and borderline personality disorder features: the role of difficulties with emotion regulation. *Child Abuse & Neglect*, 39, 147–155.
- Kuppens, P., Allen, N. B., & Sheeber, L. (2010a). Emotional inertia and psychological maladjustment. *Psychological Science*, 21(7), 984–991.
- Kuppens, P., Oravecz, Z., & Tuerlinckx, F. (2010b). Feelings change: accounting for individual differences in the temporal dynamics of affect. *Journal of Personality and Social Psychology*, 99(6), 1042–1060.
- Kuppens, P., Sheeber, L. B., Yap, M. B., Whittle, S., Simmons, J. G., & Allen, N. B. (2012). Emotional inertia prospectively predicts the onset of depressive disorder in adolescence. *Emotion*, 12(2), 283–289.
- Kwapil, T. R., & Barrantes-Vidal, N. (2015). Schizotypy: looking back and moving forward. *Schizophrenia Bulletin*, 41(2), 366–373.
- Kwapil, T. R., Gross, G. M., Silvia, P. J., & Barrantes-Vidal, N. (2013). Prediction of psychopathology and functional impairment by positive and negative schizotypy in the Chapmans’ ten-year longitudinal study. *Journal of Abnormal Psychology*, 122(3), 807–815.
- Lahey, B. B., Applegate, B., Hakes, J. K., Zald, D. H., Hariri, A. R., & Rathouz, P. J. (2012). Is there a general factor of prevalent psychopathology during adulthood? *Journal of Abnormal Psychology*, 121(4), 971–977.
- Laing, R. D. (1967). *The politics of experience*. New York, NY: Pantheon Books.
- Lardinois, M., Lataster, T., Mengelers, R., van Os, J., & Myin-Germeys, I. (2011). Childhood trauma and increased stress sensitivity in psychosis. *Acta Psychiatrica Scandinavica*, 123(1), 28–35.
- Larsson, H., Dilshad, R., Lichtenstein, P., & Barker, E. D. (2011). Developmental trajectories of *DSM-IV* symptoms of attention-deficit/hyperactivity disorder: genetic effects, family risk and associated psychopathology. *Journal of Child Psychology and Psychiatry*, 52(9), 954–963.
- Laurens, K. R., Hobbs, M. J., Sunderland, M., Green, M. J., & Mould, G. L. (2012). Psychotic-like experiences in a community sample of 8000 children aged 9 to 11 years: an item response theory analysis. *Psychological Medicine*, 42(7), 1495–1506.
- Lavender, J. M., & Anderson, D. A. (2010). Contribution of emotion regulation difficulties to disordered eating and body dissatisfaction in college men. *International Journal of Eating Disorders*, 43(4), 352–357.
- Lavender, J. M., Wonderlich, S. A., Peterson, C. B., Crosby, R. D., Engel, S. G., Mitchell, J. E., & Berg, K. C. (2014). Dimensions of emotion dysregulation in bulimia nervosa. *European Eating Disorders Review*, 22(3), 212–216.
- Lawrie, S. M., Hall, J., McIntosh, A. M., Owens, D. G., & Johnstone, E. C. (2010). The “continuum of psychosis”: scientifically unproven and clinically impractical. *British Journal of Psychiatry*, 197(6), 423–425.
- Lee, S. J., Lee, H. K., Kweon, Y. S., Lee, C. T., & Lee, K. U. (2010). Deficits in facial emotion recognition in schizophrenia: a replication study with Korean subjects. *Psychiatry Investigation*, 7(4), 291–297.
- Lenzenweger, M. F. (2010). *Schizotypy and schizophrenia: The view from experimental psychopathology*. New York, NY: Guilford Press.
- Lester, B. M. (1984). A biosocial model of infant crying. *Advances in Infancy Research*, 3, 167–212.
- Levin, D. M. (1987). *Pathologies of the modern self: Postmodern studies on narcissism, schizophrenia, and depression*. New York, NY: New York University Press.
- Lewis-Fernández, R., Aggarwal, N. K., Bäärnhielm, S., Rohlf, H., Kirmayer, L. J., Weiss, M. G., & Groen, S. (2014). Culture and psychiatric evaluation: operationalizing cultural formulation for *DSM-5*. *Psychiatry*, 77(2), 130–154.

- Lewis-Fernández, R., Aggarwal, N. K., Hinton, L., Hinton, D. E., & Kirmayer, L. J. (2015). *DSM-5 handbook on the Cultural Formulation Interview*. Arlington, VA: American Psychiatric Publishing.
- Leyro, T. M., Zvolensky, M. J., & Bernstein, A. (2010). Distress tolerance and psychopathological symptoms and disorders: a review of the empirical literature among adults. *Psychological Bulletin*, *136*(4), 576–600.
- Linaker, O. (1991). *DSM-III* diagnoses compared with factor structure of the Psychopathology Instrument for Mentally Retarded Adults (PIMRA), in an institutionalized, mostly severely retarded population. *Research in Developmental Disabilities*, *12*(2), 143–153.
- Linaker, O., & Helle, J. (1994). Validity of the schizophrenia diagnosis of the Psychopathology Instrument for Mentally Retarded Adults (PIMRA): a comparison of schizophrenic patients with and without mental retardation. *Research in Developmental Disabilities*, *15*(6), 473–486.
- Lo, A., & Abbott, M. J. (2013). Review of the theoretical, empirical, and clinical status of adaptive and maladaptive perfectionism. *Behaviour Change*, *30*(2), 96–116.
- Lobbestael, J., & Arntz, A. (2010). *The Interview for Traumatic Events in Childhood (ITEC-2), version 2*. Maastricht, The Netherlands: Maastricht University.
- Lobbestael, J., Arntz, A., Harkema-Schouten, P., & Bernstein, D. (2009). Development and psychometric evaluation of a new assessment method for childhood maltreatment experiences: the interview for traumatic events in childhood (ITEC). *Child Abuse & Neglect*, *33*(8), 505–517.
- López, S. R., & Guarnaccia, P. J. (2000). Cultural psychopathology: uncovering the social world of mental illness. *Annual Review of Psychology*, *51*(1), 571–598.
- Loth, A. K., Drabick, D. A. G., Leibenluft, E., & Hulvershorn, L. A. (2014). Do childhood externalizing disorders predict adult depression? A meta-analysis. *Journal of Abnormal Child Psychology*, *42*(7), 1103–1113.
- Luby, J. L., Heffelfinger, A. K., Mrakotsky, C., Brown, K. M., Hessler, M. J., Wallis, J. M., & Spitznagel, E. L. (2003). The clinical picture of depression in preschool children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(3), 340–348.
- Lukoff, D., & Everest, H. L. (1985). The myths in mental illness. *Journal of Transpersonal Psychology*, *17*(2), 123–153.
- Luo, S., & Han, S. (2014). The association between an oxytocin receptor gene polymorphism and cultural orientations. *Culture and Brain*, *2*(1), 89–107.
- Lysaker, P. H., Carcione, A., Dimaggio, G., Johannesen, J. K., Nicolo, G., Procacci, M., & Semerari, A. (2005). Metacognition amidst narratives of self and illness in schizophrenia: associations with insight, neurocognition, symptom and function. *Acta Psychiatrica Scandinavica*, *112*(1), 64–71.
- Mahoney, A. E. J., & McEvoy, P. M. (2012). A transdiagnostic examination of intolerance of uncertainty across anxiety and depressive disorders. *Cognitive Behavior Therapy*, *41*, 212–222.
- Main, M., & Solomon, J. (1986). Discovery of a new, insecure disorganized/disoriented attachment pattern. In T. B. Brazelton, & M. Yogman (Eds.), *Affective development in infancy* (pp. 95–124). Norwood, NJ: Ablex.
- Marks, I. (1987). *Fears, phobias, and rituals: Panic, anxiety, and their disorders*. New York, NY: Oxford University Press.
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253.
- Marsella, A. J. (1980). Depressive experience and disorder across cultures. In H. C. Triandis, & J. G. Draguns (Eds.), *Handbook of transcultural psychology* (pp. 233–262). Boston, MA: Allyn & Bacon.
- Marsella, A. J., & Yamada, A. M. (2007). Culture and psychopathology: foundations, issues, and directions. In S. Kitayama, & D. Cohen (Eds.), *Handbook of cultural psychology* (pp. 797–818). New York, NY: Guilford Press.
- Matheson, S. L., Shepherd, A. M., Pinchbeck, R. M., Laurens, K. R., & Carr, V. J. (2013). Childhood adversity in schizophrenia: a systematic meta-analysis. *Psychological Medicine*, *43*(2), 225–238.
- Matson, J. L. (1995). *The Diagnostic Assessment for the Severely Handicapped-II*. Baton Rouge, LA: Scientific Publishers.
- Matson, J. L., & Bamburg, J. W. (1998). Reliability of the assessment of dual diagnosis (ADD). *Research in Developmental Disabilities*, *19*(1), 89–95.
- Matson, J. L., Gardner, W. I., Coe, D. A., & Sovner, R. (1991). A scale for evaluating emotional disorders in severely and profoundly retarded persons: development of the Diagnostic Assessment for the Severely Handicapped (DASH-II). *Research in Developmental Disabilities*, *18*, 457–469.
- Matson, J. L., Kazdin, A. E., & Senatore, V. (1984). Psychometric properties of the Psychopathology Instrument for Mentally Retarded Adults. *Applied Research in Mental Retardation*, *5*, 881–889.
- Matsumoto, D., Yoo, S. H., & Nakagawa, S. (2008). Culture, emotion regulation, and adjustment. *Journal of Personality and Social Psychology*, *94*(6), 925–937.
- Maughan, B., & Rutter, M. (2008). Development and psychopathology: a life course perspective. In M. Rutter, D. V. M. Bishop, D. S. Pine, S. Scott, J. Stevenson, E. Taylor, & A. Thapar (Eds.), *Rutter's child and adolescent psychiatry* (5th ed., pp. 160–181). Oxford, England: Blackwell.
- McCabe, K. L., Maloney, E. A., Stain, H. J., Loughland, C. M., & Carr, V. J. (2012). Relationship between childhood adversity and clinical and cognitive features in schizophrenia. *Journal of Psychiatry Research*, *46*(5), 600–607.
- McCleery, A., Green, M. F., Hellemann, G. S., Baade, L. E., Gold, J. M., Keefe, R. S. E., & Ventura, J. (2015). Latent structure of cognition in schizophrenia: a confirmatory factor analysis of the MATRICS Consensus Cognitive Battery (MCCB). *Psychological Medicine*, *45*(12), 2657–2666.
- McEvoy, P. M., Watson, H., Watkins, E. R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders*, *151*(1), 313–320.
- McHugh, R. K., Reynolds, E. K., Leyro, T. M., & Otto, M. W. (2013). An examination of distress intolerance and emotion regulation with avoidance. *Cognitive Therapy and Research*, *37*, 363–367.
- McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research and Therapy*, *49*(3), 186–193.
- Meehl, P. E. (1962). Schizotaxia, schizotypy, schizophrenia. *American Psychologist*, *17*(12), 827–838.
- Meehl, P. E. (1989). Schizotaxia revisited. *Archives of General Psychiatry*, *46*(10), 935–944.

- Meins, E., Jones, S. R., Fernyhough, C., Hurndall, S., & Koronis, P. (2008). Attachment dimensions and schizotypy in a non-clinical sample. *Personality and Individual Differences, 44*, 1000–1011.
- Mennin, D. S., & Fresco, D. M. (2014). Emotion regulation therapy. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 469–490). New York, NY: Guilford Press.
- Mesquita, B., De Leersnyder, J., & Albert, D. (2014). The cultural regulation of emotions. In J. J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 284–304). New York, NY: Guilford Press.
- Mian, N. D., Wainwright, L., Briggs-Gowan, M. J., & Carter, A. S. (2011). An ecological risk model for early childhood anxiety: the importance of early child symptoms and temperament. *Journal of Abnormal Child Psychology, 39*(4), 501–512.
- Mickelson, K. D., Kessler, R. C., & Shaver, P. R. (1997). Adult attachment in a nationally representative sample. *Journal of Personality and Social Psychology, 73*(5), 1092–1106.
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. New York, NY: Guilford Press.
- Minnen, A., Savelsberg, P. M., & Hoogduin, K. (1994). A Dutch version of the Psychopathology Inventory for Mentally Retarded Adults (PIMRA). *Research in Developmental Disabilities, 15*, 269–278.
- Minsky, S., Vega, W., Miskimen, T., Gara, M., & Escobar, J. (2003). Diagnostic patterns in Latino, African American, and European American psychiatric patients. *Archives of General Psychiatry, 60*(6), 637–644.
- Mio, J. S., Barker-Hackett, L., & Tumaming, J. (2006). *Multicultural psychology: Understanding our diverse communities*. Boston, MA: McGraw-Hill.
- Miron, D., Lewis, M. L., & Zeanah, C. H. J. (2009). Clinical use of observational procedures in early childhood relationship assessment. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (pp. 252–265). (Vol. 1). London, England: Guilford Press.
- Mitchell, J. T., Robertson, C. D., Anastopolous, A. D., Nelson-Gray, R. O., & Kollins, S. H. (2012). Emotion dysregulation and emotional impulsivity among adults with attention-deficit/hyperactivity disorder: results of a preliminary study. *Journal of Psychopathology and Behavioral Assessment, 34*(4), 510–519.
- Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Developmental Psychopathology, 13*(2), 355–375.
- Morgan, C., Fisher, H., Hutchinson, G., Kirkbride, J., Craig, T. K., Morgan, K., & Murray, R. M. (2009). Ethnicity, social disadvantage and psychotic-like experiences in a healthy population based sample. *Acta Psychiatrica Scandinavica, 119*(3), 226–235.
- Morris, M. C., Ciesla, J. A., & Garber, J. (2010). A prospective study of stress autonomy versus stress sensitization in adolescents at varied risk for depression. *Journal of Abnormal Psychology, 119*(2), 341–354.
- Morrison, A. P. (2009). A cognitive behavioural perspective on the relationship between childhood trauma and psychosis. *Epidemiologia e Psichiatria Sociale, 18*(4), 294–298.
- Moss, S. (2002). *PAS-ADD schedules*. Brighton, England: Pavilion Publishers.
- Moss, S., Ibbotson, B., Prosser, H., Goldberg, D., Patel, P., & Simpson, N. (1997). Validity of the PAS-ADD for detecting psychiatric symptoms in adults with learning disability (mental retardation). *Social Psychiatry and Psychiatric Epidemiology, 32*(6), 344–354.
- Moss, S. C., Prosser, H., Costello, H., Simpson, N., & Patel, P. (1996). *The PAS-ADD Checklist*. Manchester, England: Hester Adrian Research Centre, University of Manchester.
- Moss, S., Prosser, H., Costello, H., Simpson, N., Patel, P., Rowe, S., & Hatton, C. (1998). Reliability and validity of the PAS-ADD Checklist for detecting psychiatric disorders in adults with intellectual disability. *Journal of Intellectual Disability Research, 42*(2), 173–183.
- Mouton-Simien, P., McCain, A. P., & Kelley, M. L. (1997). The development of the toddler behavior screening inventory. *Journal of Abnormal Child Psychology, 25*(1), 59–64.
- Muenzenmaier, K. H., Seixas, A. A., Schneeberger, A. R., Castille, D. M., Battaglia, J., & Link, B. G. (2015). Cumulative effects of stressful childhood experiences on delusions and hallucinations. *Journal of Trauma & Dissociation, 16*(4), 442–462.
- Myin-Germeys, I., & van Os, J. (2007). Stress-reactivity in psychosis: evidence for an affective pathway to psychosis. *Clinical Psychology Review, 27*(4), 409–424.
- Ndetei, D. M., & Vadher, A. (1984). A comparative cross-cultural study of the frequencies of hallucination in schizophrenia. *Acta Psychiatrica Scandinavica, 70*(6), 545–549.
- Neacsiu, A. D., Bohus, M., & Linehan, M. M. (2013). Dialectical behavior therapy skills: an intervention for emotion dysregulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 491–508). (Vol. 2). New York, NY: Guilford Press.
- Neff, K. D. (2003a). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–101.
- Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.
- Neff, K. D., Kirkpatrick, K., & Rude, S. S. (2007). Self-compassion and its link to adaptive psychological functioning. *Journal of Research in Personality, 41*, 139–154.
- Neff, K. D., & Pommier, E. (2013). The relationship between self-compassion and other-focused concern among college undergraduates, community adults, and practicing meditators. *Self and Identity, 12*(2), 160–176.
- Nigg, J. T., & Casey, B. J. (2005). An integrative theory of attention-deficit/hyperactivity disorder based on the cognitive and affective neurosciences. *Developmental Psychopathology, 17*(3), 785–806.
- Nixon, M. (2011). *Samuel Beckett's German Diaries: 1936–1937*. London, England: Bloomsbury Academic.
- Norris, M., & Lecavalier, L. (2011). Evaluating the validity of the Nisonger Child Behavior Rating Form–Parent Version. *Research in Developmental Disabilities, 32*(6), 2894–2900.
- Nuechterlein, K. H., Barch, D. M., Gold, J. M., Goldberg, T. E., Green, M. F., & Heaton, R. K. (2004). Identification of separable cognitive factors in schizophrenia. *Schizophrenia Research, 72*(1), 29–39.

- Nuechterlein, K. H., Green, M. F., Kern, R. S., Baade, L. E., Barch, D. M., Cohen, J. D., & Goldberg, T. (2008). The MATRICS Consensus Cognitive Battery, part 1: test selection, reliability, and validity. *American Journal of Psychiatry*, *165*(2), 203–213.
- Olds, D. L., Sadler, L., & Kitzman, H. (2007). Programs for parents of infants and toddlers: recent evidence from randomized trials. *Journal of Child Psychology and Psychiatry*, *48*(3–4), 355–391.
- Oltmanns, T. F., & Emery, R. E. (2012). *Abnormal psychology*. Upper Saddle River, NJ: Pearson Education.
- Omata, W. (1985). Schizoaffektive Psychosen in Deutschland und in Japan—Eine transkulturell-psychiatrische Studie [Schizoaffektive psychosen in Germany and Japan—a trans-cultural psychiatric study]. *Fortschritte der Neurologie–Psychiatrie*, *53*(5), 168–176.
- Pajulo, M., Pyykkonen, N., Kalland, M., Sinkkonen, J., Helenius, H., Punamaki, R., & Suchman, N. (2012). Substance-abusing mothers in residential treatment with their babies: importance of pre- and postnatal maternal reflective functioning. *Infant Mental Health Journal*, *33*(1), 70–81.
- Parkinson, B., & Totterdell, P. (1999). Classifying affect-regulation strategies. *Cognition and Emotion*, *13*(3), 277–303.
- Perris, C., Eisemann, M., Eriksson, U., Perris, H., Kemali, D., Amati, A., & Vacca, L. (1981). Transcultural aspects of depressive symptomatology. *Psychiatria Clinica*, *14*(2), 69–80.
- Pinkham, A. E., Sasson, N. J., Calkins, M. E., Richard, J., Hughett, P., Gur, R. E., & Gur, R. C. (2008). The other-race effect in face processing among African American and Caucasian individuals with schizophrenia. *American Journal of Psychiatry*, *165*(5), 639–645.
- Plomin, R., & Bergeman, C. S. (1991). The nature of nurture: genetic influence on “environmental” measures. *Behavioral and Brain Sciences*, *14*(3), 373–386.
- Plomin, R., & Rutter, M. (1998). Child development, molecular genetics, and what to do with genes once they are found. *Child Development*, *69*(4), 1223–1242.
- Pollack, L. O., & Forbush, K. T. (2013). Why do eating disorders and obsessive–compulsive disorder co-occur? *Eating Behaviors*, *14*(2), 211–215.
- Pollak, S. D. (2015). Developmental psychopathology: recent advances and future challenges. *World Psychiatry*, *14*(3), 262–269.
- Pollock, J., & Horrocks, S. (2009). Monitoring change in families receiving primary mental health specialist services: a pragmatic evaluation within an existing service for the under-fives. *Child and Adolescent Mental Health*, *15*(2), 120–124.
- Postert, C., Averbek-Holocher, M., Beyer, T., Muller, J., & Furniss, T. (2009). Five systems of psychiatric classification for preschool children: do differences in validity, usefulness and reliability make for competitive or complimentary constellations? *Child Psychiatry and Human Development*, *40*(1), 25–41.
- Potthoff, S., Garnefski, N., Miklósi, M., Ubbiali, A., Domínguez-Sánchez, F. J., Martins, E. C., & Kraaij, V. (2016). Cognitive emotion regulation and psychopathology across cultures: a comparison between six European countries. *Personality and Individual Differences*, *98*, 218–224.
- Poulton, R., Caspi, A., Moffitt, T. E., Cannon, M., Murray, R., & Harrington, H. (2000). Children’s self-reported psychotic symptoms and adult schizophreniform disorder: a 15-year longitudinal study. *Archives of General Psychiatry*, *57*(11), 1053–1058.
- Preti, A., Cella, M., Raballo, A., & Vellante, M. (2012). Psychotic-like or unusual subjective experiences? The role of certainty in the appraisal of the subclinical psychotic phenotype. *Psychiatry Research*, *200*(2–3), 669–673.
- Preti, A., Corrias, I., Gabbriellini, M., Lai, V., Muratore, T., Pintus, E., & Vellante, M. (2015). The independence of schizotypy from affective temperaments: a combined confirmatory factor analysis of SPQ and the short TEMPS-A. *Psychiatry Research*, *225*(1), 145–156.
- Racine, S. E., & Wildes, J. E. (2013). Emotion dysregulation and symptoms of anorexia nervosa: the unique roles of lack of emotional awareness and impulse control difficulties when upset. *International Journal of Eating Disorders*, *46*(7), 713–720.
- Raghavan, R. (2004). Learning disability and mental health: reflections and future trends. *Journal of Learning Disabilities*, *8*(1), 5–11.
- Raine, A. (1991). The SPQ: a scale for the assessment of schizotypal personality based on DSM-III-R criteria. *Schizophrenia Bulletin*, *17*(4), 555–564.
- Read, J. (2013). Childhood adversity and psychosis: from heresy to certainty. In J. Read, & J. Dillon (Eds.), *Models of madness: Psychological, social and biological approaches to psychosis* (2nd ed., pp. 249–275). London, England: Routledge.
- Read, J., Fink, P., Rudegeair, T., Felitti, V., & Whitfield, C. (2008). Child maltreatment and psychosis: a return to a genuinely integrated bio-psycho-social model. *Clinical Schizophrenia & Related Psychoses*, *2*(3), 235–254.
- Read, J., & Gumley, A. (2008). Can attachment theory help explain the relationship between childhood adversity and psychosis? *Attachment: New Directions in Psychotherapy and Relational Psychoanalysis*, *2*, 1–35.
- Read, J., Perry, B. D., Moskowitz, A., & Connolly, J. (2001). The contribution of early traumatic events to schizophrenia in some patients: a traumagenic neurodevelopmental model. *Psychiatry*, *64*(4), 319–345.
- Read, J., & Sanders, P. (2010). *A straight talking introduction to the causes of mental health problems*. Ross-on-Wye, England: PCCS Books.
- Read, J., van Os, J., Morrison, A. P., & Ross, C. A. (2005). Childhood trauma, psychosis and schizophrenia: a literature review with theoretical and clinical implications. *Acta Psychiatrica Scandinavica*, *112*(5), 330–350.
- Reid, S. (1997). *Developments in infant observation: The Tavistock model*. London, England: Routledge.
- Reininghaus, U., Kempton, M. J., Valmaggia, L., Craig, T. K., Garety, P., Onyejiaka, A., & Dazzan, P. (2016). Stress sensitivity, aberrant salience, and threat anticipation in early psychosis: an experience sampling study. *Schizophrenia Bulletin*, *42*(3), 712–722.
- Reininghaus, U., Priebe, S., & Bentall, R. P. (2013). Testing the psychopathology of psychosis: evidence for a general psychosis dimension. *Schizophrenia Bulletin*, *39*(4), 884–895.
- Reiss, S. (1988). *Reiss Screen for Maladaptive Behavior Test Manual*. Worthington, OH: IDS Publishing.
- Reiss, S., & Valenti-Hein, D. (1994). Development of a psychopathology rating scale for children with mental retardation. *Journal of Consulting and Clinical Psychology*, *62*, 28–33.
- Robins, E., & Guze, S. B. (1970). Establishment of diagnostic validity in psychiatric illness: its application to schizophrenia. *American Journal of Psychiatry*, *126*(7), 983–987.

- Roseblum, K. L., Dayton, C. J., & Muzik, M. (2009). Infant social and emotional development: emerging competence in a relational context. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (pp. 80–103). (Vol. 1). New York, NY: Guilford Press.
- Rosenberg, M. (1984). A symbolic interactionist view of psychosis. *Journal of Health and Social Behavior*, 25(3), 289–302.
- Routledge, C. (2012). Failure causes fear: the effect of self-esteem threat on death-anxiety. *Journal of Social Psychology*, 152(6), 665–669.
- Ruby, E., Polito, S., McMahon, K., Gorovitz, M., Corcoran, C., & Malaspina, D. (2014). Pathways associating childhood trauma to the neurobiology of schizophrenia. *Frontiers in Psychological and Behavioral Science*, 3(1), 1–17.
- Russell, O. (1997). The diagnosis of psychiatric disorder. In O. Russell (Ed.), *Seminars in the psychiatry of learning disabilities* (pp. 48–62). Gaskell, London: Royal College of Psychiatrists.
- Rutter, M. (1993). Resilience: some conceptual considerations. *Journal of Adolescent Health*, 14(8), 626–631.
- Rutter, M. (2007). Proceeding from observed correlation to causal inference: the use of natural experiments. *Perspectives on Psychological Science*, 2(4), 377–395.
- Rutter, M. (2012a). “Natural experiments” as a means of testing causal inferences. In C. Berzuini, P. Dawid, & L. Bernardinelli (Eds.), *Causality: Statistical perspectives and applications* (pp. 253–272). Chichester, England: Wiley.
- Rutter, M. (2012b). Gene-environment interdependence. *European Journal of Developmental Psychology*, 9(4), 391–412.
- Rutter, M. (2013). Developmental psychopathology: a paradigm shift or just a relabeling? *Development and Psychopathology*, 25(4), 1201–1213.
- Rutter, M., Kim-Cohen, J., & Maughan, B. (2006). Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry*, 47(3–4), 276–295.
- Rutter, M., Kreppner, J., & Sonuga-Barke, E. (2009). Emanuel Miller lecture: attachment insecurity, disinhibited attachment, and attachment disorders: where do research findings leave the concepts? *Journal of Child Psychology and Psychiatry*, 50(5), 529–543.
- Ryder, A. G., & Chentsova-Dutton, Y. E. (2015). Cultural-clinical psychology: from cultural scripts to contextualized treatments. In L. J. Kirmayer, R. Lemelson, & C. A. Cummings (Eds.), *Re-visioning psychiatry: Cultural phenomenology, critical neuroscience, and global mental health* (pp. 400–433). Cambridge, England: Cambridge University Press.
- Salters-Pedneault, K., Roemer, L., Tull, M. T., Rucker, L., & Mennin, D. S. (2006). Evidence of broad deficits in emotion regulation associated with chronic worry and generalized anxiety disorder. *Cognitive Therapy and Research*, 30, 469–480.
- Sandstrom, M. J. (2004). Pitfalls of the peer world: how children cope with common rejection experiences. *Journal of Abnormal Child Psychology*, 32(1), 67–81.
- Sannella, L. (1992). *The kundalini experience: Psychosis or transcendence?* Lower Lake, CA: Integral Publishing.
- Sass, L. A. (1997). The consciousness machine: self and subjectivity and schizophrenia and modern culture. In U. Neisser, & D. A. Jopling (Eds.), *The conceptual self in context: Culture, experience, self-understanding* (pp. 203–230). Cambridge, England: Cambridge University Press.
- Sassaroli, S., Lauro, L. J. R., Ruggiero, G. M., Mauri, M. C., Vinai, P., & Frost, R. (2008). Perfectionism in depression, obsessive-compulsive disorder and eating disorders. *Behaviour Research and Therapy*, 46, 757–765.
- Sauer, S., & Baer, R. A. (2010). Mindfulness and decentering as mechanisms of change in mindfulness- and acceptance-based interventions. In R. Baer (Ed.), *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change* (pp. 25–50). Oakland, CA: New Harbinger Press.
- Schafer, I., & Fisher, H. L. (2011). Childhood trauma and psychosis: what is the evidence? *Dialogues in Clinical Neuroscience*, 13(3), 360–365.
- Schalock, R. L., Luckasson, R. A., Shogren, K. A., Borthwick-Duffy, S., Bradley, V., Buntinx, W. H., & Yeager, M. H. (2007). The renaming of *mental retardation*: understanding the change to the term *intellectual disability*. *Intellectual and Developmental Disabilities*, 45(2), 116–124.
- Scheeringa, M. S., & Zeanah, C. H., Jr. (2008). Reconsideration of harm’s way: onsets and comorbidity patterns in preschool children and their caregivers following Hurricane Katrina. *Journal of Clinical Child and Adolescent Psychology*, 37, 508–518.
- Schmid, G., Schreier, A., Meyer, R., & Wolke, D. (2010). A prospective study on the persistence of infant crying, sleeping and feeding problems and preschool behaviour. *Acta Paediatrica*, 99(2), 286–290.
- Schneirla, T. C. (1957). An evolutionary and developmental theory of biphasic processes underlying approach and withdrawal. In M. R. Jones (Ed.), *Nebraska symposium on motivation* (pp. 1–42). Lincoln, NE: University of Nebraska Press.
- Schroevens, M., Kraaij, V., & Garnefski, N. (2007). Goal disturbance, cognitive coping strategies, and psychological adjustment to different types of stressful life event. *Personality and Individual Differences*, 43, 413–423.
- Semerari, A., Cucchi, M., Dimaggio, G., Cavadini, D., Carcione, A., Battelli, V., & Smeraldi, E. (2012). The development of the Metacognition Assessment Interview: instrument description, factor structure and reliability in a non-clinical sample. *Psychiatry Research*, 200(2–3), 890–895.
- Senatore, V., Matson, J. L., & Kazdin, A. E. (1985). An inventory to assess psychopathology in mentally retarded adults. *American Journal on Mental Retardation*, 89(5), 459–466.
- Sheinbaum, T., & Barrantes-Vidal, N. (2015). Mechanisms mediating the pathway from environmental adversity to psychosis proneness. In O. Mason, & G. Claridge (Eds.), *Schizotypy: New dimensions* (pp. 116–131). New York, NY: Routledge.
- Sheinbaum, T., Bifulco, A., Ballester, S., Mitjavila, M., Kwapiil, T. R., & Barrantes-Vidal, N. (2015). Interview investigation of insecure attachment styles as mediators between poor childhood care and schizophrenia-spectrum phenomenology. *PLoS One*, 10(8), e0135150.
- Sheppes, G., & Gross, J. J. (2011). Is timing everything? Temporal considerations in emotion regulation. *Personality and Social Psychology Review*, 15(4), 319–331.
- Sheppes, G., Suri, G., & Gross, J. J. (2015). Emotion regulation and psychopathology. *Annual Review of Clinical Psychology*, 11, 379–405.
- Shevlin, M., Houston, J. E., Dorahy, M. J., & Adamson, G. (2008). Cumulative traumas and psychosis: an analysis of the national comorbidity survey and the British Psychiatric Morbidity Survey. *Schizophrenia Bulletin*, 34(1), 193–199.
- Shevlin, M., McElroy, E., Bentall, R. P., Reininghaus, U., & Murphy, J. (2017). The psychosis continuum: testing a bifactor model of psychosis in a general population sample. *Schizophrenia Bulletin*, 43(1), 133–141.

- Shiota, M. (2006). Silver linings and candles in the dark: differences among positive coping strategies in predicting subjective well-being. *Emotion, 6*(2), 335–339.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: new procedures and recommendations. *Psychological Methods, 7*(4), 422–445.
- Sidor, A., Kunz, E., Schweyer, D., Eickhorst, A., & Cierpka, M. (2011). Links between maternal postpartum depressive symptoms, maternal distress, infant gender and sensitivity in a high-risk population. *Child and Adolescent Psychiatry and Mental Health, 5*(7), .
- Siegel, D. J. (2012). *The developing mind: How relationships and the brain interact to shape who we are* (2nd ed.). New York, NY: Guilford Press.
- Siegenthaler, E., Munder, T., & Egger, M. (2012). Effect of preventive interventions in mentally ill parents on the mental health of the offspring: systematic review and meta-analysis. *Journal of the American Academy of Child & Adolescent Psychiatry, 51*(1), 8–17.
- Siebert, R. J. (2001). Culture, cognition, and schizophrenia. In J. S. Schumaker, & T. Ward (Eds.), *Cultural cognition and psychopathology* (pp. 171–189). Westport, CT: Praeger.
- Silberg, J. L., Maes, H., & Eaves, L. J. (2012). Unraveling the effect of genes and environment in the transmission of parental antisocial behavior to children's conduct disturbance, depression and hyperactivity. *Journal of Child Psychology and Psychiatry, 53*(6), 668–677.
- Singh, S. P., Harley, K., & Suhail, K. (2013). Cultural specificity of emotional overinvolvement: a systematic review. *Schizophrenia Bulletin, 39*(2), 449–463.
- Skovgaard, A. M., Houmann, T., Christiansen, E., Landorph, S., Jorgensen, T., Olsen, E. M., & Lichtenberg, A. (2007). The prevalence of mental health problems in children 1½ years of age—the Copenhagen Child Cohort 2000. *Journal of Child Psychology and Psychiatry, 48*(1), 62–70.
- Skovgaard, A. M., Olsen, E. M., Christiansen, E., Houmann, T., Landorph, S. L., & Jorgensen, T. (2008). Predictors (0–10 months) of psychopathology at age 1½ years—a general population study in the Copenhagen Child Cohort CCC 2000. *Journal of Child Psychology and Psychiatry, 49*(5), 553–562.
- Smith, R. (2010). It's nothing: Beckett and anxiety. In D. Caselli (Ed.), *Beckett and nothing: Trying to understand Beckett* (pp. 192–212). Manchester, England: Manchester University Press.
- Solesvik, M., Joa, I., Larsen, T. K., Langeveld, J., Johannessen, J. O., Bjørnstad, J., & Bronnick, K. (2016). Visual hallucinations in first-episode psychosis: association with childhood trauma. *PLoS One, 11*(5), e0153458.
- Soto, J. A., Perez, C. R., Kim, Y. H., Lee, E. A., & Minnick, M. R. (2011). Is expressive suppression always associated with poorer psychological functioning? A cross-cultural comparison between European Americans and Hong Kong Chinese. *Emotion, 11*(6), 1450–1455.
- Speltz, M. L., McClellan, J., DeKlyen, M., & Jones, K. (1999). Preschool boys with oppositional defiant disorder: clinical presentation and diagnostic change. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(7), 838–845.
- Squires, J., Bricker, D., & Twombly, E. (2002). *Ages & Stages Questionnaires: Social-Emotional. A parent-completed, child-monitoring system for social-emotional behaviors*. Baltimore, MD: Paul H. Brookes.
- Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, W. A. (2005). *The development of the person: The Minnesota Study of Risk and Adaptation from Birth to Adulthood*. New York, NY: Guilford Press.
- St Clare, T., Menzies, R. G., & Jones, M. K. (2008). *Danger Ideation Reduction Therapy (DIRT) for obsessive-compulsive washers: A comprehensive guide to treatment*. Bowen Hills, Australia: Australian Academic Press.
- Stewart, S. M., Betson, C., Lam, T. H., Marshall, I. B., Lee, P. W. H., & Wong, C. M. (1997). Predicting stress in first year medical students: a longitudinal study. *Medical Education, 31*(3), 163–168.
- Stip, E., & Letourneau, G. (2009). Psychotic symptoms as a continuum between normality and pathology. *Canadian Journal of Psychiatry, 54*(3), 140–151.
- Stompe, T., Friedman, A., Ortwein, G., Strobl, R., Chaudhry, H. R., Najam, N., & Chaudhry, M. R. (1999). Comparison of delusions among schizophrenics in Austria and in Pakistan. *Psychopathology, 32*(5), 225–234.
- Stringaris, A., & Goodman, R. (2009). Longitudinal outcome of youth oppositionality: irritable, headstrong, and hurtful behaviors have distinctive predictions. *Journal of the American Academy of Child & Adolescent Psychiatry, 48*(4), 404–412.
- Sturme, P., & Ley, T. (1990). The psychopathology instrument for mentally retarded adults: internal consistencies and relationship to behaviour problems. *British Journal of Psychiatry, 156*(3), 428–430.
- Suls, J., Green, P., & Hillis, S. (1998). Emotional reactivity to everyday problems, affective inertia, and neuroticism. *Personality and Social Psychology Bulletin, 24*(2), 127–136.
- Sumathipala, A., Siribaddana, S. H., & Bhugra, D. (2004). Culture-bound syndromes: the story of Dhat syndrome. *British Journal of Psychiatry, 184*(3), 200–209.
- Suzuki, K., Takei, N., Kawai, M., Minabe, Y., & Mori, N. (2003). Is *taijin kyofusho* a culture-bound syndrome? *American Journal of Psychiatry, 160*(7), 1358.
- Svanberg, P. O., Mennet, L., & Spieker, S. (2010). Promoting a secure attachment: a primary prevention practice model. *Clinical Child Psychology and Psychiatry, 15*(3), 363–378.
- Taffe, J. R., Gray, K. M., Einfeld, S. L., Dekker, M. C., Koot, H. M., Emerson, E., & Tonge, B. J. (2007). Short form of the Developmental Behaviour Checklist. *American Journal on Mental Retardation, 112*(1), 31–39.
- Tanaka-Matsumi, J., & Draguns, J. G. (1997). Culture and psychopathology. In J. Berry, M. H. Segall, & C. Kagitcibasi (Eds.), *Handbook of cross-cultural psychology* (pp. 449–491). (Vol. 3). Boston, MA: Allyn & Bacon.
- Task Force on Research Diagnostic Criteria: Infancy and Preschool. (2003). Research diagnostic criteria for infants and preschool children: the process and empirical support. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(12), 1504–1512.
- Tassé, M. J., Aman, M. G., Hammer, D., & Rojahn, J. (1996). The Nisonger Child Behavior Rating Form: age and gender effects and norms. *Research in Developmental Disabilities, 17*(1), 59–75.

- Tateyama, M., Asai, M., Hashimoto, M., Bartels, M., & Kasper, S. (1998). Transcultural study of schizophrenic delusions. Tokyo versus Vienna and Tuebingen (Germany). *Psychopathology*, *31*(2), 59–68.
- Tateyama, M., Asai, M., Kamisada, M., Hashimoto, M., Bartels, M., & Heimann, H. (1993). Comparison of schizophrenic delusions between Japan and Germany. *Psychopathology*, *26*(3–4), 151–158.
- Taylor, S. E., & Stanton, A. L. (2007). Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology*, *3*(1), 377–401.
- Teo, A. R., & Gaw, A. C. (2010). *Hikikomori*, a Japanese culture-bound syndrome of social withdrawal? A proposal for *DSM-5*. *Journal of Nervous and Mental Disease*, *198*(6), 444–449.
- Thapar, A., Harrington, R., Ross, K., & McGuffin, P. (2000). Does the definition of ADHD affect heritability? *Journal of the American Academy of Child & Adolescent Psychiatry*, *39*, 1528–1536.
- Thompson, R. A. (1991). Emotional regulation and emotional development. *Educational Psychology Review*, *3*(4), 269–307.
- Thompson, R. A. (1994). Emotion regulation: a theme in search of definition. *Monographs of the Society for Research in Child Development*, *59*(2–3), 25–52.
- Thompson, R. J., Mata, J., Jaeggi, S., Buschkuhl, M., Jonides, J., & Gotlib, I. H. (2012). The everyday emotional experiences of individuals with major depressive disorder: examining emotional instability, inertia, and reactivity. *Journal of Abnormal Psychology*, *121*(4), 819–829.
- Titov, N., Gibson, M., Andrews, G., & McEvoy, P. (2009). Internet treatment for social phobia reduces comorbidity. *Australian and New Zealand Journal of Psychiatry*, *43*(8), 754–759.
- Toth, S. L., Gravener-Davis, J. A., Guild, D. J., & Cicchetti, D. (2013). Relational interventions for child maltreatment: past, present, and future perspectives. *Development and Psychopathology*, *25*(4pt2), 1601–1617.
- Tremblay, R., Nagin, D., Seguin, J., Zoccolillo, M., Zelazo, P., Boivin, M., Perusse, D., & Japel, C. (2004). Physical aggression during early childhood: trajectories and predictors. *Pediatrics*, *114*, 43–50.
- Trope, Y., & Liberman, N. (2003). Construal level theory of psychological distance. *Psychological Review*, *117*(2), 440–463.
- Trope, Y., & Liberman, N. (2010). Temporal construal. *Psychological Review*, *110*(3), 403–421.
- Trujillo, M. (2008). Multicultural aspects of mental health. *Primary Psychiatry*, *15*(4), 65–84.
- Tseng, W. S. (2001). Handbook of cultural psychiatry. *International Review of Psychiatry*, *14*, 71–73.
- Tseng, W. S. (2006). From peculiar psychiatric disorders through culture-bound syndromes to culture-related specific syndromes. *Transcultural Psychiatry*, *43*(4), 554–576.
- Tull, M. T., Barrett, H. M., McMillan, E. S., & Roemer, L. (2007). A preliminary investigation between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy*, *38*(3), 303–313.
- Vaccaro, L., Jones, M., Menzies, R., & St Clare, T. (2010). *Danger Ideation Reduction Therapy (DIRT) for obsessive-compulsive checkers: A comprehensive guide to treatment*. Bowen Hills, Australia: Australian Academic Press.
- van Dam, D. S., van der Ven, E., Velthorst, E., Selten, J. P., Morgan, C., & de Haan, L. (2012). Childhood bullying and the association with psychosis in non-clinical and clinical samples: a review and meta-analysis. *Psychological Medicine*, *42*, 2463–2474.
- van de Leemput, I. A., Wichers, M., Cramer, A. O., Borsboom, D., Tuerlinckx, F., Kuppens, P., & Scheffer, M. (2014). Critical slowing down as early warning for the onset and termination of depression. *Proceedings of the National Academy of Sciences*, *111*(10), 87–92.
- van Dijk, F. E., Lappenschaar, M., Kan, C. C., Verkes, R. J., & Buitelaar, J. K. (2012). Symptomatic overlap between attention-deficit/hyperactivity disorder and borderline personality disorder in women: the role of temperament and character traits. *Comprehensive Psychiatry*, *53*(1), 39–47.
- van Nierop, M., Lataster, T., Smeets, F., Gunther, N., van Zelst, C., de Graaf, R., & van Winkel, R. (2014). Psychopathological mechanisms linking childhood traumatic experiences to risk of psychotic symptoms: analysis of a large, representative population-based sample. *Schizophrenia Bulletin*, *40*(Suppl. 2), 123–130.
- van Os, J., Hanssen, M., Bijl, R. V., & Ravelli, A. (2000). Strauss (1969) revisited: a psychosis continuum in the general population? *Schizophrenia Research*, *45*(1), 11–20.
- van Os, J., Kenis, G., & Rutten, B. P. (2010). The environment and schizophrenia. *Nature*, *468*(7321), 203–212.
- van Os, J., Linscott, R. J., Myin-Germeys, I., Delespaul, P., & Krabbendam, L. (2009). A systematic review and meta-analysis of the psychosis continuum: evidence for a psychosis proneness–persistence–impairment model of psychotic disorder. *Psychological Medicine*, *39*(2), 179–195.
- van Os, J., Rutten, B. P., & Poulton, R. (2008). Gene-environment interactions in schizophrenia: review of epidemiological findings and future directions. *Schizophrenia Bulletin*, *34*(6), 1066–1082.
- van Winkel, R., Stefanis, N. C., & Myin-Germeys, I. (2008). Psychosocial stress and psychosis. A review of the neurobiological mechanisms and the evidence for gene-stress interaction. *Schizophrenia Bulletin*, *34*(6), 1095–1105.
- Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., & Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin*, *38*(4), 661–671.
- Velikonja, T., Fisher, H. L., Mason, O., & Johnson, S. (2015). Childhood trauma and schizotypy: a systematic literature review. *Psychological Medicine*, *45*(5), 947–963.
- Veling, W., Hoek, H. W., Selten, J. P., & Susser, E. (2011). Age at migration and future risk of psychotic disorders among immigrants in the Netherlands: a 7-year incidence study. *American Journal of Psychiatry*, *168*(12), 1278–1285.
- Velthorst, E., Levine, S. Z., Henquet, C., de Haan, L., van Os, J., Myin-Germeys, I., & Reichenberg, A. (2013). To cut a short test even shorter: reliability and validity of a brief assessment of intellectual ability in schizophrenia—a control-case family study. *Cognitive Neuropsychiatry*, *18*(6), 574–593.
- von Kries, R., Kalies, H., & Papousek, M. (2006). Excessive crying beyond 3 months may herald other features of multiple regulatory problems. *Archives of Pediatrics and Adolescent Medicine*, *160*(5), 508–511.

- Wakschlag, L. S., Briggs-Gowan, M. J., Choi, S. W., Nichols, S. R., Kestler, J., Burns, J. L., & Henry, D. (2014). Advancing a multidimensional, developmental spectrum approach to preschool disruptive behavior. *Journal of the American Academy of Child & Adolescent Psychiatry*, 53(1), 82–96.
- Wakschlag, L. S., Briggs-Gowan, M. J., Hill, C., Danis, B., Leventhal, B., Cicchetti, D., & Carter, A. (2008). Observational assessment of preschool disruptive behavior, part II: validity of the Disruptive Behavior Diagnostic Observation Schedule (DB-DOS). *Journal of the American Academy of Child & Adolescent Psychiatry*, 47(6), 632–641.
- Wakschlag, L. S., Choi, S. W., Carter, A. S., Hullsiek, H., Burns, J., McCarthy, K., & Briggs-Gowan, M. J. (2012). Defining the developmental parameters of temper loss in early childhood: implications for developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 53(11), 1099–1108.
- Wakschlag, L., Tolani, P., & Leventhal, B. (2010). “Ain’t misbehavin’”: towards a developmentally-specified nosology for preschool disruptive behavior. *Journal of Child Psychology and Psychiatry*, 51(1), 3–22.
- Walsh, K. K., & Shenouda, N. (1999). Correlations among the Reiss Screen, the Adaptive Behavior Scale Part II, and the Aberrant Behavior Checklist. *American Journal on Mental Retardation*, 104(3), 236–248.
- Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: a meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin*, 138(4), 775–808.
- Wechsler, D. (2008). *Wechsler Memory Scales* (4th ed.). San Antonio, TX: Pearson Education.
- Wechsler, D. (2009). *Wechsler Adult Intelligence Scale* (4th ed.). San Antonio, TX: Pearson Education.
- Weiss, N. H., Tull, M. T., Anestis, M. D., & Gratz, K. L. (2013). The relative and unique contributions of emotion dysregulation and impulsivity to post-traumatic stress disorder among substance dependent inpatients. *Drug and Alcohol Dependence*, 128(1–2), 45–51.
- Weissman, M. M., Bland, R. C., Canino, G. J., Faravelli, C., Greenwald, S., Hwu, H. G., & Yeh, E. K. (1996). Cross-national epidemiology of major depression and bipolar disorder. *JAMA*, 276(4), 293–299.
- Werner, K. H., Jazaieri, H., Goldin, P. R., Ziv, M., Heimberg, R. G., & Gross, J. J. (2012). Self-compassion and social anxiety disorder. *Anxiety, Stress & Coping*, 25(5), 543–558.
- World Health Organization. (2008). *The global burden of disease: 2004 update*. Geneva, Switzerland: World Health Organization.
- Wichers, M. (2014). The dynamic nature of depression: a new micro-level perspective of mental disorder that meets current challenges. *Psychological Medicine*, 44(7), 1349–1360.
- Wichers, M., Schrijvers, D., Geschwind, N., Jacobs, N., Myin-Germeys, I., Thiery, E., & van Os, J. (2009). Mechanisms of gene-environment interactions in depression: evidence that genes potentiate multiple sources of adversity. *Psychology Medicine*, 39(7), 1077–1086.
- Widiger, T. A. (2011). Personality and psychopathology. *World Psychiatry*, 10, 103–106.
- Williams, P. (2012). *Rethinking madness: Towards a paradigm shift in our understanding and treatment of psychosis*. San Francisco, CA: Sky’s Edge Publishing.
- Wolraich, M. L. (1997). *Diagnostic and Statistical Manual for Primary Care (DSM-PC) child and adolescent version: design, intent, and hopes for the future*. *Journal of Developmental and Behavioral Pediatrics*, 18(3), 171–172.
- Yalom, I. D. (2008). *Staring at the sun: Overcoming the terror of death*. San Francisco, CA: Jossey-Bass.
- Zatti, A., & Zarbo, C. (2015). Embodied and exbodied mind in clinical psychology. A proposal for a psycho-social interpretation of mental disorders. *Frontiers in Psychology*, 6(236), 1–7.
- Zeanah, C. H., Boris, N. W., & Scheeringa, M. S. (1997). Psychopathology in infancy. *Journal of Child Psychology and Psychiatry*, 38(1), 81–99.
- Zeanah, C. H. J., & Zeanah, P. D. (2009). The scope of infant mental health. In C. H. J. Zeanah (Ed.), *Handbook of infant mental health* (3rd ed., pp. 5–21). New York, NY: Guilford Press.
- Zero to Three: National Center for Clinical Infant Programs. (1994). *Diagnostic classification 0–3: Diagnostic classification of mental health and developmental disorders of infancy and early childhood*. Washington, DC: Zero to Three: National Center for Clinical Infant Programs.
- Zero to Three: National Center for Clinical Infant Programs. (2005). *Diagnostic classification: 0–3: Diagnostic classification of mental health and developmental disorders in infancy and early childhood, revised*. Washington, DC: Zero to Three: National Center for Clinical Infant Programs.
- Zessin, U., Dickh, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: a meta-analysis. *Applied Psychology: Health and Well-Being*, 7(3), 340–364.
- Zwaigenbaum, L., Bryson, S., Rogers, T., Roberts, W., Brian, J., & Szatmari, P. (2005). Behavioral manifestations of autism in the first year of life. *International Journal of Developmental Neuroscience*, 23(2–3), 143–152.

Chapter 12

Psychiatric Taxonomies and Corresponding Measures

Chapter Outline

| | | | |
|--|------------|---|------------|
| Traditional psychiatric taxonomies and alternative perspectives | 343 | The Structured Clinical Interview for <i>DSM-5</i> | 362 |
| A historical review on the metastructure of mental disorders | 343 | The Diagnostic Interview for <i>DSM-IV</i> Personality Disorders | 364 |
| <i>DSM</i> —recent evaluations, criticisms, and proposals | 346 | The Structured Interview for <i>DSM-IV</i> Personality Disorders | 364 |
| Psychiatric diagnosis across cultures | 349 | Self-report assessment | 364 |
| Alternative models for psychiatric taxonomies | 350 | Minnesota Multiphasic Personality Inventory-2 Restructured Form | 364 |
| <i>DSM-5</i> alternative personality disorder model traits using item-response theory analysis | 350 | Millon Clinical Multiaxial Inventory | 365 |
| Research Domains Criteria project | 351 | The Personality Assessment Inventory | 365 |
| The <i>Psychodynamic Diagnostic Manual</i> version 2 | 353 | The Shedler–Westen Assessment Procedure | 366 |
| A psychodynamic or structural model of psychopathology | 355 | Dimensional Assessment of Personality Pathology: Basic Questionnaire, Short Form, and DAPP-90 | 367 |
| Cognitive-Affective Processing System | 356 | The Schedule for Nonadaptive and Adaptive Personality and SNAP Youth | 368 |
| A network approach to environmental impact in psychotic disorders | 357 | The Personality Inventory for the <i>DSM-5</i> | 369 |
| General psychopathology factor (<i>p</i> factor) | 359 | The Child Problematic Traits Inventory | 369 |
| Developments in clinical assessment | 360 | The Personality Psychopathology Five | 370 |
| Interviews | 361 | Summary | 371 |
| The Diagnostic Interview Schedule for Children | 361 | References | 371 |
| Computerized Diagnostic Interview Schedule for Children | 362 | | |

TRADITIONAL PSYCHIATRIC TAXONOMIES AND ALTERNATIVE PERSPECTIVES

A historical review on the metastructure of mental disorders

Classification is fundamental to the quantitative study of psychiatric phenomena. A valid classification system can be seen as a building block of diagnosis, assessment, intervention, and research. The two leading classification systems are the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM)* and the International Classification of Diseases (ICD). One of their major functions is communication across users (Stahl, 2013). From a clinical perspective, they promote comparative analyses, systematic recording, cross-cultural analysis, and interpretation of data. From an educational perspective, they provide a means of delivering standardized training.

In the 30 years following the release of *DSM-III*, major scientific advances have been made. Large genetic and community studies have been conducted, and longitudinal studies, beginning in the 1970s and 1980s, have matured. New statistical techniques have emerged, providing important insights into patterns of disorders, natural history, and trajectories over time, ultimately advancing our understanding of the nature of mental illness. As its architects concede, this work has increasingly cast the spotlight on problems inherent in the assumptions underlying the *DSM* (American Psychiatric Association, 2013).

First, a polythetic categorical approach gives rise to significant heterogeneity within diagnostic groupings, as it does not account for differences in clinical presentation (e.g., symptoms, age of onset, and stage of illness) (Hickie, Scott, & McGorry, 2013; Krueger & Bezdjian, 2009; Carragher, Adamson, Bunting, & McCann, 2009). Second, the categorical system is often criticized for being rigid and reductionist in practice, frustrating clinicians, resulting in poor application

of diagnostic guidelines, and having limited clinical utility (Roberts et al., 2012). By placing an overemphasis on reliability, highly specific and narrow criteria have been identified that fail to cover the spectrum of symptoms. Consequently, many patients are classified under the vague “not otherwise-specified” (NOS) category (Verheul & Widiger, 2004; Verheul, Bartak, & Widiger, 2007). Third, valuable clinical information is lost when adhering to a categorical, diagnostic threshold. This contrasts with clinical medicine, where the clinical significance of subthreshold symptoms is well recognized. For example, “undifferentiated connective tissue disease” refers to patients who are in the early stages, but do not meet diagnostic criteria for a well-defined connective tissue disease (e.g., rheumatoid arthritis) (Szodoray et al., 2008). Revolutionizing psychiatric classification to include dimensions would align the field with other medicine areas (Kraemer, 2007).

Fourth, converging lines of research indicate that disorders cooccur more often than expected by chance, challenging the *DSM* conceptualization that disorders are discrete entities. Dimensionality also exists between disorders, reflecting shared underlying genetic and environmental liabilities. In light of this evidence, there were continuous debates regarding the restructuring or diagnostic taxonomies (Kamphuis & Noordhof, 2009).

Today the internal–external model has gained robust support from research in the field and has demonstrated invariance across cultures (Slade & Watson, 2006; Kessler et al., 2011; Vollebergh et al., 2001; Roysamb et al., 2011), gender (Roysamb et al., 2011), ethnicity (Eaton et al., 2013), age (Eaton, Krueger, & Oltmanns, 2011b), sexual orientation (Eaton, Rodriguez-Seijas, Carragher, & Krueger, 2015), and time (Krueger, Caspi, Moffitt, & Silva, 1998; Eaton et al., 2011a; Measelle, Stice, & Hogansen, 2006).

The model also provides insight into how key psychopathological processes map onto unique components of individual disorders versus shared pathology (South & Miller, 2014; Conway, Hammen, & Brennan, 2012). Furthermore, genetic and environmental risk factors for experiencing psychopathology are accounted for in this model, and internalizing–externalizing mediate the likelihood of developing additional related diagnoses across the life span (Kessler et al., 2011; Kendler & Myers, 2014; Kendler et al., 2011a; Kendler, Prescott, Myers, & Neale, 2003; Lahey, Van Hulle, Singh, Waldman, & Rathouz, 2011). Lahey, Zald, Hakes, Krueger, and Rathouz (2014) found evidence for widespread heterotypic continuity of mental disorders during adulthood, indicating that mental disorders are not fixed, independent entities. Rather, disorders are interrelated in a correlational structure that is manifested both concurrently and across time. These findings have important clinical relevance; rather than focusing on individual disorders, consideration of underlying liabilities may contribute in the selection of the appropriate treatment.

Kendler and Myers (2014), Kendler et al. (2011a), Kendler et al. (2003a), Kendler, Neale, Kessler, Heath, and Eaves (1992), and Kendler (1996) have conducted the most comprehensive multivariate behavior genetic studies to date. This research provides support for a genetic basis underlying the internalizing–externalizing spectra in addition to a genetic basis for the distress and fear subdimensions.

Recently, it has been proposed that the metastructure of psychopathology may reflect an overarching general factor, the “*p* factor,” analogous to the *g* factor of intelligence (Caspi et al., 2014). According to these authors, the *p* factor endorses an individuals’ propensity to develop any and all forms of common psychopathologies. The authors suggest that the *p* factor may account for the difficulty in identifying causes, consequences, biomarkers, and treatments with specificity to individual disorders. Research by Lahey et al. (2014) exploring the etiologic structure of child, adolescent (Lahey et al., 2011), and adult (Lahey et al., 2012) psychopathology provides evidence for a broad general factor (a bifactor in factor-analytic terms), with higher-order internalizing and externalizing factors reflecting additional shared variance in symptoms.

To date, factor mixture modeling applications have demonstrated that the latent structure of psychopathology comprises continuous and categorical components. Hybrid models are categorical insofar as they group individuals into categories. They are also dimensional because once individuals are assigned to liability classes, differences in severity between classes are modeled through continuous latent variables (Muthén, 2006). Hybrid models facilitate meaningful distinctions between homogeneous groups while allowing for different levels of severity. Although successful, the majority of structural analyses have focused on syndromal-level indicators, which are often heterogeneous.

While the *DSM-5* incorporates the internal–external metastructure, it also includes important subtyping distinctions, such as a dissociative subtype of posttraumatic stress disorder (PTSD). The inclusion of more extreme forms of psychopathology has highlighted novel dimensions spectra. For example, Keyes et al. (2013) investigated the location of disorders characterized by detachment and/or psychoticism [i.e., schizotypal, schizoid, avoidant, and paranoid personality disorders (PDs), manic episodes, and bipolar disorder] in the metastructure. They found that detachment and psychoticism represented a unique subdimension of internalizing (labeled, thought disorder). Additionally, manic episodes and bipolar disorder demonstrated substantial associations with the distress subdimension and thought disorder dimension. Caspi et al. (2014) also found evidence for a thought disorder spectrum, which—together with internalizing and externalizing—was best captured by a general psychopathology dimension (as discussed earlier).

The inclusion of schizophrenia and schizotypal PD led Kotov et al. (2011b) to identify internalizing, externalizing, and psychosis dimensions. In a separate study, Kotov et al. (2011b) integrated personality pathology into the model and identified additional dimensions, including thought disorder (e.g., mania, schizotypal PD), somatoform (e.g., hypochondriasis), and antagonism (e.g., histrionic and narcissistic PDs) spectra. Markon (2010) identified novel thought disorder and pathological introversion dimensions. Finally, Roysamb et al. (2011) identified two novel spectra: cognitive-relational disturbance (e.g., histrionic, narcissistic, paranoid, schizotypal, obsessive-compulsive, and borderline PDs) and anhedonic introversion (e.g., avoidant and dependent PDs, schizoid PD, depressive PD, and dysthymia). Noordhof, Krueger, Ormel, Oldehinkel, and Hartman (2015) found support for a bifactor model, including one nonspecific factor and four specific factors, including two novel spectra: internalizing, externalizing, attention and orientation, and autism spectrum problems.

Network Theory

Although psychiatric classification systems have greatly contributed to the reliability of psychiatric diagnoses, they appear to underestimate the unique role of individual symptoms (Boschloo et al., 2015). In contrast, the network approach assumes that psychopathology results from the causal interplay between psychiatric symptoms and their complex associations (e.g., Borsboom, 2008; Cramer, Waldorp, van der Maas, & Borsboom, 2010; Cramer, Kendler, & Borsboom, 2012; Borsboom & Cramer, 2013). By using time-series analyses on data of multiple assessments with short time intervals, the specific causal association between symptoms can be identified (de Wild-Hartmann et al., 2013; Kramer et al., 2014).

The advantage of the network approach is that it naturally accommodates the unique role of each of the individual symptoms. If associations between symptoms within the same diagnosis would differ, this implies that these symptoms are not interchangeable; the strategy of summing symptoms to establish diagnoses would, therefore, lead to loss of information. In addition, it is important to note that the network approach allows specific symptoms of one diagnosis to be related to specific symptoms of another (Cramer et al., 2010; Cramer et al., 2012; Borsboom & Cramer, 2013). As some diagnoses are based on similar symptoms (e.g., criteria for major depressive episode, dysthymia, mania or hypomania, generalized anxiety disorder (GAD), and PTSD all include sleep disturbances), these overlapping symptoms are likely to show strong associations. In addition, specific nonoverlapping symptoms of different diagnoses may also be related. If only some, and not all, symptoms of a particular diagnosis show connections with some, but not all, symptoms of another diagnosis, this implies that the specific symptom pairs connecting the two diagnoses can account for their comorbidity; focusing on diagnoses instead of symptoms would, again, lead to loss of information.

So far, only a few studies have examined the network structure of psychiatric symptoms, and empirical work has considered only two diagnoses and included 20 symptoms at most (Cramer et al., 2010; Borsboom & Cramer, 2013).

Boschloo et al. (2015) used cross-sectional data of the National Epidemiological Survey on Alcohol and Related Conditions (NESARC, second wave $n = 34,653$) (Grant, Kaplan, & Stinson, 2012), including 120 psychiatric symptoms of 12 major *DSM-IV* diagnoses. The study aimed to determine the empirical network structure of these symptoms. Moreover, this study investigated the associations of symptoms within the same diagnoses, as well as the associations of symptoms between diagnoses.

The empirically based network structure supports the global framework of the *DSM* as overall symptoms revealed more associations to symptoms within the same diagnoses than to symptoms to other diagnoses. Although findings generally support the global structure of the *DSM*, the network provides additional information on the unique role of individual symptoms.

An important strength of the network analysis technique is that it can provide detailed information on the complex relations between psychiatric symptoms. As it more adequately captures the complexity of psychopathology, it may also allow us to examine the multifactorial etiology of psychopathology in all its complexity. In past decades, etiological studies have largely been disappointing (Kapur, Phillips, & Insel, 2012; Kendler, 2012a), but this may well be a consequence of the oversimplified conceptualization of psychopathology as psychiatric diagnoses (Kendler et al., 2011b). By extending our network structure of *DSM*-based psychiatric symptoms with, for example, genetic, pathophysiological, behavioral, and psychological factors, it may be possible to determine whether specific etiological factors (e.g., cortisol) link to specific symptoms (e.g., sleep disturbances).

Importance of Facet-Level Analyses

Over the past 3 decades, researchers have made considerable progress in understanding how higher-order personality traits relate to psychopathology at both the diagnostic and the symptom levels (Kotov, Gamez, Schmidt, & Watson, 2010; Watson & Naragon-Gainey, 2014). However, evidence related to the specific lower-order level of the personality hierarchy has lagged far behind. Indeed, Kotov et al. (2010) were forced to restrict their metaanalysis to the general domain level

of personality, stating: “Our review is necessarily limited to these broad dimensions because lower order traits have been studied less consistently and the available data are insufficient” (p. 770).

Paunonen (2003) has argued strongly for the value of facet-level analyses, stating:

Arithmetically combining several narrow trait or facet measures to derive a broad factor measure can have undesirable consequences. Some of the traits might be predictive of a criterion of interest, and others might not. When the predictive and nonpredictive facets are aggregated in the pursuit of their common variance, the trait-specific but criterion-valid variance that exists in the former can be canceled by the trait-specific but nonpredictive variance in the latter (p. 413).

Supporting this argument, Reynolds and Clark (2001) found that specific facet scales were substantially better predictors of PD ratings than were general domain scores. Watson, Stasik, Ellickson-Larew, and Stanton (2015) believe facet-level analyses can be particularly informative in clarifying the nature of the associations between extraversion and psychopathology. It has been found that individual facets of extraversion can be positively related, negatively related, or unrelated to the same symptom or disorder, even though they are positively correlated with each other.

Examples of the Classification of Specific Pathologies

Bipolar pathology: Research indicates that bipolar pathology loads onto internalizing (Kessler et al., 2011; Wolf et al., 1988; Eaton et al., 2012; Forbush & Watson, 2013) and psychosis (Kotov et al., 2011a). Others suggest that the irritability facet loads onto internalizing to a larger extent than the expansive mood facet of mania (Wright et al., 2013). That is, course information is incorporated into the DSM diagnoses that are the focus of metastructure research, by definition. Eaton et al. (2013) found that almost 50% of bipolar’s diagnostic variance was accounted for by internalizing liability, which predicted future internalizing disorders, suicide attempts, angina, and ulcers.

Attention-deficit/hyperactivity disorder (ADHD): ADHD (Carragher et al., 2014) has been found to load on externalizing pathology for both men and women. It appears that a childhood diagnosis of ADHD predicts the later development of other externalizing disorders in adulthood.

Borderline personality disorder (BPD): BPD appears to be internal, loading on internalizing and externalizing (Eaton et al., 2011a; Roysamb et al., 2011; Kotov et al., 2011a; James & Taylor, 2008). Eaton et al. (2011a) found that, across both males and females, BPD loaded on the distress subdimension of internalizing and externalizing. Finally, Hudson, Zanarini, Mitchell, Choi-Kain, and Gunderson (2014) found that familial internalizing and externalizing liabilities were associated with BPD, which may help explain the pattern of comorbidity between BPD and internalizing and externalizing disorders.

Obsessive-compulsive disorder (OCD): Krueger et al. (1998) found that OCD loaded on internalizing. For the bifurcated internalizing–externalizing model, OCD has been found to load onto the fear subdimension (Slade & Watson, 2006) and the distress subdimension (Cox, Dewaele, Van Houtte, & Vincke, 2010) of internalizing.

Somatic disorders: Somatic disorders/symptoms have received some attention. Krueger, Chentsova-Dutton, Markon, Goldberg, and Ormel (2003) found that somatization, hypochondriasis, and neurasthenia load on internalizing, an observation that was validated across 14 countries. Simms, Prisciandaro, Krueger, and Goldberg (2012) found that somatic symptoms loaded onto internalizing, with specific factors also present for somatic symptoms, reflecting symptoms that are independent of internalizing.

DSM—recent evaluations, criticisms, and proposals

There are numerous well-documented problems with the DSM’s polythetic categorical approach to mental disorder delineation. For example, mental disorders rarely occur in isolation; they are typically comorbid because persons meeting criteria for one category tend to meet criteria for many others. In addition, there is extensive heterogeneity within putatively coherent categories; patients who are supposed to have the same diagnosis often differ markedly in clinically consequential ways. Indeed, inroads have even been made into the DSM-5 itself (American Psychiatric Association, 2013), in the form of an empirically based dimensional–hierarchical model of personality and psychopathology (Krueger & Markon, 2014).

Lilienfeld and Treadway (2016) combined DSM and ICD and renamed this union DSM-ICD. The DSM-ICD classification scheme is often referred to as neo-Kraepelinian (Aldenderfer & Blashfield, 1984) in recognition of the German psychiatrist Emil Kraepelin. A key assumption of the neo-Kraepelinian approach is that signs and symptoms are often sufficient to differentiate mental disorders.

Despite the extensive impact of the DSM on psychiatric research and practice, there are growing indications that its hegemony may be beginning to wane. The DSM-ICD approach has been characterized by a number of shortcomings, many of which have not been adequately resolved across the various DSM editions (Lilienfeld, 2014). For example: (1) The DSM adopts a categorical approach as a working model for measurement purposes. This model is characterized by an absence

of a point of rarity (Sneath, 1957) demarcating most *DSM* conditions from normality. Even if some *DSM* conditions are taxomic, this would not justify the adoption of a categorical model. (2) The *DSM* has generated marked phenotypic heterogeneity. Such heterogeneity urges the search for a common underlying structure. (3) Across its multiple editions, the *DSM* has been criticized for the problem of comorbidity (i.e., the cooccurrence of two or more putatively distinct conditions). (4) An optimal classification system consists of categories that yield few intermediate cases (Frances, 1980). Yet for most major classes of psychopathology, one of the most frequent diagnoses is NOS (i.e., most patients with mental disorders do not fit into any extant category). The high prevalence of NOS diagnoses probably derives from what Hyman (2010) calls the “problem of overspecification” (p. 166). (5) The presence of empirically supported therapies indicates that at least some *DSM* categories possess treatment validity and clinical utility (Garb, Lilienfeld, Nezworski, Wood, & O’Donohue, 2009). If *DSM-ICD* conditions were largely distinct, one might anticipate that their genetic and environmental architecture would similarly be largely distinct. Yet the more we learn about most *DSM* conditions, the more apparent it becomes that many of the influences are nonspecific.

According to the American Psychiatric Association (2000), PDs are assumed to represent qualitatively distinct clinical syndromes. Accumulating evidence suggests that PDs represent arbitrary distinctions along dimensions of general personality functioning rather than discrete categorical conditions (Clark, 2007; Livesley, 2007; Widiger, Simonsen, Krueger, Livesley, & Verheul, 2005). From this perspective, many of the problems typically associated with PD categories (e.g., excessive diagnostic cooccurrence, inadequate coverage, and arbitrary and unstable boundaries with normal psychological functioning) are the result of imposing a categorical system on dimensional phenomena.

After acknowledging that the purely categorical model of PD assessment was inaccurate due to excessive diagnostic overlap, poor definitions, temporal instability, inconsistency in assigning Axis II diagnoses, and the lack of empirical support for some disorders (Skodol et al., 2011a,b), the committee supervising the development of the *DSM-5* (American Psychiatric Association, 2013) decided on switching from an entirely categorical model to a hybrid model that included the retention of some diagnostic categories along with the assessment of pathological personality traits, using a five-domain, 25-facet framework.

The *DSM-5* was published in 2013 after about 10 years of preparation. The main goal of this latest version of the *DSM* was “to better fill the need of clinicians, patients and researchers for a clear and concise description of each mental disorder” (Insel & Lieberman, 2013, p. 5).

A comprehensive review of the *DSM-5* by Möller et al. (2015) analyzes its changes and their empirical and rational background and their potential consequences. Despite all its efforts, the *DSM-5* did not manage to base the *DSM* disorder (or disease) categories on neurobiological facts (Kupfer & Regier, 2011). Although the traditional measurement of brain alterations in neurocognitive disorders is considered, modern biomarkers, for example, Alzheimer’s dementia, are not. Thus, psychiatric diagnosis continues to be primarily associated to symptoms and course (Möller, 2005). At the same time, psychiatric diagnosis appears to be very consensus-oriented, despite all the efforts to achieve empirically based validity (Berk, 2013; Cuthbert & Insel, 2013).

Another main objective of the *DSM-5* was to replace or complement the categorical diagnostic system. Many scholars believe that PDs are best understood as extreme variants of ordinary personality traits that differ from what is considered average or ordinary by degree rather than in type. This type of perspective of conceptualizing PDs is referred to as a dimensional approach or system. Such a system conceptualizes various personality features along a continuum. Möller et al. (2015) argue that the best strategy to a dimensional approach would have been to apply a broad-spectrum comprehensive assessment scale covering all relevant symptoms, and then to define the “cases” on the basis of norm or reference values.

The conflict between categorical and dimensional approaches is evident in schizophrenic and affective disorders. Despite initial enthusiasm, the initial intention to replace the previous symptom-based classification of schizophrenic and bipolar disorders with a “psychotic spectrum” having an optional dimensional subdivision was ultimately abandoned due to a plethora of theoretical (Maier, Zobel, & Wagner, 2006; Möller et al., 2011, 2015) and practical issues (Möller, 2009).

In addition to several changes and criteria, all disorders related to psychological drugs or psychotherapy are still present, such as major depressive disorder (MDD); manic or depressive episodes as part of bipolar borderline disorder; schizophrenia disorder; anxiety disorder; social phobia and GAD; OCD; and stressor-related disorder, such as PTSD, ADHD, substance or alcohol addiction, PD, and dementias. Most mental illnesses are now viewed as neurodevelopmental disorders. Maturation of the nervous system interacts with a wide variety of external influences beginning at conception. The current diagnostic systems do not provide a comprehensive account of developmental patterns and how these are implicated in the development of mental illness (Cuthbert, 2014a). However, this objective was largely abandoned, not only for practical reasons, but also because of concerns that it would clash with current treatment guidelines and drug licenses (Möller, 2008). Part of the dimensional perspective has remained, such as in transnosological specifiers (e.g., the mixed feature specifier), severity assessments (e.g., global assessments of symptom domains of schizophrenia), and cross-cutting

dimensional assessments. Due to practical difficulties in the conversion of PDs from categorical to dimensional, the APA Board of Trustees voted to sustain the *DSM-IV* diagnostic system for PDs virtually unchanged and to include the proposed new model as an “alternative *DSM-5* model for personality disorders” in Section III of the *DSM-5*, the section referred to as “Emerging Measures and Models” (American Psychiatric Association, 2013).

In the alternative model, the major criteria to define any PDs are: (1) moderate or greater impairment in personality functioning and (2) the presence of pathological personality traits. According to this model, personality functioning consists of the degree to which there is an intact sense of self (a clear, coherent, and effective self-directedness) and interpersonal functioning (a good capacity for empathy and for mature, mutually rewarding intimacy with others). Pathological personality traits are classified into five trait domains: *negative affectivity*, *detachment*, *antagonism*, *disinhibition*, and *psychoticism*. Each of these trait domains is further explicated by a set of trait facets reflecting aspects of the domain itself. This trait system has been shown to correlate satisfactorily with the five-factor model (FFM) (Krueger, Hopwood, Wright, & Markon, 2014).

As the limitations of the extant structure have become clear, new developments in statistical modeling have also emerged. These methods allow for the estimation and direct quantitative comparison of models based on categorical, dimensional, and hybrid (i.e., latent variables that have dimensional and categorical aspects) latent structures (Lubke & Muthén, 2005; Markon & Krueger, 2006). As a result, key conceptual issues that were treated as a priori assumptions in the recent *DSMs*, such as the notion that most forms of psychopathology, are well characterized as discrete dichotomies, can now empirically be evaluated via contemporary quantitative modeling.

In a study, Sharp et al. (2015) evaluated four structural models fitted to the six sets of *DSM-5-II* PD criteria that account for the vast majority of specifically diagnosed PD. A bifactor model provided the best fit to the data, suggesting that personality pathology is composed of a general factor that captures common variance in diverse forms of personality pathology and six specific factors that capture unique variables. In particular, the authors examined the extent to which the borderline PD criteria would load exclusively onto the *g* factor versus onto both the *g* factor and one or more *s* factors. A large ($n = 966$) sample of inpatients were interviewed for six *DSM-IV* (American Psychiatric Association, 1994) PDs using the Structured Clinical Interview for Personality Disorders (SCID-II; First, Spitzer, Gibbon, Williams, & Benjamin, 1994) with no skip-outs. The authors applied a series of confirmatory, exploratory, and bifactor exploratory factor analyses on the rated PD criteria. The confirmatory analysis largely replicated the *DSM* PDs, but with high factor correlations. The “standard” exploratory analysis replicated four of the *DSM* PDs fairly well, but nearly half the criteria cross-loaded. In the bifactor analysis, borderline PD criteria loaded only on the general factor; the remaining PDs loaded either on both the general factor and a specific factor or largely on only a specific factor. Results are interpreted in the context of several possibilities to define the nature of the general factor.

Both ICD-10 and the *DSM-5* include among their diagnostic entities several childhood conditions that represent trait-like characteristics as one of their defining features, such as ADHD.

The DSM-5 Dimensional Trait Model and the Five-Factor Model of General Personality

Although there has been some disagreement with regard to the extent of the alignment of the *DSM-5* dimensional trait model proposal with general personality, there is a convergence in agreement that affectivity aligns with the FFM’s neuroticism, detachment with introversion, antagonism with antagonism, and disinhibition with low conscientiousness. However, there is disagreement as to whether psychoticism aligns with the FFM’s Openness (Krueger et al., 2011). Gore and Widiger (2013) carried out an empirical study to investigate the relationship between the *DSM-5* dimensional trait models of maladaptive personality with dimensional trait models of general personality. The sample consisted of 585 undergraduate psychology students. All the participants were administered the NEO-PI-R (Costa & McCrae, 1992), the 5-Dimensional Personality Test (5DPT; van Kampen, 2012), the Inventory of Personality Characteristics (IPC-5; Tellegen & Waller, 1987), and the Personality Inventory for *DSM-5* (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012).

The results support the presence of a common five-factor structure, including psychoticism within the same domain as the FFM’s Openness. One potential explanation for the relatively weak relationship of FFM openness with oddity, eccentricity, and/or psychoticism obtained in prior research is the absence of much representation of maladaptive openness within the NEO-PI-R. It was partly for this reason that the study included alternative measures of this domain of personality. Notably, the 5DPT (van Kampen, 2012) and the IPC-5 (Tellegen & Waller, 1987) include subscales for items that are more suggestive of unconventionality, eccentricity, and peculiarity hypothesized to be maladaptive variants of FFM’s Openness (Widiger, 2011). The PID-5 loaded as strongly as the NEO-PI-R, 5DPT, and IPC-5 on three of the other factors, and in all three of these cases the items within the general measures of personality are keyed largely in the same maladaptive direction as the PID-5. For example, over 80% of the NEO-PI-R items assessing neuroticism, antagonism, and low conscientiousness also concern maladaptive traits (Haigler & Widiger, 2001), consistent with the target of the PID-5.

The PID-5's Psychoticism, though, may indeed involve some psychotic symptomatology that lies outside of general personality structure. Some of the PID-5 items do appear to be referring to overt psychotic symptoms (e.g., "Sometimes I feel 'controlled' by thoughts that belong to someone else," and "Sometimes I think someone else is removing thoughts from my head"). Items that suggest Schneiderian delusions (Schneider, 1959), such as thought control and thought broadcasting, are perhaps best understood as part of a psychotic disorder rather than reflecting the magical thinking and perceptual confusions that would be evident in persons who are just odd and/or eccentric in a schizotypic manner (Kwapil & Barrantes-Vidal, 2012).

More generally, the findings also support the hypothesis that PD traits are maladaptive variants of FFM traits. The study also connects the PID-5 model with the broader nomological network of general personality research by examining how it relates to preexisting measures.

The purpose of the FFM of PD is to provide an alternative means to conceptualize and diagnose PDs. PDs are currently conceptualized as "qualitatively distinct clinical syndromes" (American Psychiatric Association, 2000; p. 689), such as that they are distinct from one another and from normal personality. (One wonders about the accuracy of the term "normal" personality. Is there such a thing as "normality," or are there only degrees of abnormality? Should "normality" be replaced by "nonclinical" vs. clinical? Carl Jung is quoted as saying, "There is no such thing as a pure extrovert or a pure introvert. Such a man would be in the lunatic asylum.")

Psychiatric diagnosis across cultures

There is little consensus on the extent to which psychiatric disorder or syndromes are universal or the extent to which they differ on their core definitions and constellation of symptoms as a result of cultural or contextual factors. This controversy continues due to the lack of biological markers, imprecise measurement, and the lack of a gold standard for validating most psychiatric diagnoses (Robins, 1985).

In a systematic review of 102 worldwide population-based studies of ADHD, significant variations in the prevalence rates of the disorder across continents were reported (Polanczyk, Silva de Lima, Horta, Biederman, & Rohde, 2007). Significant differences in the prevalence estimates were found among North America, Africa, and the Middle East, but not among North America, Europe, Asia, Oceania, or South America. The differences in rates were attributed to differences in instrumentation, methods, and definitions used across studies (Polanczyk et al., 2007). Thus, even within the same culture it has been difficult to achieve diagnostic consensus among clinicians, as well as consistency of diagnostic rates across different epidemiologic studies that use different diagnostic instruments. If there is a lack of diagnostic consistency within the same culture, an even greater challenge is achieving diagnostic consistency with a different cultural group.

Cultural and ethnic groups differ with regard to practices and activities relevant for ecocultural adaptation and survival (Weisner, 2002). Given these cultural differences, some investigators adhere to a *relativistic* perspective (e.g., Weisz, Weiss, Suwanlert, & Chaiyasit, 2006) and others to a *universalistic* perspective (Roberts & Roberts, 2007), while still others adhere to a *combined* universalistic/relativistic perspective (Rutter & Nikapota, 2002).

A combined *relativistic* and *universalistic* view (Rutter & Nikapota, 2002) may be the best choice given the state of the art in the cross-cultural validity of child psychiatric disorders. Future studies in which the extent to which gene-environment interaction affects the emergence of disorders cross-culturally may shed light on this important issue. However, at present the majority of the evidence favors the universalistic view at least for three of the criteria: *risk and protective factors*, *comorbidity*, and *treatment response*.

Even though the *DSM-IV* may have stated that clinicians should consider contextual and cultural factors in making their diagnosis, the classification provides no operational or explicit criteria on how to apply this knowledge. Furthermore, it provides no exclusionary criteria based on whether the social and contextual factors that are related to the disorder are adaptive to a child with no internal dysfunction (Wakefield, Pottick, & Kirk, 2002). In part this may be due to the fact that the expert panel guiding the *DSM-IV* development could not reach a consensus on the extent to which culture and context should be incorporated into the nosology, and chose to place all culture-bound syndromes and cultural considerations in an appendix (Canino, Lewis-Fernandez, & Bravo, 1997). Inadequate understanding of the interplay among social, cultural, and contextual factors in the development of disorders or syndromes may result in either overidentification (false positives) or underidentification (false negatives) of cases (Alegría & McGuire, 2003).

Chinese Classification of Mental Disorders

The Chinese Classification of Mental Disorders (CCMD), published by the Chinese Society of Psychiatry (CSP), is a clinical guide used in China for the diagnosis of mental disorders. It is currently on a third version, the CCMD-3, written in Chinese and English. It is similar in structure and categorization to the ICD and *DSM*, but incorporates some variations on their main diagnoses and around 40 culturally related diagnoses.

The first published Chinese psychiatric classificatory scheme appeared in 1979. A revised classification system, the CCMD-1, was made available in 1981 and was further modified in 1984 (CCMD-2-R). The CCMD-3 was published in 2001. Many Chinese psychiatrists believed the CCMD had special advantages over other manuals, such as simplicity, stability, the inclusion of culture-distinctive categories, and the exclusion of certain Western diagnostic categories. The Chinese translation of the ICD-10 was seen as linguistically complicated, containing very long sentences and awkward terms and syntax (Lee, 2001).

The diagnosis of depression is included in the CCMD, with many similar criteria to the ICD or *DSM*, with the core having been translated as “low spirits.” However, neurasthenia is a more central diagnosis. Although also found in the ICD, its diagnosis takes a particular form in China, called *shenjing shuairuo*, which emphasizes somatic (bodily) complaints, as well as fatigue or depressed feelings. Neurasthenia is a less stigmatizing diagnosis than depression in China, being conceptually distinct from psychiatric labels, and is said to fit well with a tendency to express emotional issues in somatic terms. The concept of neurasthenia as a nervous system disorder is also said to fit well with the traditional Chinese epistemology of disease causation on the basis of disharmony of vital organs and imbalance of *qi*.

The diagnosis of schizophrenia is included in the CCMD. It is applied quite readily and broadly in Chinese psychiatry. Some of the wordings of the diagnosis are different, for example rather than borderline PD as in the *DSM*, or emotionally unstable PD (borderline type) as in the ICD, the CCMD has impulsive PD. Diagnoses that are more specific to Chinese or Asian culture, though they may also be outlined in the ICD (or *DSM* glossary section), include:

- *Koro* or *genital retraction syndrome*: excessive fear of the genitals (and also breasts in women) shrinking or drawing back in to the body.
- *Zou huo ru mo* or *qigong deviation*: perception of uncontrolled flow of *qi* in the body.
- Mental disorders due to superstition or witchcraft.
- Traveling psychosis.

The CCMD-3 lists several “disorders of sexual preference,” including ego-dystonic homosexuality, but does not recognize pedophilia.

ALTERNATIVE MODELS FOR PSYCHIATRIC TAXONOMIES

The official classification of PDs and almost all mental disorders over the past 30 years has been as putatively categorical constructs that are distinct from each other and from normative functioning (American Psychiatric Association, 2013). Although these traditional PD classifications have supporters (e.g., Black, 2013; Gunderson, 2013), scholars in the field have indicated significant flaws and have proposed instead dimensional models in order to overcome many of these limitations (e.g., Clark, 2007; Krueger & Eaton, 2010).

DSM-5 alternative personality disorder model traits using item-response theory analysis

One prominent alternative is to conceptualize PDs as maladaptive, extreme variants within the same five broad trait domains that define normal personality functioning (Widiger & Trull, 2007). The FFM has emerged as a compelling framework for organizing personality traits, and appears to integrate diverse models (John, Naumann, & Soto, 2008). The five FFM domains have shown consistent links to diverse mental disorders (e.g., Kotov et al., 2010) and significant life outcomes (Widiger & Presnall, 2013).

Acknowledging the clinical relevance of the FFM, Section III of the *DSM-5* (i.e., Emerging Measures and Models) provides an alternative, hybrid PD model that comprises impairments in self and interpersonal functioning, as well as maladaptive traits that are linked to specific aspects of personality pathology.

That *DSM-5* alternative PD model consists of 25 pathological traits that are organized into five broad domains of negative affectivity (vs. emotional stability), detachment (vs. extraversion), psychoticism (vs. lucidity), antagonism (vs. agreeableness), and disinhibition (vs. conscientiousness). As is obvious from their labels and organizations, the *DSM-5* alternative PD model traits bear a strong resemblance to the general FFM, as well as the five broad factors of the Personality Psychopathology Five (Harkness & McNulty, 1994). Specifically, the trait model was developed with the intention of comprehensively capturing the spectrum of personality pathology rather than explicitly reproducing any a priori structure (i.e., the FFM). A set of six candidate domains (negative affectivity, detachment, antagonism, psychoticism, disinhibition, and compulsivity) was developed conceptually, and Personality and Personality Disorders Work Group members nominated potential lower-order trait constructs within these broad domains that would account reasonably for the universe of personality pathology (including that encoded within the *DSM-IV* PDs). The resulting 37 trait facets were operationalized

in self-report items that were refined iteratively via factor analysis and item-response theory (IRT). The analyses indicated that the list of 37 traits could be reduced to 25 traits. These 25-trait scales were comprised of 4 to 14 items for a total of 220 items on a self-report measure labeled the Personality Inventory for *DSM-5* (PID-5; Krueger et al., 2012). Subsequent research has suggested that a five-factor solution for the PID-5, with the domains of compulsivity and disinhibition loaded as extreme opposites on the same domain, was most appropriate (Krueger et al., 2012).

Thus, the traits within the *DSM-5* alternative PD model share a structural similarity with measures of normative personality traits developed to assess the FFM. Nonetheless, it is not yet known whether the *DSM-5* alternative PD model traits represent maladaptive, extreme variants of the same traits, consistent with FFM theory (Widiger & Trull, 2007).

Four published studies have utilized properties of IRT to compare and contrast the information provided by instruments assessing personality and PDs (Samuel, Carroll, Rounsaville, & Ball, 2013; Samuel, Simms, Clark, Livesley, & Widiger, 2010; Stepp et al., 2012; Walton, Roberts, Krueger, Blonigen, & Hicks, 2008). All of these studies have supported the dimensional hypothesis that personality pathology represents a maladaptive, extreme variant of normal personality traits. Walton et al. (2008) compared indices specifically for the PD construct of psychopathy, whereas Samuel et al. (2013) focused exclusively on borderline PD. Stepp et al. (2012) demonstrated that individual scales from the NEO-PI-R, the Schedule for Nonadaptive and Adaptive Personality-2 (SNAP-2), and the Temperament and Character Inventory could be integrated into five higher-order domains, with specific measurement strengths of each instrument. Samuel et al. (2010) provided a broader analysis when they compared the information provided by the predominant self-report measure of the FFM, the NEO-PI-R (Costa & McCrae, 2010), to two measures of maladaptive personality traits: the *Dimensional Assessment of Personality Pathology Basic Questionnaire* (DAPP-BQ; Livesley & Jackson, 2009a) and the SNAP-2 (Clark, Simms, Wu, & Casillas, 2008).

Samuel et al. (2013) sorted the adaptive and maladaptive traits into higher-order domains on the basis of prior factor-analytic research and then conducted IRT analyses. After removing poorly loading items, they found that a unidimensional model fit well for each putative domain. They concluded that although the normal and maladaptive instruments exhibited large overlap, the SNAP-2 and DAPP-BQ provided more information at the uppermost levels of the shared traits, whereas the NEO-PI-R provided more at the lower levels. This research supported the claim that those two models of personality pathology were maladaptive extensions of the FFM. Nonetheless, both the DAPP-BQ and the SNAP-2 models differ in important ways from the trait model included in *DSM-5*.

A study by Suzuki, Samuel, Pahlen, and Krueger (2015) attempts to replicate and extend prior findings by comparing the *DSM-5* alternative PD model traits to those from a traditional measure of the FFM using IRT analyses. The authors compared the PID-5 and the IPIP-NEO (Goldberg et al., 2006).

IRT analyses demonstrated that the facets from the remaining four domains of the PID-5 and the IPIP-NEO not only could be fitted along shared latent dimensions, but that the measures provided mostly overlapping information along those dimensions. Both the PID-5 and IPIP-NEO provided psychometric information across a broad range of the latent traits. Nonetheless, the measures were not completely redundant, and differences that emerged were mostly consistent with their design and development. The PID-5 typically offered an advantage at the upper (maladaptive) levels, whereas the IPIP-NEO provided more psychometric information at the lower (adaptive) levels of the traits. Overall, the results support the broad conclusion that the dimensional traits included within *DSM-5* alternative PD models represent maladaptive, extreme variants of at least four of the same traits that define normal personality. As a practical matter, the large overlap between the PID-5 and the IPIP-NEO suggests that both of these measures cover broad range of the shared domains. The PID-5 appears, despite its development as a measure of abnormal personality, to extend its assessment into ranges that are typically covered by normative inventories, except for openness to experience. Similarly, despite its development as a measure of normative personality, the IPIP-NEO captures the maladaptive range of these traits, consistent with past research (Miller et al., 2008; Trull, Widiger, Lynam, & Costa, 2003).

Research Domains Criteria project

The Research Domains Criteria (RDoC) project was formally launched in 2009 by the National Institute of Mental Health. It was developed in response to accumulating shortcomings within the *DSM-ICD* system. The aim of the RDoC was to transform the current psychiatric framework into an explicitly biological system (Cuthbert, 2014a,b; Insel et al., 2010; Sanislow et al., 2010).

The framework of the RDoC (Cuthbert & Insel, 2013; Insel et al., 2010) is primarily a research-related alternative and is primarily based on five domains or constructs: *negative valence systems*, *positive valence systems*, *cognitive systems*, *systems for social processes*, and *arousal/modulatory systems* (Fig. 12.1). These psychological domains, which cover only a limited range of psychological traits, are considered to be better associated with neurobiological conditions than the categorical psychopathology dimensions.

| DOMAINS/CONSTRUCTS | UNITS OF ANALYSIS | | | | | | | Paradigms |
|-------------------------------------|-------------------|-----------|-------|----------|------------|----------|--------------|-----------|
| | Genes | Molecules | Cells | Circuits | Physiology | Behavior | Self-Reports | |
| Negative Valence Systems | | | | | | | | |
| Acute threat ("fear") | | | | | | | | |
| Potential threat ("anxiety") | | | | | | | | |
| Sustained threat | | | | | | | | |
| Loss | | | | | | | | |
| Frustrative nonreward | | | | | | | | |
| Positive Valence Systems | | | | | | | | |
| Approach motivation | | | | | | | | |
| Initial responsiveness to reward | | | | | | | | |
| Sustained responsiveness to reward | | | | | | | | |
| Reward learning | | | | | | | | |
| Habit | | | | | | | | |
| Cognitive Systems | | | | | | | | |
| Attention | | | | | | | | |
| Perception | | | | | | | | |
| Working memory | | | | | | | | |
| Declarative memory | | | | | | | | |
| Language behavior | | | | | | | | |
| Cognitive (effortful) control | | | | | | | | |
| Systems for Social Processes | | | | | | | | |
| Affiliation/attachment | | | | | | | | |
| Social communication | | | | | | | | |
| Perception/understanding of self | | | | | | | | |
| Perception/understanding of others | | | | | | | | |
| Arousal/Modulatory Systems | | | | | | | | |
| Arousal | | | | | | | | |
| Biological rhythms | | | | | | | | |
| Sleep-wake | | | | | | | | |

FIGURE 12.1 Research Domain Criteria Matrix. (From Cuthbert, B. N. (2014). *The RDoC Framework: facilitating transition from ICD/DSM to dimensional approaches that integrate neuroscience and psychopathology*. *World Psychiatry*, 13(1), 28–35, with permission. Copyright 2014 by John Wiley & Sons.)

RDoC classification rests on three assumptions. First, the RDoC system conceptualizes mental illnesses as brain disorders. In contrast to neurological disorders with identifiable lesions, mental disorders can be referred to as disorders of brain circuits. Second, RDoC classification postulates that the dysfunction in neural circuits can be assessed with clinical neuroscience measures, including electrophysiology, functional neuroimaging, and new methods for quantifying connections in vivo. Third, the RDoC suggests that data from genetics and clinical neuroscience “will yield biosignatures that will augment clinical symptoms and signs for clinical management” (p. 749). Examples where clinically relevant models of circuitry behavior links initiate future clinical use include fear/extinction, reward, executive function, and impulse control. For example, in the evaluation of an “anxiety disorder,” the evaluation should incorporate information from functional or structural imaging, genomic sequencing, and laboratory-based evaluations of fear conditioning and extinction.

RDoC rests on several assumptions, four of which are most significant (Cuthbert & Insel, 2013). First, RDoC is considered a transdiagnostic model, as it seeks markers of dysfunctional psychobiological circuitry that transcend multiple traditional disorder categories. Second, RDoC is translational in emphasis, encouraging researchers to apply the basic science of brain systems and behavior to an understanding of mental disorders. Third, RDoC adopts a dimensional framework in light of evidence that the activity of most brain circuits, such as reward and threat systems, is continuously distributed, with few or no clear-cut boundaries distinguishing normality from abnormality. Fourth, RDoC takes into account different levels of analysis, including the biological and behavioral (Cuthbert & Insel, 2013).

Although RDoC does not confound biological mediation with etiology, it may still place considerably less emphasis on psychosocial than on biological variables (Hershenberg & Goldfried, 2015; Lilienfeld, 2014). The RDoC matrix focuses mostly on intraindividual variables, with little or no explicit coverage of extraindividual variables, such as the social, developmental, or cultural context (Berenbaum, 2013; Shankman & Gorka, 2015; Whooley & Horwitz, 2013). This omission is significant given that the phenotypic expression of biological vulnerabilities may often be constrained by sociocultural factors. For example, religious beliefs, as well as regional differences in the pricing and availability of alcohol, are associated with—and probably causally linked to—risk for alcohol use disorder (Kendler, 2012b). Hence, even individuals with

a potent genetic propensity toward alcohol use disorder may display low rates of this condition if raised in a socially traditional environment.

Furthermore, five of the seven RDoC units of analysis focus explicitly on biological indicators, raising concerns that biological levels of analysis may receive undue attention by investigators (Berenbaum, 2013). Although several RDoC publications (e.g., Morris & Cuthbert, 2012) have acknowledged the importance of psychosocial variables and developmental considerations in the RDoC program, these processes are not explicitly represented in the matrix.

A key distinction that has received little attention in the RDoC literature is between biological predispositions to psychopathology and their behavioral manifestations (Lilienfeld, 2014). In this respect, the distinction between *basic tendencies* and *characteristic adaptations* in the personality literature provides a useful organizing framework (Harkness & Lilienfeld, 1997; McCrae & Costa, 1995). Basic tendencies are personality traits, such as negative emotionality, whereas characteristic adaptations are the behavioral expressions of these traits, such as an anxiety disorder. Wakefield's (1992) influential harmful dysfunction framework is broadly consistent with this distinction; this model posits that the definition of mental disorder is a conjunction of: (1) a failure in, or breakdown of, a naturally selected psychological system (dysfunction) and (2) impairment (harm). This model proposes that the presence of biological dysfunction alone is not sufficient for psychopathology; this dysfunction must also be manifested in social harm.

The distinction between basic tendencies and characteristic adaptations highlights the point that individuals with similar biological predispositions toward psychopathology can manifest these predispositions in different ways, in part as a consequence of developmental and psychosocial factors. If so, RDoC may be insufficient as a model for mental disorder, as it may often be unable to distinguish physiological risk factors for psychopathology from psychopathology per se (also Wakefield, 2014). If so, RDoC, at least in its present form, may be better suited as a model of predispositions toward mental illness than of mental illness itself.

The *Psychodynamic Diagnostic Manual version 2*

The *Psychodynamic Diagnostic Manual (PDM; Task Force, 2006)* is currently preparing its second edition (Huprich et al., 2015). The authors of the *PDM* sought to create a diagnostic manual that captured both the functional and the descriptive aspects of psychopathology. The *PDM* was published during a transitional period in mental nosology. This period began with the publication of the *DSM-III* in 1980.

The *DSM-III* represented a shift from a psychoanalytically influenced dimensional, inferential diagnostic system to a “neo-Kraepelinian” descriptive, multiaxial classification that relied on present versus absent criteria for identifying distinct mental disorders. The aim of this shift was to approach and endorse other theoretical orientations that gradually gained, such as cognitive-behavioral, family systems, humanistic, and biological. As a diagnostic manual, the *PDM* complements the *DSM* and focuses on the psychological, cognitive, emotional, and motivational processes that are components of various psychopathologies. These processes include “affect tolerance, regulation and expression; coping strategies and defenses; capacities for self and other understanding; and quality of relationships (*PDM Task Force, 2006, p. 3*).

The *PDM* provides a framework for improving comprehensive treatment approaches and for understanding the biological and psychological origins of both mental health and mental illness. In focusing on the full range of mental functioning, the *PDM* complements the *DSM* and ICD efforts to list symptoms and syndromes. In contrast to the *DSM*, the *PDM* has aspired to be a taxonomy of people rather than diseases, and has conceptualized its main purpose as helping clinicians to diagnose complex psychopathologies, formulate individual cases, and plan the suitable treatment for each patient.

Part 1—the adult section—opened with the Personality Patterns and Disorders (P) axis, followed by the Profile of Mental Functioning (M) axis. The patients' symptoms (and syndromes and their subjective experience of them; S axis) were intended to capture the phenomenology of mental illness—the personal, private experience of suffering—from the perspective of the patient. These three subsections were followed by illustrative case formulations demonstrating this more holistic, biopsychosocial kind of diagnosis.

Part 2—the child and adolescent section—reordered things a bit on the basis of respect for the developing nature of children's psychologies, and opened with the Profile of Mental Functioning axis, followed by the Emerging Personality Patterns and Disorders axis, then the Subjective Experiences axis. A special section on Infancy and Early Childhood Mental Health Disorders followed. Part 3 contained a selection of relevant empirical papers by noted scholars on psychodynamic diagnosis and psychotherapy research.

Schematically, according to this structure, the clinician should assess the following in all patients (except infants, assessed with the Infancy and Early Childhood section):

- Level of personality organization and the prevalent personality styles or disorders (Axis P for adults and Emerging Personality Patterns and Disorders for adolescents and children).

- Level of overall mental functioning (Axis M for adults and Profile of Mental Functioning for adolescents and children), on the basis of the evaluation of nine different, but partly overlapping, capacities: (1) capacity for regulation, attention, and learning; (2) capacity for relationships; (3) quality of internal experience and level of confidence and self-regard; (4) affective experience, expression, and communication; (5) defensive patterns and capacities; (6) capacity to form internal representations; (7) capacity for differentiation and integration; (8) self-observing capacity or psychological-mindedness; and (9) capacity for internal standards and ideals, each assessed along a continuum with four possible levels. After having assessed the level of these capacities, the clinician must estimate the overall health/sickness of the mental functioning of the patient on a continuum of eight possible levels.
- Symptoms and syndromes and the patient's subjective experience of them (Axis S for adult and Subjective Experiences for adolescents). The *PDM* considers each disorder as a constellation of signs, symptoms, or personality traits that constitute a unity of meaning. It attempts to capture the gestalt of human complexity while combining the precision of dimensional systems and the ease of categorical applications (Gazzillo, Lingardi, & Del Corno, 2012).

PDM-Derived Empirical Tools

Although the *PDM* has earned respect from both psychodynamic and nonpsychodynamic practitioners (Gordon, 2008, 2009), it runs the risk of being underestimated because it lacks appropriate assessment instruments. Thus, Gordon and Bornstein (2012) developed two user-friendly tools: the Psychodiagnostic Chart (PDC) and the Psychodynamic Diagnostic Prototypes (PDP).

The Psychodiagnostic Chart

The two forms of the PDC (Gordon & Bornstein, 2012) would operationalize the entire adult and children/adolescents sections of the *PDM*. The chart has been developed to be idiographic, flexible, and useful for practitioners of various theoretical orientations, to have a distinct dimension of personality structure, and to integrate the *PDM* with the symptom classifications of the *DSM* or *ICD*. The PDC has been developed on the basis of the *PDM* (first edition) structure and will be modified according to the *PDM-2* modifications.

Taken together, statistical analyses lend strong support to the construct validity of the Overall Personality Organization scale of the PDC. They specifically support the conclusion that personality patterns can exist on a continuum from neurotic to psychotic levels (Fig. 12.2). These analyses support the position of Kernberg (1984) and McWilliams (2011) that personality organization is the most important dimension by which overall psychopathology can be understood. This position

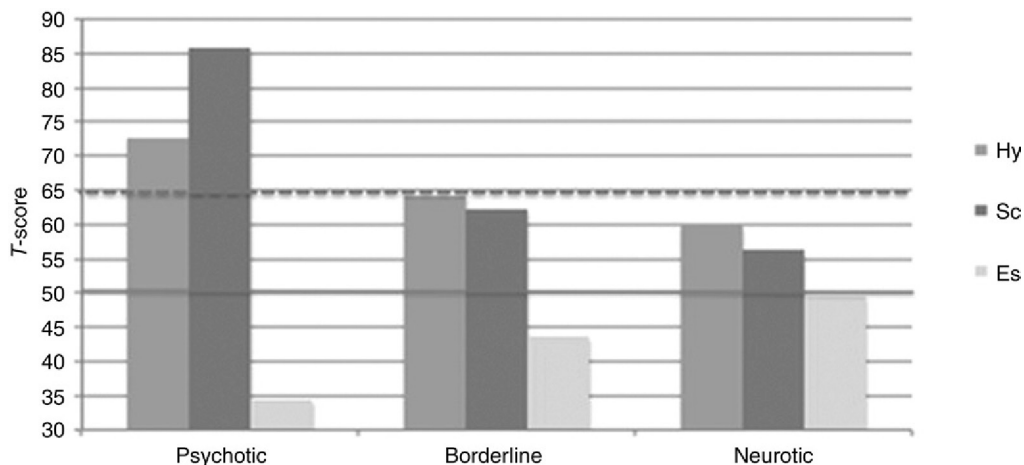


FIGURE 12.2 MMPI-2 Hysteria (Hy), Schizophrenia (Sc), and Ego Strength (Es) Scales within the Psychotic, Borderline, and Neurotic Categories of the Personality Organization Scale. Solid line at MMPI-2 score of T_{50} is average. Dotted line at T_{65} indicates clinically significant scores. Psychotic (ratings 1–3, $n = 13$), Borderline (4–6, $n = 52$), and Neurotic (7–10, $n = 33$). Psychotic: $Sc \gg Hy > Es$; Borderline: $(Sc \sim Hy) > Es$; and Neurotic: $(Sc \sim Hy) > Es$ all in average to moderate range. Hy: Psychotic $>$ Neurotic; Sc: Psychotic \gg (Borderline \sim Neurotic); Es: Neurotic \gg Psychotic; Neurotic $>$ Borderline; Borderline $>$ Psychotic. MMPI, Minnesota Multiphasic Personality Inventory; $T = T$ -scores: standard scores with a mean of 50 and a standard deviation of 10. (From Lingardi, V., McWilliams, N., Bornstein, R. F., Gazzillo, F., & Gordon, R. M. (2015). *The Psychodynamic Diagnostic Manual Version 2 (PDM-2): assessing patients for improved clinical practice and research*. *Psychoanalytic Psychology*, 32(1), 94, with permission. Copyright 2015 by the American Psychological Association.)

was recently empirically supported by the review conducted by [Koelen et al. \(2012\)](#). The authors found also that expert practitioners of various theoretical orientations (most of whom were not psychodynamically oriented) claim that personality organization is an essential dimension in understanding their patients, and that personality patterns express themselves across the range of personality structure. The conviction of the members of the Personality Task Force of the original *PDM* that personality should be assessed as a first step in diagnoses has thus received considerable empirical support and therefore will be a primary, distinct dimension or axis in *PDM-2*.

The Psychodynamic Diagnostic Prototypes

The PDP ([Gazzillo et al., 2012](#)) consists of 19 prototypic descriptions of PDs, one for each disorder included on the P axis of the *PDM*. The aim of the PDP is to help clinicians and researchers use the P axis even without a previous knowledge of the *PDM*. For this reason, the authors have taken the *PDM* descriptions of all the Axis P disorders, deleted the reference to articles and books presented in manual, and reformulated those parts of the *PDM* personality descriptions that were too theoretically laden or too inferential. To operationalize these theoretical concepts, the authors then took into account well-validated dynamic assessment tools, such as the Defense Mechanisms Rating Scale ([Perry, 1990](#)) and the Analytic Process Scales ([Waldron, Scharf, Hurst, Firestein, & Burton, 2004](#)).

The clinician/rater who uses the PDP assesses on a 1–5 rater scale the degree to which the patient resembles one or more PDP prototypes. A score of 1 means no resemblance, while a score of 5 means a complete match between the patient’s clinical presentation and the prototypical description of that PD; thus, with a score of 4 or 5, it is possible to make a categorical diagnosis of the disorder ([Spitzer, First, Shedler, Westen, & Skodol, 2008](#)).

Assessing the *concurrent and discriminant validity* of the PDP, the authors have used as criterion measures the *DSM-IV* Axis II personality diagnoses of patients as assessed by the raters with the Axis II checklist. The average correlation between the PDP and the analogous *DSM* disorder is .62, while the average correlation between the PDP prototype and a different *DSM* disorder is .05.

A psychodynamic or structural model of psychopathology

Another recently developed approach in the classification of psychopathology is the psychodynamic model as proposed by [Trimboli, Marshall, and Keenan \(2013\)](#). Adopting [Kernberg’s \(1984\)](#) framework of psychopathology, the authors divided psychopathology into three levels of ego development: *neurotic*, *borderline*, and *psychotic* levels. Kernberg proposed three primary variables that facilitate the differentiation among these three levels: *identity integrating*, *mode of defensive functioning*, and *intactness of reality testing*, as shown in [Table 12.1](#).

[Trimboli et al. \(2013\)](#) further differentiated these three superordinate structural levels into nine categories of adult psychopathology. These categories are arranged in terms of increasing severity as follows: *normal* (neurotically organized), *neurotic trait disorder*, and *neurotic symptom disorder*; *high-*, *mid-*, and *low-level borderline disorders*; and *affective*, *cognitive affective*, and *cognitive psychotic disorders*.

The authors propose the following seven key variables of personality functioning for creating an integrated framework: *cognition*, *affect*, *self-object relations*, *interpersonal relations*, *defenses*, *superego functioning*, and *primary dynamics*. By assessing these seven variables, clinicians will be able to determine where the patient’s symptoms and underlying personality structure fall on the structural dimension of psychopathology.

The nine categories of psychopathological functioning are organized in order of increasing severity of developmental deficits and embrace the entire range of diagnostic entities from “normal” and neurotic, through various levels of bipolar disorders, to affective and cognitive psychoses. The initial target was to determine at what point along the continuum of ego development the patient’s level of structural development falls.

TABLE 12.1 Level of Ego Organization and Associated Personality Variables

| | Neurotic | Borderline | Psychotic |
|--------------------|------------|------------|-----------|
| Identity integrity | Present | Absent | Absent |
| Level of defenses | Repression | Splitting | Splitting |
| Reality testing | Intact | Intact | Disrupted |

The *neurotic level of ego organization* comprises three diagnostic categories: “normal,” neurotic trait disorder, and neurotic symptom disorder. Individuals at all three levels are similar, manifesting identity integration, higher-level defenses (repression), intact superego and reality testing, and the ability for accurate mentalization, secure attachments, and reciprocal interpersonal relationships. Individuals who are characterized as “normal” are typically symptom free except when under stressful situations. Individuals with a neurotic trait disorder or a neurotic symptom disorder exhibit symptoms that correspond to the specific levels of functioning.

The authors distinguish three levels of *psychopath with borderline organizations*: high, mid, and low. All these levels share characteristics of identity diffusion (i.e., split-self and split-object relations), lower-level defensive functioning, and reality testing that is typically intact but characterized by a decreased capacity for mentalization. The degree of stable adaptive functioning, however, limited or pathologically based, is the major criterion for differentiating among the three levels of borderline organization.

In the *psychotic level of organization* the authors included affective psychosis, cognitive-affective psychosis, and cognitive psychosis.

Cognitive-Affective Processing System

The Cognitive-Affective Processing System (CAPS) model provides a conceptual framework that is comprehensive and inclusive of existing models of personality functioning. In this sense, models of personality disorders, such as psychoanalytic and psychodynamic, interpersonal, social cognitive, trait, and neurobiological can be readily mapped into this framework. The CAPS model (Mischel & Shoda, 1995; Fig. 12.3) describes the way individuals’ inner cognitive affective and motivational processes become activated within a specific social–environmental context. Such processes guide the individual toward consistent behavioral patterns within these social–environmental contexts. Although the CAPS model accounts for situational variation by assuming individuals vary in how they behave across situations, it also assumes that the underlying personality system is relatively stable (Mischel & Shoda, 2008).

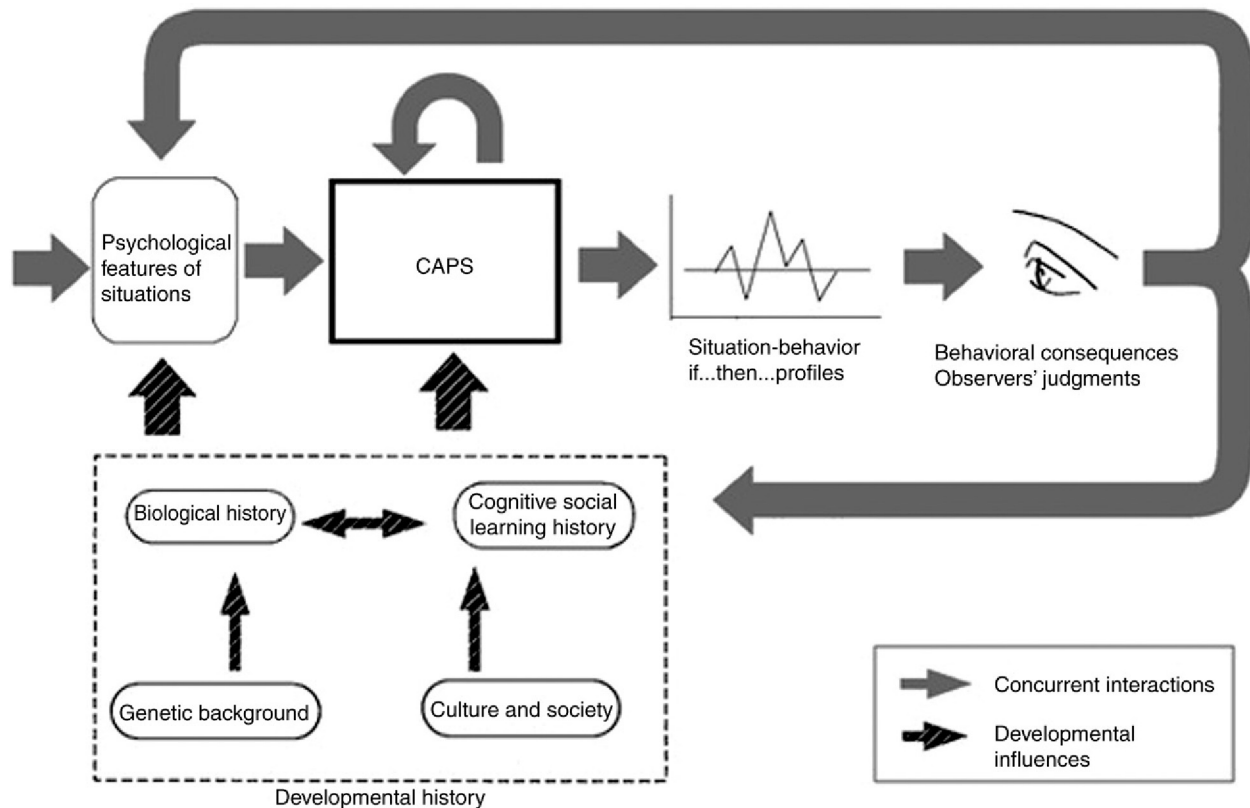


FIGURE 12.3 The Cognitive-Affective Personality System (CAPS) in relation to concurrent interactions and developmental influences. (From Mischel, W., & Shoda, Y. (1995). *A Cognitive-Affective System Theory of Personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure*. *Psychological Review*, 102(2), 246–268, with permission. Copyright 1995 by the American Psychological Association.)

TABLE 12.2 Types of Cognitive-Affective Units in the Personality Mediating System

| | |
|----|---|
| 1. | Encodings: Categories (constructs) for the self, people, events, and situations (external and internal) |
| 2. | Expectancies and Beliefs: About the social world, about outcomes for behavior in particular situations, about self-efficacy |
| 3. | Affects: Feelings, emotions, and affective responses (including physiological reactions) |
| 4. | Goals and Values: Desirable outcomes and affective states; aversive outcomes and affective states; goals, values, and life projects |
| 5. | Competencies and Self-Regulatory Plans: Potential behaviors and scripts that one can do, and plans and strategies for organizing action and for affecting outcomes and one's own behavior and internal states |

Source: Based in part on Mischel (1973). Reprinted from Mischel, W., & Shoda, Y. (1995). A Cognitive-Affective System Theory of Personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102(2), 246–268, with permission. Copyright 1995 by the American Psychological Association.

Level 1 is composed of an individual's various cognitive-affective units that interconnect in the mind to form a myriad of representational networks. These include an individual's encodings, expectancies and beliefs, affects, goals, and values, as well as competency or self-regulatory plans (Table 12.2).

Level 2 analysis in the CAPS model involves a description of the behaviors that result from the different patterns of activation occurring in Level 1. For example, if a person experiences a failure that results in doubting his or her ability, a distinct pattern of activation could occur in Level 1.

Level 3 is characterized by a behavioral expression that is observed by another person, who then forms an idea about the observed person's personality characteristics. In the previous example, this might include an observer forming impressions that the person in question is depressed or angry.

Level 4 of analysis identifies individuals' social and environmental contexts in which specific personality characteristics become expressed. The context could vary in its specificity for evoking specific behaviors and responses.

Level 5 represents the influence of each individual's biogenetic predispositions. This encompasses a large range of variables, including gender, sex, genetic predispositions, and cultural factors. The fifth level of analysis is different from the others, in that it recognizes that certain variables can be found across multiple levels (e.g., [Donnellan, Burt, Levendosky, & Klump, 2008](#)).

A network approach to environmental impact in psychotic disorders

The spectrum of psychotic disorders represents a multifactorial and heterogeneous condition that is thought to be the outcome of a complex interplay between genetic and environmental factors. Standard approaches to psychosis spectrum diagnosis, such as schizophrenia, conceptualize the construct as a latent structure that acts as a common cause of its symptoms ([Schmittmann et al., 2013](#)). This framework typically assumes that environmental factors affect symptoms via the latent disorders (i.e., the disorder mediates the relation between environmental and symptoms).

A recent study ([Varese et al., 2012](#)) challenges this assumption, as symptoms of a disorder are influenced by a variety of risk factors. An alternative model is the *network approach* ([Borsboom & Cramer, 2013](#)). Network models can disentangle the mechanisms that underlie the relation between environmental risk factors and disorders in the psychosis spectrum.

To provide an example of how network models can be used to investigate the association between schizophrenia and environmental exposure, [Isvoranu et al. \(2016b\)](#) constructed three networks of baseline data from the Early Developmental Stages of Psychopathology (EDSP) study ([Wittchen, Perkonig, Lachner, & Nelson, 1998](#)), a 10-year prospective follow-up study investigating vulnerability and risk factors for onset and progression of psychopathological syndromes (detailed information about the sample is available elsewhere) ([Wittchen et al., 1998](#); [Guloksuz et al., 2015](#)).

First, [Isvoranu, Borsboom, van Os, and Guloksuz \(2016\)](#) determined the network structure pertaining to three environmental risk factors (cannabis use, developmental trauma, and urban environment), seven dimensional measures of psychopathology (anxiety, depression, interpersonal sensitivity, OCD, phobic anxiety, somatizations, and hostility), and one composite dimensional measure of psychosis expression. They estimate this network using the *mgm* R-package ([Haslbeck & Waldorp, 2016](#)); details about the method and a step-by-step tutorial on how to execute this type of analysis are available elsewhere ([Haslbeck & Waldorp, 2016](#); [Costantini et al., 2015](#)).

The resulting network (Fig. 12.4) shows a dense pattern of connections between dimensions of psychopathology and suggests that the three environmental risk factors are differentially related to specific symptoms in this network. For

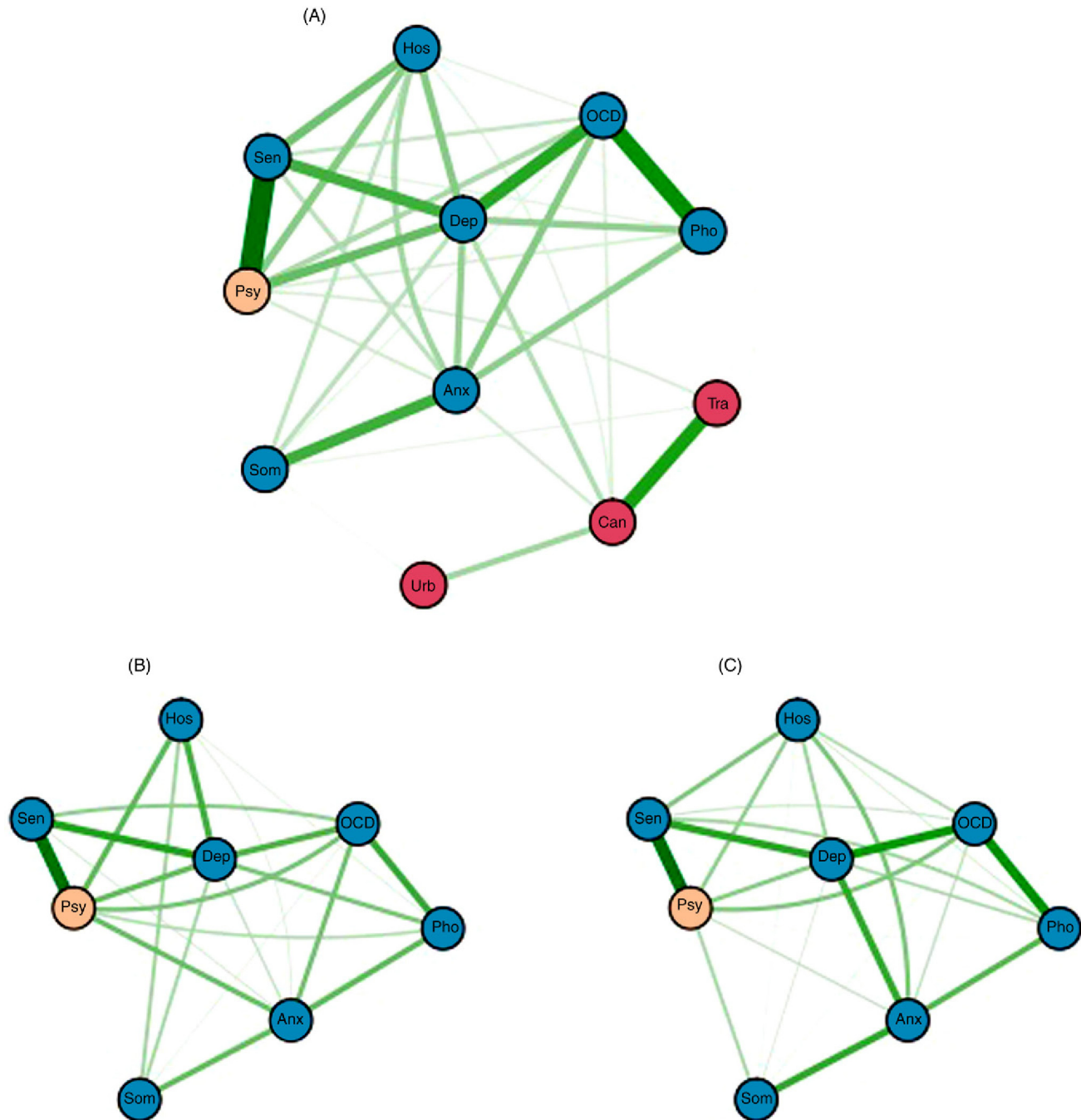


FIGURE 12.4 (A) Network visualization of interrelations between environmental factors and schizophrenia symptomatology. (B–C) Network visualization of differences in psychopathology symptoms connectivity between a group not exposed to any of the three environmental factors and a group exposed to cannabis use. (B) No environmental exposure and (C) environmental exposure to cannabis. Environmental exposure: *Can*, Cannabis; *Tra*, trauma; *Urb*, urbanicity. Psychopathology: *Anx*, Anxiety; *Dep*, depression; *Hos*, hostility; *OCD*, obsessive-compulsive disorder; *Pho*, phobic anxiety; *Sen*, interpersonal sensitivity; *Som*, somatization. Psychosis expression: *Psy*, Paranoid ideation and psychoticism. (From Isvoranu, A. M., Borsboom, D., van Os, J., & Guloksuz, S. (2016). *A network approach to environmental impact in psychotic disorder: brief theoretical framework*. *Schizophrenia Bulletin*, *sbw049*, with permission. Copyright 2016 by Oxford University Press.)

example, *developmental trauma* is linked to *psychosis expression* and *somatization*, while *cannabis use* is much more strongly related to other domains of psychopathology, such as *depression*, *anxiety*, *OCD*, and *hostility*. In addition, there is a strong positive link between *trauma* and *cannabis use*. *Urbanicity* has the least strong direct impact on psychopathology symptoms, featuring only one (weak) positive connection to *somatization* (i.e., people coming from urban areas may be more prone to expressing symptoms of somatization). In fact, the network suggests that the effect of *urbanicity* may be

largely mediated by *cannabis use*—people in urban areas may be more likely to use cannabis, which may in turn lead to the development of, for example, anxiety.

The network approach is a novel psychometric framework based on a dynamic systems perspective. In network models, mental disorders, such as schizophrenia, are not conceptualized as common causes of symptoms, but as conditions that arise from the interaction between symptoms. Specifically, if symptoms engage in patterns of mutual reinforcement and feedback, the system as a whole can get “locked” in a state of extended (or even permanent) symptom activation: a mental disorder. Individual differences in vulnerability are naturally represented as differences in the connectivity of the network model; in more strongly connected networks, symptoms feature a higher level of interaction, which means that they will more easily activate each other to render the system as a whole less resilient.

The relevant patterns of interaction can be visualized in a network structure, in which variables (here: risk factors and measures of psychopathology) are represented as *nodes*. The presence of an *edge* between any two nodes implies the existence of a statistical association, which does not vanish upon controlling for all of the other nodes in the network (e.g., a partial correlation). Thus, the presence of an edge is suggestive of the existence of a causal relation, although it does not specify the nature or direction of such a relation. In standard visualizations, green edges indicate positive connections, while red edges indicate negative connections (Borsboom & Cramer, 2013).

General psychopathology factor (*p* factor)

Hasin and Kilcoyne (2012) assume that common *DSM* psychiatric disorders in adulthood incorporate by two underlying core psychopathological processes: an *internalizing dimension* indicating liability to experience mood and anxiety disorders, such as major depression, GAD, panic disorder, and social phobia, and an *externalizing dimension* indicating liability to experience substance disorders and antisocial disorders. During the past 15 years, multiple studies in different parts of the world, in different age groups, in general community samples, and in clinical populations (e.g., Forbush & Watson, 2013; Kendler et al., 2003b; Krueger, 1999; Slade & Watson, 2006) have replicated this basic finding (Krueger & Markon, 2006, 2011).

With the publication of the *DSM-5* and debate focusing on the need for a dimensional nosology (Insel, 2013), Caspi et al. (2014) evaluated six recent findings about the epidemiology of mental disorder. First, life-course epidemiology points to the need for longitudinal research designs to study the course of psychopathology. Previous research on the structure of psychopathology has been carried out using cross-sectional designs, focusing on individuals who report symptoms within a specified period. However, research has revealed that cross-sectional designs combine single-episode one-off cases with recurrent and chronic cases, which are known to differ in the extent of their comorbid conditions, the severity, and possibly the etiology of their conditions.

Second, sequential comorbidity led to the need to model multiple disorders over time. Previous research focused on comorbidity as defined by the cooccurrence of two or more disorders at the same time. However, both retrospective (Kessler et al., 2011) and prospective longitudinal (Copeland, Shanahan, Costello, & Angold, 2011) studies have shown that comorbidity is also sequential. Caspi et al. (2014) highlight the need to take into account both concurrent and sequential comorbidity when evaluating the structure of psychopathology.

Third, previous research has omitted psychotic disorders from the evaluation of the structure of psychopathology. Only recently have some researchers incorporated psychotic symptoms and symptoms of schizotypal PDs into their assessment of the structure of psychopathology, indicating to the existence of a third, distinct thought disorder spectrum (Kotov et al., 2011a,b). According to Caspi et al. (2014), efforts to model the structure of psychopathology without consideration of psychotic symptoms may not represent the population as a whole.

Fourth, twin studies and risk factor studies have suggested that the liability to many disorder pairs (e.g., schizophrenia and bipolar disorder; major depression and GAD) is influenced by the same genetic factors (e.g., Lichtenstein et al., 2009; Sartor et al., 2010) and that many disorder pairs are characterized by shared intermediate phenotypes (Nolen-Hoeksema & Watkins, 2011). These findings suggest that the causes of different disorders may be similar, underscoring the potential value of a transdiagnostic approach to psychiatric disorder.

Fifth, in previous studies, research has illustrated *DSM* disorders as dichotomous variables. Diagnostic thresholds have been increasingly considered arbitrary. There is meaningful and useful clinical information above and below diagnostic thresholds (e.g., Kessler et al., 2003; Lewinsohn, Shankman, Gau, & Klein, 2004).

Sixth, evidence is required regarding the possibility of one *General Psychopathology* factor. This speculation has emerged from the observation that disorders are positively correlated not just at the disorder level, but also at the spectrum level. Given high correlations at the spectrum level, Lahey et al. (2012) suggested the possibility that in addition to

propensities to specific forms of psychopathology (e.g., Internalizing vs. Externalizing), there may be one underlying factor that reflects all forms of common psychopathologies. A useful way to think about the meaning of such a general factor in psychopathology is by analogy in relation to cognitive abilities. Caspi et al. (2014) used confirmatory factor models to test a hierarchical bifactor model that derives a general factor from the correlation matrix between different mental disorders and found that depression, anxiety, substance use, and conduct/antisocial disorders all loaded strongly on a single factor, in addition to specific Internalizing and Externalizing spectra.

Caspi et al. (2014) proposed that the p factor influences present/absent performance on hundreds of psychiatric symptoms, which are typically aggregated into dozens of distinct diagnoses, which further aggregate into two overarching Externalizing versus Internalizing domains and finally cluster into one normally distributed dimension of psychopathology from low to high: p . Almost all of the variation in the lower-order abilities is accounted for by p . The higher one's p , the higher the possibility of the severity and duration of disorder, extent of sequential comorbidity, adult life impairment, childhood developmental history, family history of liability to psychiatric illness, and brain function from early life to midlife.

Thus, it appears that p is a dimension that unites all disorders and has neurological roots. It is important to acknowledge that the uniformly positive correlations observed within and across disorders—and the resulting factor solutions—do not prove the existence of a unitary g -like causal factor. As has been pointed out in relation to intelligence (van der Maas et al., 2006), such positive intercorrelations also could result from dynamic processes during development, rather than from a single unitary cause (e.g., having one disorder could raise the risk of developing most other disorders).

DEVELOPMENTS IN CLINICAL ASSESSMENT

Assessment is a critical phase, as it affects treatment planning or intervention. Before treatment planning, clinicians form a diagnostic hypothesis. Data collection through a variety of methods aids to confirm or disprove their initial hypothesis regarding the patient's pathology. The most common measures employed during the assessment process are semistructured interviews (SSI) and broad spectrum questionnaires (BSQ). SSI are standardized tools with a large number of questions. During the interviewing, clinicians select further questions based on the ones previously answered, a process referred to as the "adaptability of assessment." However, SSI are often time consuming and can be affected by reasoning biases introduced by clinicians (Groth-Marnat, 2009). BSQ can also be time consuming to complete and interpret. Moreover, questionnaires provide a set of summed scores where a given score can result from different response patterns. Due to their additive basis, traditional psychometric approaches and in particular self-report inventories do not provide significant information about response patterns (e.g., Fava, Ruini, & Rafanelli, 2004). In sum, an issue is that clinicians do not have a readily available formal, objective method to interpret clinical outcome derived by the combination of the patient's responses to questionnaires.

The *formal psychological assessment* (Bottesi, Spoto, Freeston, Sanavio, & Vidotto, 2015) is an attempt to overcome this limitation by conceptualizing the clinical diagnosis as a multidimensional set of elements that characterize a patient and that can be ordered in terms of relevance (Table 12.3).

The formal psychological assessment is a theoretically neutral methodology (comparable, in terms of broadness of application, to analysis of variance, factorial analysis, and case-control studies) that could be applied to personality inventories and instruments. More specifically, the generalization of the procedure could be carried out through the following steps: (1) identification of a set of items to be used; (2) identification of a theoretical framework, as well as its own attributes; (3) attribution of assignment and clinical context construction; (4) given the clinical context, the clinical structure can be obtained; and (5) testing of the obtained deterministic structure on an adequate sample. As an example, a deterministic model could be constructed using the Millon Clinical Multiaxial Inventory-III (MCMI-III; Millon & Davis, 1997) and the *DSM-5* (American Psychiatric Association, 2013) criteria for PDs; and then the probabilistic model could be subsequently tested. Consider Item 114 of the MCMI-III: "A good way to avoid mistakes is to have a routine for doing things," which is included in the subscale assessing obsessive-compulsive personality disorder (OCPD). When building the clinical context, this object can be mapped to two attributes (*DSM-5* criteria for OCPD), namely, "Is preoccupied with details, rules, lists, order, organization or schedule to the extent that the major point of the activity is lost" and "Shows rigidity and stubbornness." Likewise, Item 137, "I always see to it that my work is finished before taking time out for leisure activities," can be mapped to the attribute "Is excessively devoted to work and productivity to the exclusion of leisure activities and friendships (not accounted for by obvious economic necessity)." The other six items could then be mapped, as potentially could items that are currently on other scales but map to the attributes.

TABLE 12.3 Definitions of the Main Concepts of Formal Psychological Assessment

| Concepts | Definitions |
|-----------------------------------|--|
| Object | An item investigating some clinical issue |
| Attribute | A clinical symptom or criterion used to specify one or more clinical disorders |
| Clinical context | An objects \times attributes Boolean matrix containing a 1 in a cell ij whenever the item i investigates the attribute j , and a 0 elsewhere |
| Clinical domain | The set Q of all the clinical items that can be asked about a specific disorder |
| Prerequisite relation | A relation defined among the items of the domain stating that whenever an item i investigates a subset of the attributes of another item i' i is a prerequisite for i' |
| Clinical state | The subset K of items of the domain that describes an individual according to the prerequisite relation defined among the items; the clinical state is latent and not directly observable, and it can be inferred on the basis of the response pattern and some error parameters |
| Clinical structure | The couple (Q, κ) where Q is the clinical domain and κ is the collection of clinical states satisfying the prerequisite relation |
| Admissible response pattern | It corresponds to the clinical state; it is said to be admissible, as it satisfies the prerequisite relation in the following way: If i is a prerequisite for i' , there won't be any admissible response patterns containing i' and not containing i |
| False positive rate (η_i) | It represents the probability to observe an affirmative answer to an item i even if the individual does not satisfy all the attributes investigated by i |
| False negative rate (β_i) | It represents the probability to observe a negative answer to an item i even if the individual does satisfy all the attributes investigated by i |
| Probabilistic clinical structure | It is the quintuple $(Q, \kappa, \pi, \eta, \beta)$ where (Q, κ) is a clinical structure, π is a probability distribution on the clinical states, and η and β are two vectors including the values of false positive and false negative rates, respectively, for each item of the domain |
| Node | Each of the points in Fig. 12.1 represents both the clinical state and the set of attributes investigated by that specific clinical state |

Source: From Bottesi, G., Spoto, A., Freeston, M. H., Sanavio, E., & Vidotto, G. (2015). Beyond the score: clinical evaluation through formal psychological assessment. *Journal of Personality Assessment*, 97(3), 252–260, with permission. Copyright 2015 by Taylor & Francis Ltd.

INTERVIEWS

The Diagnostic Interview Schedule for Children

The *Diagnostic Interview Schedule for Children* (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000) is a fully structured diagnostic instrument that assesses 34 common psychiatric diagnoses of children and adolescents. The DISC-IV is designed for interviewer administration—either by lay interviewers (people with no formal clinical training) or by clinicians—or by self-completion.

The DISC-IV has been designed to obtain information about *DSM-IV* (American Psychiatric Association, 1994) diagnoses, essentially by ascertaining the presence or absence of symptoms. The instrument uses the diagnostic criteria as specified in *DSM-IV* (with *DSM-III-R* (American Psychiatric Association, 1987) and the ICD-10 classification of mental and behavioral disorders (World Health Organization, 1992). It does not elicit contextual information except to determine bereavement reactions, and specific rule-outs that would cast doubt on the diagnoses (e.g., failure to speak in Selective Mutism when unfamiliar with English).

The DISC-IV cannot be used to establish a diagnosis for conditions that require the interpretation of specialized test results or to replace information derived from clinical observations. For these reasons, it does not cover diagnoses, such as pervasive developmental disorders, speech and language disorders, or the organic brain syndromes.

The DISC-IV was originally developed for use in large-scale epidemiological surveys of children and adolescents, but is now also being used in many clinical studies, screening projects, and service settings. More specifically, the DISC-IV can be used as:

- An aid to clinical assessment (it produces an instant diagnostic report prior to examination, and allows the clinician to focus on problems).
- Mental health screening (e.g., suicide prevention screens) applicable in schools, residential or foster care, juvenile justice.

- Diagnostic assessment in settings without psychiatric expertise (e.g., pediatric or family practice, and emergency rooms).
- Research: Inclusion and exclusion criteria for treatment protocols, low-cost assessment in large-scale field studies, and mapping comorbidity in research samples.

Computerized Diagnostic Interview Schedule for Children

The *Computerized Diagnostic Interview Schedule for Children* (C-DISC; Fisher, Lucas, Lucas, Sarsfield, & Shaffer, 2006) is a comprehensive, structured interview that covers 36 mental health disorders for children and adolescents, using *DSM-IV* (American Psychiatric Association, 1994) criteria. The C-DISC is the most widely used and studied mental health interview that has been tested in both clinical and community populations. Parallel youth and caretaker interviews are available that are suitable for children aged 9–17 years, and for caretakers of 6–17 year olds.

One version of the C-DISC is lay interviewer administered, while another is self-administered using computerized voice files. Both produce a series of reports, including a diagnostic report that indicates endorsed symptoms, criteria, and diagnoses. These reports can be used by a clinician as part of a more thorough assessment.

The Structured Clinical Interview for *DSM-5*

The *Structured Clinical Interview for DSM-5* (SCID-5; First, 2015) has been the diagnostic interview most widely used by researchers for making *DSM* diagnoses for the past 30 years, and SCID-5 is its most updated version to be used for diagnoses with the *DSM-5* (American Psychiatric Association, 2013). As was the case with earlier editions (e.g., Structured Clinical Interview for *DSM-IV*), it includes different versions for research, clinical trials, major mental disorders, and PDs.

SCID-5-RV

The most comprehensive version of the SCID-5, the *Structured Clinical Interview for DSM-5, Research Version* (SCID-5-RV) (First, Williams, Karg, & Spitzer, 2015b) contains more disorders than the Clinician Version and includes all of the relevant subtypes, severity, and course specifiers. The SCID-5-RV comes in a standard “core” configuration that includes the disorders most researchers are likely to assess routinely for most studies, as well as in an “enhanced” configuration that additionally includes a number of optional disorders.

An important feature of the SCID-5-RV is its customizability, allowing the instrument to be tailored to meet the requirements of a particular study, for example, to remove unneeded elements, such as certain specifiers, to alter the flow through the interview or add additional scales of the researcher’s choosing, such as severity rating scales.

SCID-5-CV

The *Structured Clinical Interview for DSM-5, Clinician Version* (SCID-5-CV; First, Williams, Karg, & Spitzer, 2015c), is a SSI in supplementing or supporting the *DSM-5* (American Psychiatric Association, 2013) diagnoses. The SCID-5-CV guides the clinician through the diagnostic process by providing questions along each corresponding *DSM-5* criterion, which is rated as either present or absent.

The SCID-5-CV is a shortened and reformatted version of the Research Version of the SCID. It covers the *DSM-5* diagnoses most commonly seen in clinical settings: depressive and bipolar disorders, schizophrenia spectrum and other psychotic disorders, substance use disorders, anxiety disorders (panic disorder, agoraphobia, social anxiety disorder, GAD), OCD, PTSD, ADHD, and adjustment disorder. It also screens for 17 additional *DSM-5* disorders that are included in their entirety in the SCID-5-RV, but have been left out of the SCID-5-CV. If the patient answers any of these screening questions in the affirmative, the clinician needs to follow up with an unstructured clinical assessment of the diagnostic requirements for the screened disorders.

Besides diagnostic coverage, the SCID-5-CV differs from the SCID-5-RV in other ways. The specifiers included in the SCID-5-CV are limited to those that have an impact on the diagnostic coding. Thus, only the severity, psychosis, and remission specifiers for Bipolar Disorder and MDD are included in the SCID-5-CV. Similarly, the ADHD presentation types (i.e., predominantly inattentive, predominantly hyperactive/impulsive, and combined) are included because they are also required to determine the diagnostic code. Moreover, although most of the disorders in the SCID-5-RV are assessed for both current and lifetime, the SCID-5-CV focuses largely on whether the criteria are currently met, as the current clinical status of a disorder is most relevant for treatment decisions. The only disorders in the SCID-5-CV that also include a lifetime assessment are MDD, Bipolar I and II Disorders, Schizophrenia and the other psychotic disorders, Panic Disorder, and PTSD.

Despite the “clinician” designation, the SCID-5-CV can be used in research settings as long as the disorders of particular interest to the researcher are among those included in the SCID-5-CV.

SCID-5-CT

The *Structured Clinical Interview for DSM-5 Disorders, Clinical Trials Version* (SCID-5-CT; First, Williams, Karg, & Spitzer, 2015d) is a modified version of the SCID-5-RV that has been reformatted and adapted for use in clinical trials. It is typically modified to include only those diagnostic elements of the SCID-5 that are needed to determine whether the subject fulfills the inclusion and exclusion criteria of a particular clinical trial.

SCID-5-PD

The *Structured Clinical Interview for DSM-5 Personality Disorders* (SCID-5-PD; First, Williams, Benjamin, & Spitzer, 2015a) is a semistructured diagnostic interview for the assessment of the 10 *DSM-5* PDs across Clusters A, B, and C (avoidant, dependent, obsessive–compulsive, paranoid, schizotypal, schizoid, histrionic, narcissistic, and antisocial PD), as well as other specified PD. The SCID-5-PD also includes the Structured Clinical Interview for the *DSM-5* Screening Personality Questionnaire (SCID-5-SPQ). The SCID-5-SPQ serves as a brief, 20-min self-report screening instrument to reduce the time of the SCID-5-PD clinical interview. Its 106 questions correspond directly to each first question in the full SCID-5-PD.

The SCID-5-PD is the updated version of the former *Structured Clinical Interview for DSM-IV Axis II Personality Disorders* (SCID-II; First, Gibbon, Spitzer, & Benjamin, 1997). Although the *DSM-IV* (American Psychiatric Association, 1994) PD criteria are unchanged in *DSM-5* (American Psychiatric Association, 2013), the SCID-5-PD interview questions have been thoroughly reviewed and revised to optimally capture the construct reflected in the diagnostic criteria. In addition, the SCID-5-PD can be used to diagnose PD, either categorically (present or absent) or dimensionally.

The basic structure of the SCID-5-PD is similar to the other SCID-5 interviews that cover nonpersonality *DSM-5* disorders, and it can be used in various types of research studies, just as the SCID-II can be used. It has been used to investigate patterns of PDs cooccurring with other mental disorders or medical conditions, select a group of study subjects with a particular PD, investigate the underlying structure of personality pathology, and compare with other assessment methods for PDs.

SCID Reliability and Validity

Studies examining the psychometric properties of the SCID-5 have not yet been published. However, reliability and validity of the SCID, both for *DSM-IV* (American Psychiatric Association, 1994) and the previous *DSM-III-R* version (American Psychiatric Association, 1987), have been reported in several studies. To mention a few, Lobbestael, Leurgans, and Arntz (2011) report moderate to excellent interrater agreement of the *DSM-IV* Axis I disorders, while most categorically and dimensionally measured PDs showed robust interrater agreement. Zanarini and Frankenburg (2001) and Zanarini et al. (2000) concluded, based on their results, that both *DSM-IV* Axis I and Axis II disorders can be diagnosed reliably when using appropriate SSI, and that the reliability of Axis II disorders is both good to excellent and practically equivalent to that found for most Axis I disorders. Also, they suggest that high levels of reliability, once achieved, can be maintained over time for both Axis I and II disorders. Skodol, Oldham, Rosnick, Kellman, and Hyler (1991) and Zanarini et al. (2000) investigated the convergent validity of the *DSM-III-R* SCID-II by comparing it to diagnoses made by the International Personality Disorder Examination (IPDE; Loranger, 1999). The authors found that the two instruments’ diagnoses for each PD measure the same PDs to a “reasonable” extent.

The Structured Clinical Interview for DSM-IV Childhood Diagnoses

The *Structured Clinical Interview for DSM-IV Childhood Diagnoses* (KID-SCID; Matzner, 1994) is a less known SSI developed to assess children’s psychopathology and follows the basic conventions as the standard SCID (i.e., overall structure, ratings, etc.). It includes many of the childhood disorders, as well as most of the “adult” disorders included in the SCID, with probe questions reformulated to suit children. Preliminary findings (Matzner, Silva, Silvan, Chowdhury, & Nastasi, 1997) suggested that test–retest reliability of disruptive behavior and anxiety diagnoses in a clinic population is good, with three diagnoses showing excellent reliability. Additionally, a more recent study (Roelofs, Muris, Braet, Arntz, & Beelen, 2015) concludes that the KID-SCID can generally be seen as a reliable and useful tool and can assist clinicians in carrying out clinical evaluations of children and adolescents.

The Diagnostic Interview for *DSM-IV* Personality Disorders

The *Diagnostic Interview for DSM-IV Personality Disorders* (DIPD-IV; Zanarini, Frankenburg, Sickel, & Yong, 1996) is another semistructured clinical interview for the assessment of all *DSM-IV* PDs. Like most clinical interviews, specialized training is required before the interview can be administered, and it lasts around 90 min. The interview has 108 items, with each disorder rated on a scale of 0 (disorder is absent) to 2 (disorder is present). If the total scores exceed a threshold, the clinician can diagnose a disorder. The original paper cites internal consistency levels in a range of .64–.93, with six of the disorders having levels greater than .70; acceptable levels of test–retest reliability with kappas in a range of .58–1 are reported over a 6-month period.

The Structured Interview for *DSM-IV* Personality Disorders

The *Structured Interview for DSM-IV Personality Disorders* (SIDP-IV; Pfohl, Blum, & Zimmerman, 1997) is a fairly brief interview (lasting roughly 60 min.) that features both a patient and an informant. There are two versions of the SIDP-IV: a diagnostic version and a “topical” version, though the only difference is the order of the questions. The benefit of including a topical version is that the natural sequence of questions is designed to make interviewing defensive patients easier. The SIDP-IV can also assess for Personality Disorder Not Specified (PDNOS), although it will diagnose this when disorders are one criterion short of the diagnostic threshold. Interrater reliability for each PD was found to be greater than .70 in two studies (Damen, de Jong, & van der Kroft, 2004; Jane, Pagan, Turkheimer, Fiedler, & Oltmanns, 2006).

SELF-REPORT ASSESSMENT

Minnesota Multiphasic Personality Inventory-2 Restructured Form

The Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF) (Ben-Porath & Tellegen, 2008), a new version of the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), includes Restructured Clinical (RC) Scales (Tellegen et al., 2003) and was subsequently subjected to extensive research (e.g., Arbisi, Sellbom, & Ben-Porath, 2008; Forbey & Ben-Porath, 2007; Sellbom, Ben-Porath, & Graham, 2006; Sellbom, Ben-Porath, McNulty, Arbisi, & Graham, 2006; Sellbom, Graham, & Schenk, 2006; Simms, Casillas, Clark, Watson, & Doebbeling, 2005), with an overriding goal of improved discriminant validity, or the test’s ability to reliably differentiate between clinical syndromes or diagnoses. Most of the MMPI and MMPI-2 Clinical Scales are relatively heterogeneous; that is, they measure diverse groupings of signs and symptoms, such that an elevation on Scale 2 (Depression), for example, may or may not indicate a depressive disorder. The MMPI-2-RF scales, on the other hand, are fairly homogeneous, designed to measure more precisely distinct symptom constellations or disorders. From a theoretical perspective, the MMPI-2-RF scales rest on the assumption that psychopathology is a homogeneous additive condition.

The MMPI-2-RF normative sample was drawn from the MMPI-2 normative sample and consists of 2276 individuals aged 18–80 years from several regions and diverse communities in the United States. No new norms were collected for the MMPI-2-RF.

The RC Scales were designed to be psychometrically improved versions of the original Clinical Scales, which were known to contain a high level of interscale correlation and overlapping items, and were confounded by the presence of an overarching factor that has since been extracted and placed in a separate scale (demoralization) (Bosch et al., 2014). The RC scales measure the core constructs of the original clinical scales.

Finally, the RC scales have lower interscale correlations and, in contrast to the original clinical scales, contain no interscale item overlap (Tellegen et al., 2006). The effects of removal of the common variance spread across the older clinical scales due to a general factor common to psychopathology, with the use of sophisticated psychometric methods, has been characterized as a paradigm shift in personality assessment (Archer, 2006; Rogers, Sewell, Harrison, & Jordan, 2006). Critics of the new scales argue that the removal of this common variance makes the RC scales less ecologically valid because patients tend to present complex patterns of symptoms.

The validity scales in both the MMPI-2 and MMPI-2-RF contain three basic types of validity measures: those that were designed to detect nonresponding or inconsistent responding (CNS, VRIN, and TRIN), those designed to detect when clients are overreporting or exaggerating the prevalence or severity of psychological symptoms (F, Fb, Fp, and FBS), and those designed to detect when test takers are underreporting or downplaying psychological symptoms (L, K, and S). A new addition to the validity scales for the MMPI-2-RF includes an overreporting scale of somatic symptoms (Fs), as well as revised versions of the validity scales of the MMPI-2. The MMPI-2-RF does not include the S or Fb scales, and the F-restructured scale now covers the entirety of the test.

The Content Scales of the MMPI-2 were developed (Butcher, Graham, Williams, & Ben-Porath, 1990) to increase the incremental validity of the clinical scales. The Content Scales contain items intended to provide insight into specific types of symptoms and areas of functioning that the Clinical Scales do not measure, and are supposed to be used in addition to the Clinical Scales to interpret profiles. The items on the Content Scales contain obvious content and therefore are susceptible to response bias, exaggeration, or denial of symptoms, and thus should be interpreted with caution.

The diagnostic construct validity of the MMPI-2-RF has been examined in patient samples (Sellbom, Bagby, Kushner, Quilty, & Ayearst, 2012). Participants were diagnosed with the Structured Clinical Interview for *DSM-IV* Axis I Disorders—Patient Edition (SCID-I/P; First, Spitzer, Gibbon, & Williams, 1997), and the data set used was composed of 544 patients: 67 with bipolar disorder, 407 with MDD, and 70 with schizophrenia. Multivariate analyses revealed a pattern of mean scale differences among patient groups that was mostly consistent with the prominent features of each diagnostic group. Logistic regression analyses identified a number of scales that were strong, unique predictors in the differentiation between pairs of diagnostic groups. The higher-order (H-O), Emotional/Internalizing Dysfunction (EID), and Thought Dysfunction (THD) scales were most useful in differentiating between patient groups, whereas the Activation (ACT) Specific Problem scale was most useful for differentiating bipolar disorder patients from other diagnostic groups. Although not all hypothesized scale differences emerged, the authors (Sellbom, Wygant, & Bagby, 2012) conclude that, overall, the pattern of results provides support for the diagnostic construct validity of the MMPI-2-RF scales.

Millon Clinical Multiaxial Inventory

The MCMI-I (Millon, 1977) was first published to measure the pathologies of personality formulated in Millon's (1969/1983) original theoretical model. At the time Millon was involved in developing the *DSM-III* (American Psychiatric Association, 1980). He played a pioneering role by introducing the idea to place PDs on a separate axis so that sufficient clinical attention would be given to personality pathology. He developed the MCMI-I to be aligned with *DSM-III* nosology and grouped its scales into categories of personality and clinical syndromes to reflect the distinction between Axis I and Axis II.

After publication of the *DSM-III-R* (American Psychiatric Association, 1987), Millon revised his instrument (MCMI-II; Millon, 1987) to incorporate scales for two new, provisional PDs (i.e., self-defeating and sadistic). The test was also updated to reflect changes in Millon's model (Millon & Klerman, 1986). In this regard a PTSD scale was added to measure the *DSM-IV* (American Psychiatric Association, 1994) trauma syndrome, and three PD scales were renamed: Aggressive became Sadistic, Passive–Aggressive became Negativistic, and Self-Defeating became Masochistic. Psychometric refinements included improved item wording, shorter scales, and a return to the simpler (1 vs. 2) item-weighting system used with the MCMI-I. In 2009, T. Millon, C. Millon, Davis, and Grossman (2009) restandardized the MCMI-III BR scores using a combined-gender norm sample of approximately 1000 men and women, replacing the previous system of calculating BR scores separately for men and women. He also added a set of Grossman facet scales for the PDs and introduced an inconsistency index to assist in the assessment of profile validity.

The MCMI-IV (Millon, Millon, & Grossman, 2015) has been published with the same goals as its predecessors. *DSM-5* (American Psychiatric Association, 2013) combines Axes I, II, and III into one list that contains all mental disorders, including PDs. Significantly, the MCMI-III's scales remain compatible with the recently published *DSM-5*, as categorical diagnosis of PDs was retained in Section II, and no new PDs were introduced.

An advantage of the MCMI is that its test scales can be interpreted both categorically and dimensionally. Millon created cutoff points for scales at BR 75 and BR 85 that are linked to the prevalence of each disorder in a general psychiatric population.

The Personality Assessment Inventory

The Personality Assessment Inventory (PAI; Morey, 1991) is a self-administered, multiscale inventory intended to provide clinically useful information about client variables in professional and research settings. It consists of 344 items that are answered on a 4-point Likert-type scale, with the options of Totally False, Slightly True, Mainly True, and Very True. The 344 items encompass 22 nonoverlapping full scales: 4 validity, 11 clinical, 5 treatment consideration, and 2 interpersonal. The clinical syndromes assessed by the PAI were selected on the basis of the stability of their importance within the nosology of psychopathology and their significance in contemporary diagnostic practice. Ten of the full scales contain conceptually derived subscales that were designed to facilitate interpretation and coverage of the full breadth of clinical constructs. The literature on each clinical syndrome was examined to identify those components most central to the definition of the disorder, and items were written to provide an assessment of each component of the syndrome in question.

Theoretical Basis and Test Development

The development of the PAI was based on a construct validation framework that emphasized a theoretical/rational, as well as a quantitative method of scale development. This framework places a strong emphasis on a theoretically informed approach to the development and selection of items, as well as on the assessment of their stability and correlates. As a first step, the theoretical and empirical literature for each of the constructs to be measured was closely examined because this articulation had to serve as a guide to the content of information sampled and to the subsequent assessment of content validity. The development of the test then went through four iterations in a sequential construct validation strategy similar to that described by [Loevinger \(1957\)](#) and [Jackson \(1970\)](#), although item selection involved the consideration of a number of item parameters that were not described by those authors. Notably, the assumption at each point of the development process was that no single quantitative item parameter should be used as the sole criterion for item selection. An overreliance on a single parameter in item selection typically leads to a scale with one desirable psychometric property and numerous undesirable ones. Both the conceptual nature and the empirical adequacy of the items played an important role in their inclusion in the final version of the PAI.

The construction of the PAI sought to develop scales that provided a balanced sampling of the most important elements of the constructs being measured. This content coverage was designed to include both a consideration of *breadth*, as well as *depth* of the construct. The *breadth* of content coverage refers to the diversity of elements subsumed within a construct. For example, in measuring depression it is important to inquire about physiological and cognitive symptoms, as well as features of affect. The PAI sought to ensure breadth of content coverage through the use of subscales representing the major elements of the measured constructs, as indicated by the theoretical and empirical literature. The *depth* of content coverage refers to the need to sample across the full range of construct severity. To assure adequate depth of coverage, the scales were designed to include items reflecting both milder and most severe forms. The use of four alternative scalings provides each item with the capacity to capture differences in the severity of the manifestation of a feature of a particular disorder, and is further justified psychometrically in that it allows a scale to capture truer variance per item, meaning that even scales of modest length can achieve satisfactory reliability. This item type may also be preferred by clinicians considering particular items (e.g., risk indicators) or by clients themselves, who often disapprove of forced-choice alternatives because they feel that the truth may be between the two extremes presented.

In addition to differences in depth of severity reflected in response options, the items themselves were constructed to tap different levels of severity. For example, cognitive elements of depression can vary from mild pessimism to severe feelings of hopelessness, helplessness, and despair. Item characteristic curves were used to select items that provide information across the full range of construct severity. The nature of the severity continuum varies across the constructs. As an example, severity on the Suicidal Ideation (SUI) scale involves the imminence of the suicidal threat. Thus, items on this scale vary from vague and poorly articulated thoughts about suicide to imminent plans for self-harm.

One implication of a careful consideration of content validity in the construction of a test is that it is assumed that item content is critical in determining an item's ability to capture the phenomenology of various disorders and traits, and thus its relevance for the assessment of the construct. Empirically derived tests may include items on a construct scale that have no apparent relation to the construct in question. However, research (e.g., [Holden, 1989](#); [Holden & Fekken, 1990](#); [Peterson, Clark, & Bennett, 1989](#)) has consistently indicated that such items add little or no validity to self-report tests. The available empirical evidence is consistent with the assumption that the content of a self-report item is critical in determining its utility in measurement. This assumption does not preclude the potential utility of items that are truly "subtle" in the sense that a lay audience cannot readily identify the relationship of the item to mental health status.

In the examination of test validity presented in the manual ([Morey, 1991](#)), a number of the best available clinical indicators were administered concurrently to various samples to determine their convergence with corresponding PAI scales. Diagnostic and other clinical judgments concerning clinical behaviors (as rated by the treating clinician) have also been examined to determine if their PAI correlates were consistent with hypothesized relations. Finally, a number of simulation studies have been performed to determine the efficacy of the PAI validity scales in identifying response sets.

The Shedler–Westen Assessment Procedure

The Shedler–Westen Assessment Procedure (SWAP-200) ([Shedler & Westen, 2004a](#)) (and its revised version, the SWAP-II) is a comprehensive set of 200 items capturing both personality pathology and aspects of adaptive personality functioning. The instrument is based on the Q-sort method. The SWAP is a tool for personality diagnosis and clinical case formulation that provides clinicians of all theoretical orientations with a standard vocabulary for clinical case description ([Shedler & Westen, 2004a,b, 2007](#); [Westen & Shedler, 1999a,b](#); [Westen, Shedler, Bradley, & DeFife, 2012](#)). The SWAP instruments

can be used to derive both (1) trait dimensions and (2) naturally occurring diagnostic categories in the clinical population (i.e., diagnostic prototypes; [Westen & Shedler, 1999b](#); [Westen et al., 2012](#)).

The vocabulary consists of 200 personality descriptive statements, each of which may describe a given patient very well, somewhat, or not at all. The clinician describes a patient by ranking the statements into eight categories, from most descriptive of the patient (scored 7) to not descriptive or irrelevant (scored 0).

Factor analyses of the SWAP-200 (the prior adult version of the instrument) yielded 12 factors ([Shedler & Westen, 2004a](#)), including Psychological Health, Psychopathy, Emotional Dysregulation, Dysphoria, Obsessionality, Thought Disorder, Sexual Conflict, and Histrionic Sexualization. Factor analysis of the SWAP-200-A (the adolescent version of the instrument) yielded 11 highly similar factors, although it also included some factors distinct to this developmental period (e.g., Delinquent Behavior, Attentional Dysregulation, and Peer Rejection).

The SWAP-II is the latest revision of the Shedler–Westen Assessment Procedure, which has been used in numerous taxonomic studies (e.g., [Shedler & Westen, 2004a,b](#); [Westen & Shedler, 1999a,b, 2007](#)). To describe a patient, a clinically experienced observer sorts 200 personality descriptive statements into 8 categories. The instrument is based on the Q-sort method, which requires observers to arrange items into a fixed distribution.

The major differences between the factor structures uncovered using data from the SWAP-200 and the SWAP-II were: (1) the SWAP-200 data yielded a Dysphoria factor, whereas the SWAP-II data yielded more differentiated Depression, Anxious Somatization, and Social Anxiety/Avoidance scales; (2) SWAP-200 factors related to schizoid, schizotypal, and avoidant pathology were reconfigured, producing SWAP-II Schizotypy, Emotional Avoidance, and Social Anxiety factors; (3) items that loaded on the SWAP-200 Dissociation factor tended to load on the SWAP-II Emotional Dysregulation factor; (4) an Unstable Commitments factor emerged with the SWAP-II; and (5) a Boundary Disturbance factor emerged with the SWAP-II.

The SWAP-II incorporates the additional feedback of more than 2000 clinician consultants of all theoretical orientations. Items were edited for clarity, and new item content was added where feedback indicated omission of relevant personality constructs. For example, the burgeoning literature on harm avoidance ([Pezawas et al., 2005](#)) suggested that the SWAP-200 did not adequately cover the construct, so an item was added to address it directly (Decisions and actions are unduly influenced by efforts to avoid perceived dangers; is more concerned with avoiding harm than pursuing desires). Item analyses were also conducted of SWAP-200 items, and items were deleted that did not discriminate among patients in a national sample (i.e., that showed minimal variance across patients), and deleted or combined where analyses indicated empirical redundancy. Overall, 23 items had significant content alterations from the SWAP-200 to the SWAP-II, and additional items were edited to clarify existing content. The revision process and its outcome have been described in additional detail in a prior publication ([Westen & Shedler, 2007](#)).

An increasing body of research supports the validity and reliability of the adult and adolescent versions of the SWAP in predicting a wide range of criterion variables, including suicide attempts, history of psychiatric hospitalizations, adaptive functioning, interview diagnoses, psychiatric disorders in first- and second-degree biological relatives, and developmental and family history variables (see reviews in [Shedler & Westen, 2007](#); [Westen & Shedler, 2007](#); [Westen et al., 2012](#)). Interrater reliability of SWAP diagnostic scale scores is above .80 in all studies to date and is often above .90 ([Marin-Avellan, McGauley, Campbell, & Fonagy, 2005](#); [Westen & Muderrisoglu, 2003](#); [Westen & Shedler, 2007](#)).

Dimensional Assessment of Personality Pathology: Basic Questionnaire, Short Form, and DAPP-90

The DAPP-BQ ([Livesley & Jackson, 2009b](#)) was designed to assess and contribute to the treatment of PDs. It assesses a variety of affective, cognitive, and interpersonal characteristics that have important implications for a person's mental health, adjustment, and well-being. The DAPP-BQ consists of 290 items that assess 18 dimensions of PDs. The factor structure of the DAPP-BQ has been extensively investigated. [Livesley, Jang, and Vernon \(1998\)](#) reported that the lower-order personality scales converge into four higher-order latent factors or domains: emotional dysregulation, dissocial behavior, inhibitedness, and compulsivity.

Studies have shown its reliability and validity in the general population, as well as in patients seeking treatment for PDs ([van Kampen, de Beurs, & Andrea, 2008](#)) and mood, anxiety, and somatoform disorders ([de Beurs, Rinne, van Kampen, Verheul, & Andrea, 2009](#)). A further study by [de Beurs, Rinne, van Kampen, Verheul, and Andrea \(2010\)](#) concluded that the *Dimensional Assessment of Personality Pathology Short Form* (DAPP-SF) was able to distinguish patients with PDs.

The DAPP-SF ([van Kampen et al., 2008](#)) is a self-report questionnaire that assesses the presence and severity of personality pathology. It has 126 items measuring personal preferences and behavior and is the shortened version of the DAPP-BQ ([Livesley & Jackson, 2009b](#)), which has 290 items. The DAPP-SF is made up of 18 personality dimensions (submissiveness, cognitive distortion, identity problems, affective lability, stimulus seeking, compulsivity, restricted expression,

callousness, oppositionality, intimacy problems, rejection, anxiousness, conduct problems, suspiciousness, social avoidance, narcissism, insecure attachment, and self-harm) and four second-order factors (emotional dysregulation, dissocial behavior, inhibition, and compulsivity). Each item is rated on a 5-point Likert scale.

Psychometric analysis of the DAPP-SF has revealed sufficient reliability with alpha coefficients in the range of .78–.89, as well as construct validity and congruent factor structure (Tucker's congruence coefficients in the range of 0.89–1.00) in the general population and in patients seeking treatment for PDs (van Kampen et al., 2008). The same was also found in patients seeking treatment for mood, anxiety, and somatoform disorders (de Beurs et al., 2009).

To investigate the ability of the DAPP-SF to discriminate between participants with and without one or more PDs, the DAPP-SF scores were compared for individuals with and without a PD according to the SIDP-IV ($n = 89$).

The ability of the DAPP-SF to discriminate between participants with and without one or more PDs according to the SIDP-IV was investigated once more with Pearson's correlations for DAPP-SF subscale and second-order factor scores and the number of criteria met on each SIDP-IV PD. The latter can function as a profile of PD symptoms, which better suits the dimensional character of the DAPP-SF. Although the overall pattern of significant correlations showed some concurrence between DAPP-SF dimensions and the number of criteria met on each PD according to the SIDP-IV—such as for borderline, histrionic, and depressive PD—and suggests that the dimensional approach to the SIDP-IV outcomes is in line with expectations, the correlation coefficients revealed primarily moderate associations.

The DAPP-90 (Aluja, Blanch, Blanco, Martí-Guiu, & Balada, 2014) is a 90-item shortened version of the original DAPP-BQ (Livesley & Jackson, 2009a) developed through the authorized Spanish version (Gutiérrez-Zotes et al., 2008). This self-report questionnaire consists of a 5-point scale that ranges from 1 (Very unlike me) to 5 (Very like me) and has 18 facets: Submissiveness (SUB), Affective Instability (AIN; called Affective Lability in previous studies), Anxiousness (ANX), Insecure Attachment (IAT), Cognitive Distortion (COG), Identity Problems (IPR), Low Affiliation (LAF; called Social Avoidance in previous studies), Oppositionality (OPP), Narcissism (NAR), Stimulus Seeking (STS), Callousness (CAL), Rejection (REJ), Conduct Problems (COP), Restricted Expression (REX), Intimacy Problems (INP), Compulsivity (COM), Suspiciousness (SUS), and Self-Harm (SHA).

The Schedule for Nonadaptive and Adaptive Personality and SNAP Youth

SNAP, now in its second edition (SNAP-2; Clark et al., 2008), is a dimensional measure of maladaptive traits. Its 15 scales were constructed to assess empirically identified clusters of PD criteria (Clark, 1990). Scale items were written or adapted from existing measures to represent the content of these PD criterion clusters, drawing from conceptualizations of normal and pathological personality to ensure representation of the continuous range of personality. The SNAP-2 has demonstrated good conceptual, structural, and empirical convergence with other measures of personality pathology, such as the MMPI-2 (Butcher et al., 1989) and the DAPP-BQ (Livesley & Jackson, 2009a), as well as demonstrating good convergent–discriminant correlations with measures assessing normal-range personality traits in the framework of the FFM (e.g., Clark et al., 2008; Markon, Krueger, & Watson, 2005; Pryor, Miller, Hoffman, & Harding, 2009).

SNAP-2 has strong convergent and discriminant relations with the DAPP-BQ (e.g., Clark, Livesley, Schroeder, & Irish, 1996), and the Dimensional Personality Symptom Item Pool (DIPSI) structure also is quite similar conceptually to both the SNAP-2 and DAPP-BQ (De Clercq, De Fruyt, van Leeuwen, & Mervielde, 2006; Kushner, Tackett, & De Clercq, 2013). The addition of the Schedule for Nonadaptive and Adaptive Personality-Youth (SNAP-Y) to this extended family of instruments provides an additional tool for those who wish to follow the good practice of using multiple methods for measuring similar constructs. Additionally, the close correspondence of SNAP-Y and SNAP-2 items renders these instruments ideal for the longitudinal measurement of personality across the life span. Finally, in contrast to the DAPP-BQ-A and the DIPSI, the SNAP-Y also can be scored for the 10 *DSM-IV* (American Psychiatric Association, 1994) and *DSM-5* (American Psychiatric Association, 2013) PDs and for four scales of the FFM (omitting Openness; Calabrese, Rudick, Simms, & Clark, 2012).

The SNAP-Y is an adaptation for adolescents of the adult SNAP/SNAP-2 (Clark et al., 2008), a 390-item, true/false format, factor analytically derived self-report questionnaire that assesses 15 lower-order personality trait dimensions across the continuum from normal to abnormal personality functioning. The 15 scales form three higher-order factors—Negative Affectivity (NA), Positive Affectivity (PA), and Disinhibition versus Constraint (DvC)—each comprising one lower-order scale assessing the core of the factor and three or more additional lower-order scales assessing other facets of the factor. The NA factor scales are negative temperament (NT; the core scale), mistrust, manipulativeness, aggression, self-harm, eccentric perceptions, and dependency; the PA factor scales are positive temperament (PT; the core scale), exhibitionism, entitlement, and—on the other end—detachment; and the DvC factor scales are disinhibition (the core scale) and impulsivity versus propriety and workaholism. The instrument also assesses the validity of participants' responses with five validity scales—Variable Response Inconsistency (VRIN), True Response Inconsistency (TRIN), Desirability Response

Inconsistency (DRIN), Rare Virtues (RV), and Deviance (DEV)—plus an overall index of invalidity (II) constructed from a combination of the five primary validity scale scores.

SNAP-Y and SNAP-2 scoring procedures are the same, based on evidence that personality scales developed for adult function well in adolescent samples (e.g., the DAPP-BQ-A) and children and adolescents produce structures similar to those found in adults (e.g., the DIPSI).

The Personality Inventory for the *DSM-5*

The Personality Inventory for the *DSM-5* (PID-5) (Krueger et al., 2012) assesses the maladaptive traits proposed in Section III of *DSM-5* (American Psychiatric Association, 2013). The measure includes 220 self-report items tapping 25 PD traits, organized based on factor-analytic evidence into five broad domains: Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism. Each trait facet is measured by 4–14 items. PID-5 items are rated on a 4-point scale. Higher scale scores are indicative of greater personality pathology. Krueger et al. (2012) reported adequate to good internal consistencies based on a US representative sample. Accumulating evidence supports the construct validity of the PID-5 as a broad measure of PD-relevant traits (Anderson et al., 2013; Hopwood, Schade, Krueger, Wright, & Markon, 2013; Hopwood et al., 2013b; Wright et al., 2012a; Wright et al., 2012b).

A rich body of literature is yielding consistent evidence for the validity of the *DSM-5* trait model as it is operationalized in the PID-5. A substantial body of literature suggest that the PID-5 can account for the reliable variance in *DSM-IV* (American Psychiatric Association, 1994) PDs, as well as for specific clinical constructs beyond personality traits and PDs (e.g., dysfunctional beliefs; Krueger & Markon, 2014). Additionally, the *DSM-5* traits (American Psychiatric Association, 2013), as they are operationalized in the PID-5, can be well understood as a maladaptive extension of the FFM of personality (Suzuki et al., 2015). The PID-5 scales also proved useful in providing orienting dimensions for identifying the empirical structure of psychopathology (Wright & Simms, 2014). Data strongly support a hierarchical structure of PID-5 pathological traits ranging from a general personality pathology factor to a two-factor (i.e., internalizing pathological trait factor vs. externalizing pathological trait factor) and a three-factor (internalizing factor, externalizing factor, and detachment factor) down to a FFM of maladaptive personality domains (Wright et al., 2012b).

Markon, Quilty, Bagby, and Krueger (2013) developed and validated an Informant Report Form of the PID-5 (PID-5-IRF) to extend the PID-5 database beyond self-report. The PID-5-IRF was studied in normative US samples and also in an elevated-risk community sample. The 25 scales of the PID-5-IRF were found to be reliable, and they also showed a clear five-factor structure resembling the structure of the PID-5 Self-Report Form (PID-5-SRF).

The Personality Inventory for the *DSM-5* Brief Form (PID-5-BF), a brief form of the PID-5, has also been made available to researchers and clinicians (Krueger, Derringer, Markon, Watson, & Skodol, 2013). The PID-5-BF was designed to screen for possible PD by quantifying the overall elevation of scores across the five broad maladaptive trait dimensions listed in *DSM-5* Criterion B. The PID-5-BF assesses the five maladaptive trait dimensions of Negative Affectivity (NA), Detachment (De), Antagonism (A), Disinhibition (Di), and Psychoticism (Ps).

The Personality Inventory for DSM-5: Child Age 11–17

The Personality Inventory for *DSM-5* (PID-5) was also adapted for children aged 11–17 (Krueger, Derringer, Markon, Watson, & Skodol, 2013). It is a 220-item self-rated personality trait assessment scale that assesses 25 personality trait facets: Anhedonia, Anxiousness, Attention Seeking, Callousness, Deceitfulness, Depressivity, Distractibility, Eccentricity, Emotional Lability, Grandiosity, Hostility, Impulsivity, Intimacy Avoidance, Irresponsibility, Manipulativeness, Perceptual Dysregulation, Perseveration, Restricted Affectivity, Rigid Perfectionism, Risk Taking, Separation Insecurity, Submissiveness, Suspiciousness, Unusual Beliefs and Experiences, and Withdrawal, with each trait facet consisting of 4–14 items. Specific triplets of facets (groups of three) can be combined to yield indices of the five broader trait domains of Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism. The measure is completed by the child prior to a visit with the clinician.

Like the PID-5 for adults, the Personality Inventory for *DSM-5* for children aged 11–17 also comes in a brief form (PID-5-BF; Krueger et al., 2013a) that consists of 25 items and assesses five personality trait domains—negative affect, detachment, antagonism, disinhibition, and psychoticism—with each trait domain consisting of five items.

The Child Problematic Traits Inventory

The Child Problematic Traits Inventory (CPTI; Colins et al., 2014) was developed and validated to provide a reliable assessment of interpersonal, Callous–Unemotional, and behavioral/lifestyle psychopathic traits from early childhood onward.

In developing the CPTI, the aim was to assess psychopathic personality in (early) childhood in line with the three-factor model of psychopathic personality in adolescents (Andershed, Kerr, Stattin, & Levander, 2002) and adults (Cooke & Michie, 2001). Thus, the 28 CPTI items were intended to load on three theoretically proposed dimensions or factors, being an interpersonal factor (Grandiose–Deceitful), a CU factor (Callous–Unemotional), and a behavioral factor (Impulsive–Need for Stimulation). Additionally, these three factors load onto an overarching latent psychopathy construct (i.e., Psychopathic Personality).

Colins et al. (2014) report evidence that the three-factor model traits: lying, deceitfulness/manipulation, grandiosity, lack of empathy/callousness, shallow affect, lack of remorse or guilt, impulsivity, need for stimulation, sensation seeking, and proneness to boredom can be assessed in a meaningful way in early, middle, and late childhood. The second principle was that the CPTI should not include traits that are closely related to or even overlapping conceptually with rule breaking, conduct problems, and antisocial behavior, to avoid contamination problems (e.g., Skeem & Cooke, 2010) when using the CPTI as a measure of psychopathic personality traits in research aimed at understanding the development of conduct problems (e.g., Frick, Ray, Thornton, & Kahn, 2014).

The Personality Psychopathology Five

The *Personality Psychopathology 5* (PSY-5; Harkness and McNulty, 1994) included broad dimensions labeled aggression, psychoticism, disconstraint, negative emotionality/neuroticism, and introversion/low positive emotionality. The PSY-5 dimensional constructs were used to select items from the MMPI-2 (Butcher et al., 1989) item pool to construct MMPI-2/MMPI-2 Restructured Form scales designed to assess the PSY-5 dimensions (Harkness, Finn, McNulty, & Shields, 2012; Harkness, McNulty, & Ben-Porath, 1995; Harkness et al., 2014a). Over 2 decades of research, the construct validity of the PSY-5 model gained support through the clinical utility of the MMPI-2 PSY-5 scales (for a review, see Harkness et al., 2012). For example, the PSY-5 scales were used to characterize meaningful subtypes of PTSD in veterans, establishing reliable individual differences with PSY-5–defined externalizing and internalizing propensities associated with specific symptom constellations and trajectories after exposure to traumatic events (Miller, Kaloupek, Dillon, & Keane, 2004; Miller, Vogt, Mozley, Kaloupek, & Keane, 2006). Moreover, PSY-5 scales were found to predict development of substance use disorders after combat deployment consistent with predictions of the PSY-5 model (Ferrier-Auerbach et al., 2009). Finally, the PSY-5 scales were meaningfully associated with *DSM-III-R* PDs, (Trull, Ueda, Costa, & McCrae, 1995), *DSM-IV* PDs (Wygant, Sellbom, Graham, & Schenk, 2006), and, most recently, the *DSM-5* trait-dimensional mode of personality dysfunction (Anderson et al., 2013), demonstrating convergence between the PSY-5 model and *DSM*-defined PD.

Harkness, Reynolds, and Lilienfeld (2014) propose that five major systems allow dynamic adaptation to the external environment—*reality modeling for action, short-term danger detection, long-term cost/benefit protection, resource acquisition, and agenda protection*—disruption in any of these systems can lead to maladaptive interactions with the environment. What is important in this reconceptualization of the standard clinical assessment is the coherence and practicality of a dimensional focus on adaptation within the proposed functional systems in contrast to the categorical approach employed by the *DSM-5* (American Psychiatric Association, 2013). The review of mental systems approach relies on theory rather than a simple descriptive symptom count unifying applied psychopathology to other disciplines (Harkness & Lilienfeld, 2013).

General Assessment of Personality Disorder

The General Assessment of Personality Disorder (GAPD) (Livesley, 2006) is a 144-item self-report measure operationalizing the two core components of personality pathology proposed in Livesley's (2003) *adaptive failure model*. The primary scale Self-Pathology covers items regarding the structure of personality (e.g., problems of differentiation and integration) and agency (e.g., conative pathology). The primary scale Interpersonal Dysfunction is about failure of kinship functioning and societal functioning. These primary scales are divided into a total of 19 subscales (15 for self-pathology and 4 for interpersonal dysfunction). The present study used the original Canadian version and a Dutch translation (Berghuis, 2007). The original Canadian version was translated into Dutch and then translated back by an English native speaker; this version was subsequently approved by the original author (J.L.). Of note, the Dutch translation differs from the Canadian version in that the Canadian version includes two additional questions that were added by the original test author (J.L.) after data collection had already started in the Netherlands (item 12 from the Affiliation subscale and item 98 from the Difficulty Setting and Attaining Goals subscale).

SUMMARY

The chapter begins with a historical account of psychiatric taxonomies until the most recent versions of *DSM-5* and ICD-10. The reader is presented with the criticisms of the classic taxonomies and in particular the *DSM*, with a special emphasis on the issue of comorbidity. A number of alternative proposals are presented, the most explored and challenging being the RDoC. The controversy regarding the latent factor structure of psychopathology focuses on the options of one general factor of psychopathology (p), a factor structure of externalizing/internalizing disorders, and a three-factor structure of externalizing/internalizing and psychotic disorders. The most recent approach concerns an integrative model of comorbidity.

REFERENCES

- Alenderfer, M. S., & Blashfield, R. K. (1984). Cluster analysis. *Sage University paper series on quantitative applications in the social sciences*. Newbury Park, CA: Sage (pp. 7–44).
- Alegría, M., & McGuire, T. (2003). Rethinking a universal framework in the psychiatric symptom–disorder relationship. *Journal of Health and Social Behavior*, 257–274.
- Aluja, A., Blanch, À., Blanco, E., Martí-Guiu, M., & Balada, F. (2014). The dimensional assessment of personality psychopathology basic questionnaire: shortened versions item analysis. *Spanish Journal of Psychology*, 17, E102.
- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders: DSM-III* (3rd ed.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., rev.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5)* (5th ed.). Washington, DC: American Psychiatric Association.
- Andershed, H., Kerr, M., Stattin, H., & Levander, S. (2002). Psychopathic traits in non-referred youths: initial test of a new assessment tool. In E. Blaauw, & L. Sheridan (Eds.), *Psychopaths: Current international perspectives* (pp. 131–158). Hague, The Netherlands: Elsevier.
- Anderson, J. L., Sellbom, M., Bagby, R. M., Quilty, L. C., Veltri, C. O., Markon, K. E., & Krueger, R. F. (2013). On the convergence between PSY-5 domains and PID-5 domains and facets implications for assessment of *DSM-5* personality traits. *Assessment*, 20(3), 286–294.
- Arbisi, P. A., Sellbom, M., & Ben-Porath, Y. S. (2008). Empirical correlates of the MMPI–2 Restructured Clinical (RC) scales in psychiatric inpatients. *Journal of Personality Assessment*, 90(2), 122–128.
- Archer, R. P. (2006). A perspective on the Restructured Clinical (RC) Scale project. *Journal of Personality Assessment*, 87(2), 179–185.
- Ben-Porath, Y. S., & Tellegen, A. (2008). *MMPI–2–RF: Manual for administration, scoring, and interpretation*. Minneapolis, MN: University of Minnesota Press.
- Berenbaum, H. (2013). Classification and psychopathology research. *Journal of Abnormal Psychology*, 122(3), 894–901.
- Berghuis, H. (2007). *General assessment of personality disorder (GAPD)*. Amersfoort, The Netherlands: Symfora Groep.
- Berk, M. (2013). The *DSM-5*: hyperbole, hope or hypothesis? *BioMed Central Medicine*, 11(1), 1.
- Black, D. W. (2013). *DSM-5* is approved, but personality disorders criteria have not changed. *Annals of Clinical Psychiatry*, 25(1), 1.
- Borsboom, D. (2008). Psychometric perspectives on diagnostic systems. *Journal of Clinical Psychology*, 64(9), 1089–1108.
- Borsboom, D., & Cramer, A. O. (2013). Network analysis: an integrative approach to the structure of psychopathology. *Annual Review of Clinical Psychology*, 9, 91–121.
- Bosch, P., van Luijtelaaar, G., van den Noort, M., Schenkwald, J., Kueppenbender, N., Lim, S., & Coenen, A. (2014). The MMPI-2 in chronic psychiatric illness. *Scandinavian Journal of Psychology*, 55(5), 513–519.
- Boschloo, L., van Borkulo, C. D., Rhemtulla, M., Keyes, K. M., Borsboom, D., & Schoevers, R. A. (2015). The network structure of symptoms of the *Diagnostic and Statistical Manual of Mental Disorders*. *PLoS One*, 10(9), e0137621.
- Bottesi, G., Spoto, A., Freeston, M. H., Sanavio, E., & Vidotto, G. (2015). Beyond the score: clinical evaluation through formal psychological assessment. *Journal of Personality Assessment*, 97(3), 252–260.
- Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *MMPI–2, the Minnesota Multiphasic Personality Inventory–2: Manual for administration and scoring*. Minneapolis, MN: University of Minnesota Press.
- Butcher, J. N., Graham, J. R., Williams, C. L., & Ben-Porath, Y. S. (1990). *Development and use of the MMPI-2 Content Scales*. Minneapolis, MN: University of Minnesota Press.
- Calabrese, W. R., Rudick, M. M., Simms, L. J., & Clark, L. A. (2012). Development and validation of Big Four personality scales for the Schedule for Nonadaptive and Adaptive Personality–Second Edition (SNAP-2). *Psychological Assessment*, 24(3), 751–763.
- Canino, G., Lewis-Fernandez, R., & Bravo, M. (1997). Methodological challenges in cross-cultural mental health research. *Transcultural Psychiatry*, 34(2), 163–184.

- Carragher, N., Adamson, G., Bunting, B., & McCann, S. (2009). Subtypes of depression in a nationally representative sample. *Journal of Affective Disorders, 113*(1), 88–99.
- Carragher, N., Krueger, R. F., Eaton, N. R., Markon, K. E., Keyes, K. M., Blanco, C., & Hasin, D. S. (2014). ADHD and the externalizing spectrum: direct comparison of categorical, continuous, and hybrid models of liability in a nationally representative sample. *Social Psychiatry and Psychiatric Epidemiology, 49*(8), 1307–1317.
- Caspi, A., Houts, R. M., Belsky, D. W., Goldman-Mellor, S. J., Harrington, H., Israel, S., & Moffitt, T. E. (2014). The p factor: one general psychopathology factor in the structure of psychiatric disorders? *Clinical Psychological Science, 2*(2), 119–137.
- Clark, L. A. (1990). Toward a consensual set of symptom clusters for assessment of personality disorder. In J. Butcher, & C. Spielberger (Eds.), *Advances in personality assessment* (pp. 243–266). (Vol. 8). Hillsdale, NJ: Erlbaum.
- Clark, L. A. (2007). Assessment and diagnosis of personality disorder: perennial issues and an emerging reconceptualization. *Annual Review of Psychology, 58*, 227–257.
- Clark, L. A., Livesley, W. J., Schroeder, M. L., & Irish, S. L. (1996). Convergence of two systems for assessing specific traits of personality disorder. *Psychological Assessment, 8*(3), 294–303.
- Clark, L. A., Simms, L. J., Wu, K. D., & Casillas, A. (2008). *Manual for the schedule for nonadaptive and adaptive personality (SNAP-2)* (2nd ed.). Minneapolis, MN: University of Minnesota Press.
- Colins, O. F., Andershed, H., Frogner, L., Lopez-Romero, L., Veen, V., & Andershed, A. K. (2014). A new measure to assess psychopathic personality in children: the Child Problematic Traits Inventory. *Journal of Psychopathology and Behavioral Assessment, 36*(1), 4–21.
- Conway, C. C., Hammen, C., & Brennan, P. A. (2012). Expanding stress generation theory: test of a transdiagnostic model. *Journal of Abnormal Psychology, 121*(3), 754.
- Cooke, D. J., & Michie, C. (2001). Refining the construct of psychopathy: towards a hierarchical model. *Psychological Assessment, 13*(2), 171–188.
- Copeland, W., Shanahan, L., Costello, E. J., & Angold, A. (2011). Cumulative prevalence of psychiatric disorders by young adulthood: a prospective cohort analysis from the Great Smoky Mountains Study. *Journal of the American Academy of Child and Adolescent Psychiatry, 50*(3), 252–261.
- Costa, P. T., & McCrae, R. R. (1992). *NEO PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr., & McCrae, R. R. (2010). *NEO inventories professional manual: NEO PI-3, NEO-FFI-3, NEO PI-R*. Lutz, FL: PAR, Inc.
- Costantini, G., Epskamp, S., Borsboom, D., Perugini, M., Mõttus, R., Waldorp, L. J., & Cramer, A. O. (2015). State of the aRt personality research: a tutorial on network analysis of personality data in R. *Journal of Research in Personality, 54*, 13–29.
- Cox, N., Dewaele, A., Van Houtte, M., & Vincke, J. (2010). Stress-related growth, coming out, and internalized homonegativity in lesbian, gay, and bisexual youth: an examination of stress-related growth within the minority stress model. *Journal of Homosexuality, 58*(1), 117–137.
- Cramer, A. O., Kendler, K. S., & Borsboom, D. (2012). A constructionist account of emotional disorders. *Behavioral and Brain Sciences, 35*(03), 146–147.
- Cramer, A. O. J., Waldorp, L. J., van der Maas, H. L. J., & Borsboom, D. (2010). Comorbidity: a network perspective. *Behavioral and Brain Sciences, 33*(2–3), 137–193.
- Cuthbert, B. N. (2014a). The RDoC framework: facilitating transition from ICD/DSM to dimensional approaches that integrate neuroscience and psychopathology. *World Psychiatry, 13*(1), 28–35.
- Cuthbert, B. N. (2014b). Response to Lilienfeld. *Behaviour Research and Therapy, 62*, 140–142.
- Cuthbert, B. N., & Insel, T. R. (2013). Toward the future of psychiatric diagnosis: the seven pillars of RDoC. *BioMed Central Medicine, 11*(1), 1.
- Damen, K. F., de Jong, C. A., & van der Kroft, P. J. (2004). Interrater reliability of the structured interview for DSM-IV personality in an opioid-dependent patient sample. *European Addiction Research, 10*(3), 99–104.
- de Beurs, E., Rinne, T., van Kampen, D., Verheul, R., & Andrea, H. (2009). Reliability and validity of the Dutch Dimensional Assessment of Personality Pathology–Short Form (DAPP-SF), a shortened version of the DAPP–Basic Questionnaire. *Journal of Personality Disorders, 23*(3), 308–326.
- de Beurs, E., Rinne, T., van Kampen, D., Verheul, R., & Andrea, H. (2010). Criterion-related validity of the DAPP-SF and its utility as a screener for personality disorders in outpatient care. *Personality and Mental Health, 4*(4), 271–283.
- De Clercq, B., De Fruyt, F., van Leeuwen, K., & Mervielde, I. (2006). The structure of maladaptive personality traits in childhood: a step toward an integrative developmental perspective for DSM-V. *Journal of Abnormal Psychology, 115*(4), 639–657.
- de Wild-Hartmann, J. A., Wichers, M., van Bemmelen, A. L., Derom, C., Thiery, E., Jacobs, N., & Simons, C. J. (2013). Day-to-day associations between subjective sleep and affect in regard to future depression in a female population-based sample. *British Journal of Psychiatry, 202*(6), 407–412.
- Donnellan, M. B., Burt, S. A., Levendosky, A. A., & Klump, K. L. (2008). Genes, personality, and attachment in adults: a multivariate behavioral genetic analysis. *Personality and Social Psychology Bulletin, 34*(1), 3–16.
- Eaton, N. R., Keyes, K. M., Krueger, R. F., Balsis, S., Skodol, A. E., Markon, K. E., & Hasin, D. S. (2012). An invariant dimensional liability model of gender differences in mental disorder prevalence: evidence from a national sample. *Journal of Abnormal Psychology, 121*(1), 282.
- Eaton, N. R., Krueger, R. F., Keyes, K. M., Skodol, A. E., Markon, K. E., Grant, B. F., & Hasin, D. S. (2011a). Borderline personality disorder co-morbidity: relationship to the internalizing–externalizing structure of common mental disorders. *Psychological Medicine, 41*(05), 1041–1050.
- Eaton, N. R., Krueger, R. F., Markon, K. E., Keyes, K. M., Skodol, A. E., Wall, M., Hasin, D. S., & Grant, B. F. (2013). The structure and predictive validity of the internalizing disorders. *Journal of Abnormal Psychology, 122*(1), 86–92.
- Eaton, N. R., Krueger, R. F., & Oltmanns, T. F. (2011b). The structure and long-term stability of the internalizing spectrum of personality and psychopathology across the lifespan. *Psychology and Aging, 26*, 987–993.
- Eaton, N. R., Rodriguez-Seijas, C., Carragher, N., & Krueger, R. F. (2015). Transdiagnostic factors of psychopathology and substance use disorders: a review. *Social Psychiatry and Psychiatric Epidemiology, 50*(2), 171–182.

- Fava, G. A., Ruini, C., & Rafanelli, C. (2004). Psychometric theory is an obstacle to the progress of clinical research. *Psychotherapy and Psychosomatics*, 73, 145–148.
- Ferrier-Auerbach, A. G., Kehle, S. M., Erbes, C. R., Arbisi, P. A., Thuras, P., & Polusny, M. A. (2009). Predictors of alcohol use prior to deployment in National Guard soldiers. *Addictive Behaviors*, 34(8), 625–631.
- First, M. B. (2015). Structured clinical interview for the *DSM* (SCID). In *Encyclopedia of clinical psychology* (Vol. 1–6). Hoboken, NJ: Wiley.
- First, M. B., Gibbon, M., Spitzer, R. L., & Benjamin, L. S. (1997a). *Structured clinical interview for DSM-IV axis II personality disorders (SCID-II)*. Washington, DC: American Psychiatric Press.
- First, M. B., Spitzer, R. L., Gibbon, M., Williams, J. B. W., & Benjamin, L. (1994). *Structured clinical interview for DSM-IV axis II personality disorders (SCID-II, version 2.0)*. New York, NY: New York State Psychiatric Institute, Biometrics Research Department.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1997b). *Structured clinical interview for axis I DSM-IV disorders—patient version (SCID-I/P version 2.0)*. New York, NY: New York State Psychiatric Institute, Biometrics Research Department.
- First, M. B., Williams, J. B. W., Benjamin, L. S., & Spitzer, R. L. (2015a). *Structured clinical interview for DSM-5 personality disorder (SCID-5-PD)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015b). *Structured clinical interview for DSM-5 disorders, research version (SCID-5-RV)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015c). *Structured clinical interview for DSM-5 disorders, clinician version (SCID-5-CV)*. Arlington, VA: American Psychiatric Association.
- First, M. B., Williams, J. B. W., Karg, R. S., & Spitzer, R. L. (2015d). *Structured clinical interview for DSM-5 disorders, clinical trials version (SCID-5-CT)*. Arlington, VA: American Psychiatric Association.
- Fisher, P., Lucas, L., Lucas, C., Sarsfield, A., & Shaffer, D. (2006). *User manual (English generic, Spanish generic, present state & voice DISC interviews)*. Columbia University, DISC Development Group, Available from: http://www.cdc.gov/nchs/data/nhanes/limited_access/interviewer_manual.pdf.
- Forbey, J. D., & Ben-Porath, Y. S. (2007). A comparison of the MMPI-2 restructured clinical (RC) and clinical scales in a substance abuse treatment sample. *Psychological Services*, 4(1), 46.
- Forbush, K. T., & Watson, D. (2013). The structure of common and uncommon mental disorders. *Psychological Medicine*, 43(01), 97–108.
- Frances, A. (1980). The *DSM-III* personality disorders section: a commentary. *American Journal of Psychiatry*, 137, 1050–1054.
- Frick, P. J., Ray, J., Thornton, L., & Kahn, R. E. (2014). Can callous–unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin*, 140(1), 1–57.
- Garb, H. N., Lilienfeld, S. O., Nezworski, M. T., Wood, J. M., & O'Donohue, W. T. (2009). Can quality improvement processes help psychological assessment meet the demands of evidence-based practice? *Scientific Review of Mental Health Practice*, 7(1).
- Gazzillo, F., Lingiard, V., & Del Corno, F. (2012). Towards the validation of three assessment instruments derived from the *PDM* p axis: the psychodynamic diagnostic prototypes, the Core Preoccupations Questionnaire and the Pathogenic Beliefs Questionnaire. *Bollettino di Psicologia Applicata*, 265(58), 31–45.
- Goldberg, L. R., Johnson, J. A., Eber, H. W., Hogan, R., Ashton, M. C., Cloninger, C. R., & Gough, H. G. (2006). The international personality item pool and the future of public-domain personality measures. *Journal of Research in Personality*, 40, 84–96.
- Gordon, R. M. (2008). Early reactions to the *PDM* by psychodynamic CBT and other psychologists. *Psychologist–Psychoanalyst*, 46(1), 13.
- Gordon, R. M. (2009). Reactions to the *Psychodynamic Diagnostic Manual (PDM)* by psychodynamic, CBT and other non-psychodynamic psychologists. *Issues in Psychoanalytic Psychology*, 31(1), 55–62.
- Gordon, R. M., & Bornstein, R. F. (2012). The psychodiagnostic charts. Unpublished document.
- Gore, W. L., & Widiger, T. A. (2013). The *DSM-5* dimensional trait model and five-factor models of general personality. *Journal of Abnormal Psychology*, 122(3), 816.
- Grant, B. F., Kaplan, K. K., & Stinson, F. S. (2012). *Source and accuracy statement: the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions: source and accuracy report*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.
- Groth-Marnat, G. (2009). *Handbook of psychological assessment* (5th ed.). Hoboken, NJ: Wiley.
- Guloksuz, S., van Nierop, M., Lieb, R., van Winkel, R., Wittchen, H. U., & van Os, J. (2015). Evidence that the presence of psychosis in non-psychotic disorder is environment-dependent and mediated by severity of non-psychotic psychopathology. *Psychological Medicine*, 45(11), 2389–2401.
- Gunderson, J. G. (2013). Seeking clarity for future revisions of the personality disorders in *DSM-5*. *Personality Disorders: Theory, Research, and Treatment*, 4(4), 368–376.
- Gutiérrez-Zotes, J. A., Gutiérrez, F., Valero, J., Gallego, E., Bailles, E., Torres, X., & Livesley, W. J. (2008). Structure of personality pathology in normal and clinical samples: Spanish validation of the DAPP-BQ. *Journal of Personality Disorders*, 22(4), 389–404.
- Haigler, E. D., & Widiger, T. A. (2001). Experimental manipulation of NEO-PI-R items. *Journal of Personality Assessment*, 77(2), 339–358.
- Harkness, A. R., & Lilienfeld, S. O. (1997). Individual differences science for treatment planning: personality traits. *Psychological Assessment*, 9(4), 349.
- Harkness, A. R., & Lilienfeld, S. O. (2013). Science should drive the bus of clinical description; but how does “science take the wheel”? a commentary on Markon. *Journal of Personality Disorders*, 27(5), 580–589.
- Harkness, A. R., & McNulty, J. L. (1994). The Personality Psychopathology Five (PSY-5): issues from the pages of a diagnostic manual instead of a dictionary. In S. Strack, & M. Lorr (Eds.), *Differentiating normal and abnormal personality* (pp. 291–315). New York, NY: Springer.
- Harkness, A. R., Finn, J. A., McNulty, J. L., & Shields, S. M. (2012). The Personality Psychopathology—Five (PSY-5): recent constructive replication and assessment literature review. *Psychological Assessment*, 24(2), 432–443.
- Harkness, A. R., McNulty, J. L., & Ben-Porath, Y. S. (1995). The Personality Psychopathology Five (PSY-5): constructs and MMPI-2 scales. *Psychological Assessment*, 7(1), 104–114.

- Harkness, A. R., McNulty, J. L., Finn, J. A., Reynolds, S. M., Shields, S. M., & Arbisi, P. (2014a). The MMPI-2-RF Personality Psychopathology Five (PSY-5-RF) scales: development and validity research. *Journal of Personality Assessment*, *96*(2), 140–150.
- Harkness, A. R., Reynolds, S. M., & Lilienfeld, S. O. (2014b). A review of systems for psychology and psychiatry: adaptive systems, Personality Psychopathology Five (PSY-5), and the *DSM-5*. *Journal of Personality Assessment*, *96*(2), 121–139.
- Hasin, D., & Kilcoyne, B. (2012). Comorbidity of psychiatric and substance use disorders in the United States: current issues and findings from the NESARC. *Current Opinion in Psychiatry*, *25*(3), 165–171.
- Haslbeck, J., & Waldorp, L. J. (2016). mgm: Structure Estimation for time-varying Mixed Graphical Models in high-dimensional data. *Journal of Statistical Software* [arXiv preprint, p. arXiv:1510.06871].
- Hershenberg, R., & Goldfried, M. R. (2015). Implications of RDoC for the research and practice of psychotherapy. *Behavior Therapy*, *46*(2), 156–165.
- Hickie, I. B., Scott, J., & McGorry, P. D. (2013). Clinical staging for mental disorders: a new development in diagnostic practice in mental health. *Medical Journal of Australia*, *198*(9), 461–462.
- Holden, R. R. (1989). Disguise and the structured self-report assessment of psychopathology: II. A clinical replication. *Journal of Clinical Psychology*, *45*(4), 583–586.
- Holden, R. R., & Fekken, G. C. (1990). Structured psychopathological test item characteristics and validity. *Psychological Assessment*, *2*(1), 35–40.
- Hopwood, C. J., Schade, N., Krueger, R. F., Wright, A. G., & Markon, K. E. (2013a). Connecting *DSM-5* personality traits and pathological beliefs: toward a unifying model. *Journal of Psychopathology and Behavioral Assessment*, *35*(2), 162–172.
- Hopwood, C. J., Wright, A. G., Krueger, R. F., Schade, N., Markon, K. E., & Morey, L. C. (2013b). *DSM-5* pathological personality traits and the Personality Assessment Inventory. *Assessment*, *20*(3), 269–285.
- Hudson, J. I., Zanarini, M. C., Mitchell, K. S., Choi-Kain, L. W., & Gunderson, J. G. (2014). The contribution of familial internalizing and externalizing liability factors to borderline personality disorder. *Psychological Medicine*, *44*(11), 2397–2407.
- Huprich, S. K., McWilliams, N., Lingardi, V., Bornstein, R. F., Gazzillo, F., & Gordon, R. M. (2015). The *Psychodynamic Diagnostic Manual (PDM)* and the *PDM-2*: opportunities to significantly affect the profession. *Psychoanalytic Inquiry*, *35*(1), 60–73.
- Hyman, S. E. (2010). The diagnosis of mental disorders: the problem of reification. *Annual Review of Clinical Psychology*, *6*, 155–179.
- Insel, T. (2013). Transforming diagnosis. Director's blog. Available from: <https://www.nimh.nih.gov/about/directors/thomas-insel/blog/2013/transforming-diagnosis.shtml>
- Insel, T. R., & Lieberman, J. A. (2013). *DSM-5 and RDoC: shared interests*. Washington, DC: National Institute of Mental Health.
- Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., & Wang, P. (2010). Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, *167*(7), 748–751.
- Isvoranu, A. M., Borsboom, D., van Os, J., & Guloksuz, S. (2016). A network approach to environmental impact in psychotic disorder: brief theoretical framework. *Schizophrenia Bulletin*, sbw049.
- Isvoranu, A. M., van Borkulo, C. D., Boyette, L. L., Wigman, J. T., Vinkers, C. H., Borsboom, D., & Group Investigators. (2016). A network approach to psychosis: pathways between childhood trauma and psychotic symptoms. *Schizophrenia Bulletin*, sbw055.
- Jackson, D. N. (1970). A sequential system for personality scale development. In C. D. Spielberger (Ed.), *Current topics in clinical and community psychology* (pp. 61–96). (Vol. 2). Orlando, FL: Academic Press.
- James, L. M., & Taylor, J. (2008). Revisiting the structure of mental disorders: borderline personality disorder and the internalizing/externalizing spectra. *British Journal of Clinical Psychology*, *47*(4), 361–380.
- Jane, J. S., Pagan, J. L., Turkheimer, E., Fiedler, E. R., & Oltmanns, T. F. (2006). The interrater reliability of the Structured Interview for *DSM-IV* Personality. *Comprehensive Psychiatry*, *47*(5), 368–375.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research*, *3* (pp. 114–158). New York, NY: Guilford Press.
- Kamphuis, J. H., & Noordhof, A. (2009). On categorical diagnoses in *DSM-V*: cutting dimensions at useful points? *Psychological Assessment*, *21*(3), 294.
- Kapur, S., Phillips, A. G., & Insel, T. R. (2012). Why has it taken so long for biological psychiatry to develop clinical tests and what to do about it? *Molecular Psychiatry*, *17*(12), 1174–1179.
- Kendler, K. S. (1996). Major depression and generalised anxiety disorder: same genes, (partly) different environments—revisited. *British Journal of Psychiatry*, *168*(30), 68–75.
- Kendler, K. S. (2012a). Levels of explanation in psychiatric and substance use disorders: implications for the development of an etiologically based nosology. *Molecular Psychiatry*, *17*(1), 11–21.
- Kendler, K. S. (2012b). The dappled nature of causes of psychiatric illness: replacing the organic-functional/hardware–software dichotomy with empirically based pluralism. *Molecular Psychiatry*, *17*(4), 377–388.
- Kendler, K. S., & Myers, J. (2014). The boundaries of the internalizing and externalizing genetic spectra in men and women. *Psychological Medicine*, *44*(03), 647–655.
- Kendler, K. S., Aggen, S. H., Knudsen, G. P., Roysamb, E., Neale, M. C., & Reichborn-Kjennerud, T. (2011a). The structure of genetic and environmental risk factors for syndromal and subsyndromal common *DSM-IV* axis I and all axis II disorders. *American Journal of Psychiatry*, *168*(1), 29–39.
- Kendler, K. S., Jacobson, K. C., Prescott, C. A., & Neale, M. C. (2003a). Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants, and opiates in male twins. *American Journal of Psychiatry*, *160*, 687–695.
- Kendler, K. S., Neale, M. C., Kessler, R. C., Heath, A. C., & Eaves, L. J. (1992). Major depression and generalized anxiety disorder: same genes, (partly) different environments? *Archives of General Psychiatry*, *49*(9), 716–722.
- Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003b). The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of General Psychiatry*, *60*(9), 929–937.

- Kendler, K. S., Zachar, P., & Craver, C. (2011b). What kinds of things are psychiatric disorders? *Psychological Medicine*, *41*(06), 1143–1150.
- Kernberg, O. F. (1984). *Severe personality disorders: Psychotherapeutic strategies*. New Haven, CT: Yale University Press.
- Kessler, R. C., Merikangas, K. R., Berglund, P., Eaton, W. W., Koretz, D. S., & Walters, E. E. (2003). Mild disorders should not be eliminated from the *DSM-V*. *Archives of General Psychiatry*, *60*(11), 1117–1122.
- Kessler, R. C., Ormel, J., Petukhova, M., McLaughlin, K. A., Green, J. G., Russo, L. J., & Andrade, L. (2011). Development of lifetime comorbidity in the World Health Organization world mental health surveys. *Archives of General Psychiatry*, *68*(1), 90–100.
- Keyes, K. M., Eaton, N. R., Krueger, R. F., Skodol, A. E., Wall, M. M., Grant, B., & Hasin, D. S. (2013). Thought disorder in the meta-structure of psychopathology. *Psychological Medicine*, *43*(08), 1673–1683.
- Koelen, J. A., Luyten, P., Eurelings-Bontekoe, L. H., Diguier, L., Vermote, R., Lowyck, B., & Bühring, M. E. (2012). The impact of level of personality organization on treatment response: a systematic review. *Psychiatry*, *75*(4), 355–374.
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “big” personality traits to anxiety, depressive, and substance use disorders: a meta-analysis. *Psychological Bulletin*, *136*(5), 768.
- Kotov, R., Chang, S. W., Fochtmann, L. J., Mojtabai, R., Carlson, G. A., Sedler, M. J., & Bromet, E. J. (2011a). Schizophrenia in the internalizing–externalizing framework: a third dimension? *Schizophrenia Bulletin*, *37*, 1168–1178.
- Kotov, R., Ruggero, C. J., Krueger, R. F., Watson, D., Yuan, Q., & Zimmerman, M. (2011b). New dimensions in the quantitative classification of mental illness. *Archives of General Psychiatry*, *68*(10), 1003–1011.
- Kraemer, H. C. (2007). *DSM* categories and dimensions in clinical and research contexts. *International Journal of Methods in Psychiatric Research*, *16*(S1), S8–S15.
- Kramer, I., Simons, C. J., Hartmann, J. A., Menne-Lothmann, C., Viechtbauer, W., Peeters, F., & Os, J. (2014). A therapeutic application of the experience sampling method in the treatment of depression: a randomized controlled trial. *World Psychiatry*, *13*(1), 68–77.
- Krueger, R. F. (1999). The structure of common mental disorders. *Archives of General Psychiatry*, *56*(10), 921–926.
- Krueger, R. F., & Bezdjian, S. (2009). Enhancing research and treatment of mental disorders with dimensional concepts: toward *DSM-V* and ICD-11. *World Psychiatry*, *8*(1), 3–6.
- Krueger, R. F., & Eaton, N. R. (2010). Personality traits and the classification of mental disorders: toward a more complete integration in *DSM-5* and an empirical model of psychopathology. *Personality Disorders: Theory, Research, and Treatment*, *1*(2), 97–118.
- Krueger, R. F., & Markon, K. E. (2006). Reinterpreting comorbidity: a model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology*, *2*, 111.
- Krueger, R. F., & Markon, K. E. (2011). A dimensional-spectrum model of psychopathology: progress and opportunities. *Archives of General Psychiatry*, *68*(1), 10–11.
- Krueger, R. F., & Markon, K. E. (2014). The role of the *DSM-5* personality trait model in moving toward a quantitative and empirically based approach to classifying personality and psychopathology. *Annual Review of Clinical Psychology*, *10*, 477–501.
- Krueger, R. F., Chentsova-Dutton, Y. E., Markon, K. E., Goldberg, D., & Ormel, J. (2003). A cross-cultural study of the structure of comorbidity among common psychopathological syndromes in the general health care setting. *Journal of Abnormal Psychology*, *112*(3), 437.
- Krueger, R. F., Caspi, A., Moffitt, T. E., & Silva, P. A. (1998). The structure and stability of common mental disorders (*DSM-III-R*): a longitudinal-epidemiological study. *Journal of Abnormal Psychology*, *107*(2), 216.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2012). Initial construction of a maladaptive personality trait model and inventory for *DSM-5*. *Psychological Medicine*, *42*(09), 1879–1890.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2013). The Personality Inventory for *DSM-5* Brief Form (PID-5-BF). Manuscript in preparation.
- Krueger, R. F., Derringer, J., Markon, K. E., Watson, D., & Skodol, A. E. (2013b). *The Personality Inventory for DSM-5 (PID-5)—child age 11–17*. Washington, DC: American Psychiatric Association.
- Krueger, R. F., Eaton, N. R., Clark, L. A., Watson, D., Markon, K. E., Derringer, J., & Livesley, W. J. (2011). Deriving an empirical structure of personality pathology for *DSM-5*. *Journal of Personality Disorders*, *25*, 170–191.
- Krueger, R. F., Hopwood, C. J., Wright, A. G., & Markon, K. E. (2014). *DSM-5* and the path toward empirically based and clinically useful conceptualization of personality and psychopathology. *Clinical Psychology: Science and Practice*, *21*(3), 245–261.
- Kupfer, D. J., & Regier, D. A. (2011). Neuroscience, clinical evidence, and the future of psychiatric classification in *DSM-5*. *American Journal of Psychiatry*, *168*(7), 672–674.
- Kushner, S. C., Tackett, J. L., & de Clercq, B. (2013). The joint hierarchical structure of adolescent personality pathology: converging evidence from two approaches to measurement. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *22*(3), 199–205.
- Kwapil, T. R., & Barrantes-Vidal, N. (2012). Schizotypal personality disorder: an integrative review. In T. Widiger (Ed.), *The Oxford handbook of personality disorders* (pp. 437–477). New York, NY: Oxford University Press.
- Lahey, B. B., Applegate, B., Hakes, J. K., Zald, D. H., Hariri, A. R., & Rathouz, P. J. (2012). Is there a general factor of prevalent psychopathology during adulthood? *Journal of Abnormal Psychology*, *121*(4), 971–977.
- Lahey, B. B., Van Hulle, C. A., Singh, A. L., Waldman, I. D., & Rathouz, P. J. (2011). Higher-order genetic and environmental structure of prevalent forms of child and adolescent psychopathology. *Archives of General Psychiatry*, *68*(2), 181–189.
- Lahey, B. B., Zald, D. H., Hakes, J. K., Krueger, R. F., & Rathouz, P. J. (2014). Patterns of heterotypic continuity associated with the cross-sectional correlational structure of prevalent mental disorders in adults. *JAMA Psychiatry*, *71*(9), 989–996.
- Lee, S. (2001). From diversity to unity: the classification of mental disorders in 21st-century China. *Psychiatric Clinics of North America*, *24*(3), 421–431.

- Lewinsohn, P. M., Shankman, S. A., Gau, J. M., & Klein, D. N. (2004). The prevalence and co-morbidity of subthreshold psychiatric conditions. *Psychological Medicine*, 34(4), 613–622.
- Lichtenstein, P., Yip, B. H., Björk, C., Pawitan, Y., Cannon, T. D., Sullivan, P. F., & Hultman, C. (2009). Common genetic determinants of schizophrenia and bipolar disorder in Swedish families: a population-based study. *Lancet*, 373(9659), 234–239.
- Lilienfeld, S. O. (2014). The Research Domain Criteria (RDoC): an analysis of methodological and conceptual challenges. *Behaviour Research and Therapy*, 62, 129–139.
- Lilienfeld, S. O., & Treadway, M. T. (2016). Clashing diagnostic approaches: DSM-ICD versus RDoC. *Annual Review of Clinical Psychology*, 12, 435–463.
- Livesley, W. J. (2003). *Practical management of personality disorders*. New York, NY: Guilford Press.
- Livesley, W. J. (2006). General assessment of personality disorder (GAPD). Unpublished manuscript. Vancouver, BC, Canada: Department of Psychiatry, University of British Columbia.
- Livesley, W. J. (2007). A framework for integrating dimensional and categorical classifications of personality disorder. *Journal of Personality Disorders*, 21(2), 199.
- Livesley, W. J., & Jackson, D. N. (2009a). *Dimensional Assessment of Personality Pathology—Basic Questionnaire*. Port Huron, MI: Sigma Assessment Systems.
- Livesley, W. J., & Jackson, D. (2009b). *Manual for the Dimensional Assessment of Personality Pathology—Basic Questionnaire*. Port Huron, MI: Sigma Assessment Systems.
- Livesley, W. J., Jang, K. L., & Vernon, P. A. (1998). Phenotypic and genetic structure of traits delineating personality disorder. *Archives of General Psychiatry*, 55(10), 941–948.
- Lobbetael, J., Leurgans, M., & Arntz, A. (2011). Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I disorders (SCID I) and Axis II disorders (SCID II). *Clinical Psychology and Psychotherapy*, 18(1), 75–79.
- Loevinger, J. (1957). Objective tests as instruments of psychological theory. *Psychological Reports*, 3, 635–694.
- Loranger, A. W. (1999). *IPDE: International personality disorder examination: DSM-IV and ICD-10 interviews*. Odessa, FL: Psychological Assessment Resources.
- Lubke, G. H., & Muthén, B. (2005). Investigating population heterogeneity with factor mixture models. *Psychological Methods*, 10(1), 21.
- Maier, W., Zobel, A., & Wagner, M. (2006). Schizophrenia and bipolar disorder: differences and overlaps. *Current Opinion in Psychiatry*, 19(2), 165–170.
- Marin-Avellan, L. E., McGauley, G., Campbell, C., & Fonagy, P. (2005). Using the SWAP-200 in a personality-disordered forensic population: is it valid, reliable and useful? *Criminal Behaviour and Mental Health*, 15(1), 28–45.
- Markon, K. E. (2010). Modeling psychopathology structure: a symptom-level analysis of Axis I and II disorders. *Psychological Medicine*, 40(02), 273–288.
- Markon, K. E., & Krueger, R. F. (2006). Information-theoretic latent distribution modeling: distinguishing discrete and continuous latent variable models. *Psychological Methods*, 11(3), 228.
- Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: an integrative hierarchical approach. *Journal of Personality and Social Psychology*, 88(1), 139–157.
- Markon, K. E., Quilty, L. C., Bagby, R. M., & Krueger, R. F. (2013). The development and psychometric properties of an informant-report form of the Personality Inventory for DSM-5 (PID-5). *Assessment*, 20(3), 370–383.
- Matzner, F. (1994). Videotapes as training tools for the development of the KID-SCID. *Scientific Proceedings of the American Academy of Child and Adolescent Psychiatric Association, Forty-Second Annual Meeting*. Washington, DC [Paper presentation].
- Matzner, F., Silva, R., Silvan, M., Chowdhury, M., & Nastasi, L. (1997). Preliminary test–retest reliability of the KID-SCID. *Scientific Proceedings of the American Academy of Child and Adolescent Psychiatry, Forty-Fifth Annual Meeting*. Washington, DC [Paper presentation].
- McCrae, R. R., & Costa, P. T. (1995). Trait explanations in personality psychology. *European Journal of Personality*, 9(4), 231–252.
- McWilliams, N. (2011). *Psychoanalytic diagnosis: Understanding personality structure in the clinical process*. New York, NY: Guilford Press.
- Measelle, J. R., Stice, E., & Hogansen, J. M. (2006). Developmental trajectories of co-occurring depressive, eating, antisocial, and substance abuse problems in female adolescents. *Journal of Abnormal Psychology*, 115(3), 524.
- Miller, M. W., Kaloupek, D. G., Dillon, A. L., & Keane, T. M. (2004). Externalizing and internalizing subtypes of combat-related PTSD: a replication and extension using the PSY-5 scales. *Journal of Abnormal Psychology*, 113(4), 636–645.
- Miller, J. D., Lynam, D. R., Rolland, J. P., de Fruyt, F., Reynolds, S. K., Pham-Scott, A., & Bagby, R. M. (2008). Scoring the DSM-IV personality disorders using the five-factor model: development and validation of normative scores for North American, French, and Dutch-Flemish samples. *Journal of Personality Disorders*, 22(5), 433–450.
- Miller, M. W., Vogt, D. S., Mozley, S. L., Kaloupek, D. G., & Keane, T. M. (2006). PTSD and substance-related problems: the mediating roles of constraint and negative emotionality. *Journal of Abnormal Psychology*, 115(2), 369–379.
- Millon, T. (1977). *Millon Clinical Multiaxial Inventory manual*. Minneapolis, MN: National Computer Systems.
- Millon, T. (1983). *Modern psychopathology*. Prospect Heights, IL: Waveland (Original work published in 1969).
- Millon, T. (1987). *Millon Clinical Multiaxial Inventory II (MCMI-II) manual*. Minneapolis, MN: National Computer Systems.
- Millon, T., & Davis, R. D. (1997). *Manual for the Millon Clinical Multiaxial Inventory—III (MCMI-III)*. Minneapolis, MN: National Computer Systems.
- Millon, T., & Klerman, G. L. (1986). *Contemporary directions in psychopathology: Toward the DSM-IV*. New York, NY: Guilford Press.
- Millon, T., Millon, C., Davis, R. D., & Grossman, S. (2009). *Millon Clinical Multiaxial Inventory—III (MCMI-III): manual*. Minneapolis, MN: Pearson.
- Millon, T., Millon, C., & Grossman, S. (2015). *MCMI-IV: Millon Clinical Multiaxial Inventory—IV*. Minneapolis, MN: Pearson Assessments.

- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system theory of personality: reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, *102*(2), 246–268.
- Mischel, W., & Shoda, Y. (2008). Toward a unified theory of personality. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 208–241). New York, NY: Guilford Press.
- Möller, H. J. (2005). Problems associated with the classification and diagnosis of psychiatric disorders. *World Journal of Biological Psychiatry*, *6*(1), 45–56.
- Möller, H. J. (2008). Systematic of psychiatric disorders between categorical and dimensional approaches. *European Archives of Psychiatry and Clinical Neuroscience*, *258*(2), 48–73.
- Möller, H. J. (2009). Development of DSM-V and ICD-11: tendencies and potential of new classifications in psychiatry at the current state of knowledge. *Psychiatry and Clinical Neurosciences*, *63*(5), 595–612.
- Möller, H. J., Bandelow, B., Bauer, M., Hampel, H., Herpertz, S. C., Soyka, M., & Maier, W. (2015). DSM-5 reviewed from different angles: goal attainment, rationality, use of evidence, consequences—part 1: general aspects and paradigmatic discussion of depressive disorders. *European Archives of Psychiatry and Clinical Neuroscience*, *265*(1), 5–18.
- Möller, H. J., Jäger, M., Riedel, M., Obermeier, M., Strauss, A., & Bottlender, R. (2011). The Munich 15-year follow-up study (MUFUSSAD) on first-hospitalized patients with schizophrenic or affective disorders: assessing courses, types and time stability of diagnostic classification. *European Psychiatry*, *26*(4), 231–243.
- Morey, L. C. (1991). *Personality assessment inventory (PAI)*. Odessa, FL: Routledge.
- Morris, S. E., & Cuthbert, B. N. (2012). Research domain criteria: cognitive systems, neural circuits, and dimensions of behavior. *Dialogues in Clinical Neuroscience*, *14*(1), 29–37.
- Muthén, B. (2006). Should substance use disorders be considered as categorical or dimensional? *Addiction*, *101*(1), 6–16.
- Nolen-Hoeksema, S., & Watkins, E. R. (2011). A heuristic for developing transdiagnostic models of psychopathology explaining multifinality and divergent trajectories. *Perspectives on Psychological Science*, *6*(6), 589–609.
- Noordhof, A., Krueger, R. F., Ormel, J., Oldehinkel, A. J., & Hartman, C. A. (2015). Integrating autism-related symptoms into the dimensional internalizing and externalizing model of psychopathology: the TRAILS study. *Journal of Abnormal Child Psychology*, *43*(3), 577–587.
- Paunonen, S. V. (2003). Big Five factors of personality and replicated predictions of behavior. *Journal of Personality and Social Psychology*, *84*(2), 411.
- Perry, C. J. (1990). *Defense Mechanism Rating Scale (DMRS)* (5th ed.). Boston, MA: Cambridge Hospital.
- Peterson, G. W., Clark, D. A., & Bennett, B. (1989). The utility of MMPI subtle, obvious scales for detecting fake good and fake bad response sets. *Journal of Clinical Psychology*, *45*(4), 575–583.
- Pezawas, L., Meyer-Lindenberg, A., Drabant, E. M., Verchinski, B. A., Munoz, K. E., Kolachana, B. S., & Weinberger, D. R. (2005). 5-HTTLPR polymorphism impacts human cingulate-amygdala interactions: a genetic susceptibility mechanism for depression. *Nature Neuroscience*, *8*(6), 828–834.
- Pfohl, B., Blum, N., & Zimmerman, M. (1997). *Structured interview for DSM-IV personality: SIDP-IV*. Washington, DC: American Psychiatric Association.
- Polanczyk, G., Silva de Lima, M., Horta, B. L., Biederman, J., & Rohde, L. A. (2007). The worldwide prevalence of ADHD: a systematic review and metaregression analysis. *American Journal of Psychiatry*, *164*(6), 942–948.
- Pryor, L. R., Miller, J. D., Hoffman, B. J., & Harding, H. G. (2009). Pathological personality traits and externalizing behaviour. *Personality and Mental Health*, *3*(1), 26–40.
- Reynolds, S. K., & Clark, L. A. (2001). Predicting dimensions of personality disorder from domains and facets of the five factor model. *Journal of Personality*, *69*(2), 199–222.
- Roberts, R. E., & Roberts, C. R. (2007). Ethnicity and risk of psychiatric disorder among adolescents. *Research in Human Development*, *4*(1–2), 89–117.
- Roberts, M. C., Reed, G. M., Medina-Mora, M. E., Keeley, J. W., Sharan, P., Johnson, D. K., & Maruta, T. (2012). A global clinicians' map of mental disorders to improve ICD-11: analysing meta-structure to enhance clinical utility. *International Review of Psychiatry*, *24*(6), 578–590.
- Robins, L. N. (1985). Epidemiology: reflections on testing the validity of psychiatric interviews. *Archives of General Psychiatry*, *42*(9), 918–924.
- Roelofs, J., Muris, P., Braet, C., Arntz, A., & Beelen, I. (2015). The Structured Clinical Interview for DSM-IV childhood diagnoses (Kid-SCID): first psychometric evaluation in a Dutch sample of clinically referred youths. *Child Psychiatry and Human Development*, *46*(3), 367–375.
- Rogers, R., Sewell, K. W., Harrison, K. S., & Jordan, M. J. (2006). The MMPI-2 restructured clinical scales: a paradigmatic shift in scale development. *Journal of Personality Assessment*, *87*(2), 139–147.
- Roysamb, E., Kendler, K. S., Tambs, K., Orstavik, R. E., Neale, M. C., Aggen, S. H., & Reichborn-Kjennerud, T. (2011). The joint structure of DSM-IV Axis I and Axis II disorders. *Journal of Abnormal Psychology*, *120*(1), 198.
- Rutter, M., & Nikapota, A. (2002). Culture, ethnicity, society and psychopathology. In M. Rutter, & E. Taylor (Eds.), *Child and adolescent psychiatry* (pp. 277–286). (Vol. 16). Oxford: Blackwell.
- Samuel, D. B., Carroll, K. M., Rounsaville, B. J., & Ball, S. A. (2013). Personality disorders as maladaptive, extreme variants of normal personality: borderline personality disorder and neuroticism in a substance using sample. *Journal of Personality Disorders*, *27*(5), 625.
- Samuel, D. B., Simms, L. J., Clark, L. A., Livesley, W. J., & Widiger, T. A. (2010). An item response theory integration of normal and abnormal personality scales. *Personality Disorders: Theory, Research, and Treatment*, *1*(1), 5.
- Sanislow, C. A., Pine, D. S., Quinn, K. J., Kozak, M. J., Garvey, M. A., Heinssen, R. K., & Cuthbert, B. N. (2010). Developing constructs for psychopathology research: research domain criteria. *Journal of Abnormal Psychology*, *119*(4), 631.
- Sartor, C. E., Grant, J. D., Buchholz, K. K., Madden, P. A. F., Heath, A. C., Agrawal, A., & Lynskey, M. T. (2010). Common genetic contributions to alcohol and cannabis use and dependence symptomatology. *Alcoholism, Clinical and Experimental Research*, *34*(3), 545–554.

- Schmittmann, V. D., Cramer, A. O., Waldorp, L. J., Epskamp, S., Kievit, R. A., & Borsboom, D. (2013). Deconstructing the construct: a network perspective on psychological phenomena. *New Ideas in Psychology, 31*(1), 43–53.
- Schneider, K. (1959). In M. W. Hamilton (Ed.), *Clinical psychopathology* (5th ed.). Oxford: Grune and Stratton.
- Sellbom, M., Ben-Porath, Y. S., & Graham, J. R. (2006a). Correlates of the MMPI-2 Restructured Clinical (RC) scales in a college counseling setting. *Journal of Personality Assessment, 86*(1), 88–99.
- Sellbom, M., Bagby, R. M., Kushner, S., Quilty, L. C., & Ayeart, L. E. (2012a). Diagnostic construct validity of MMPI-2 restructured form (MMPI-2-RF) scale scores. *Assessment, 19*(2), 176–186.
- Sellbom, M., Ben-Porath, Y. S., McNulty, J. L., Arbisi, P. A., & Graham, J. R. (2006b). Elevation differences between MMPI-2 Clinical and Restructured Clinical (RC) Scales: frequency, origins, and interpretative implications. *Assessment, 13*(4), 430–441.
- Sellbom, M., Graham, J. R., & Schenk, P. W. (2006c). Incremental validity of the MMPI-2 Restructured Clinical (RC) scales in a private practice sample. *Journal of Personality Assessment, 86*(2), 196–205.
- Sellbom, M., Wygant, D., & Bagby, M. (2012b). Utility of the MMPI-2-RF in detecting non-credible somatic complaints. *Psychiatry Research, 197*(3), 295–301.
- Shaffer, D., Fisher, P., Lucas, C., Dulcan, M., & Schwab-Stone, M. (2000). NIMH Diagnostic Interview Schedule for Children, version IV (NIMH DISC-IV): description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*(1), 28–38.
- Shankman, S. A., & Gorka, S. M. (2015). Psychopathology research in the RDoC era: unanswered questions and the importance of the psychophysiological unit of analysis. *International Journal of Psychophysiology, 98*(2), 330–337.
- Sharp, C., Wright, A. G., Fowler, J. C., Frueh, B. C., Allen, J. G., Oldham, J., & Clark, L. A. (2015). The structure of personality pathology: both general ('g') and specific ('s') factors? *Journal of Abnormal Psychology, 124*(2), 387.
- Shedler, J., & Westen, D. (2004a). Dimensions of personality pathology: an alternative to the five-factor model. *American Journal of Psychiatry, 161*, 1743–1754.
- Shedler, J., & Westen, D. (2004b). Refining *DSM-IV* personality disorder diagnosis: integrating science and practice. *American Journal of Psychiatry, 161*(8), 1350–1365.
- Shedler, J., & Westen, D. (2007). The Shedler–Westen Assessment Procedure (SWAP): making personality diagnosis clinically meaningful. *Journal of Personality Assessment, 89*(1), 41–55.
- Simms, L. J., Casillas, A., Clark, L. A., Watson, D., & Doebbeling, B. N. (2005). Psychometric evaluation of the restructured clinical scales of the MMPI-2. *Psychological Assessment, 17*(3), 345–358.
- Simms, L. J., Prisciandaro, J. J., Krueger, R. F., & Goldberg, D. P. (2012). The structure of depression, anxiety and somatic symptoms in primary care. *Psychological Medicine, 42*(01), 15–28.
- Skeem, J. L., & Cooke, D. J. (2010). Is criminal behavior a central component of psychopathy? Conceptual directions for resolving the debate. *Psychological Assessment, 22*(2), 433–445.
- Skodol, A. E., Bender, D. S., Oldham, J. M., Clark, L. A., Morey, L. C., Verheul, R., & Siever, L. J. (2011a). Proposed changes in personality and personality disorder assessment and diagnosis for *DSM-5* part II: clinical application. *Personality Disorders: Theory, Research, and Treatment, 2*(1), 23.
- Skodol, A. E., Clark, L. A., Bender, D. S., Krueger, R. F., Morey, L. C., Verheul, R., & Oldham, J. M. (2011b). Proposed changes in personality and personality disorder assessment and diagnosis for *DSM-5* part I: description and rationale. *Personality Disorders: Theory, Research, and Treatment, 2*(1), 4.
- Skodol, A. E., Oldham, J. M., Rosnick, L., Kellman, H. D., & Hyler, S. E. (1991). Diagnosis of *DSM-III-R* personality disorders: a comparison of two structured interviews. *International Journal of Methods in Psychiatric Research, 1*(1), 13–26.
- Slade, T. I. M., & Watson, D. (2006). The structure of common *DSM-IV* and *ICD-10* mental disorders in the Australian general population. *Psychological Medicine, 36*(11), 1593–1600.
- Sneath, P. H. (1957). Some thoughts on bacterial classification. *Microbiology, 17*(1), 184–200.
- South, S. C., & Miller, M. L. (2014). Measuring momentary stress, affect, and cognition: relationships with the internalizing and externalizing spectra. *Journal of Psychopathology and Behavioral Assessment, 36*(1), 93–104.
- Spitzer, R. L., First, M. B., Shedler, J., Westen, D., & Skodol, A. E. (2008). Clinical utility of five dimensional systems for personality diagnosis: a “consumer preference” study. *Journal of Nervous and Mental Disease, 196*(5), 356–374.
- Stahl, S. M. (2013). The last *Diagnostic and Statistical Manual (DSM)*: replacing our symptom-based diagnoses with a brain circuit-based classification of mental illnesses. *Central Nervous System Spectrums, 18*(02), 65–68.
- Stepp, S. D., Yu, L., Miller, J. D., Hallquist, M. N., Trull, T. J., & Pilkonis, P. A. (2012). Integrating competing dimensional models of personality: linking the SNAP, TCI, and NEO using item response theory. *Personality Disorders: Theory, Research, and Treatment, 3*(2), 107–126.
- Suzuki, T., Samuel, D. B., Pahlen, S., & Krueger, R. F. (2015). *DSM-5* alternative personality disorder model traits as maladaptive extreme variants of the five-factor model: an item-response theory analysis. *Journal of Abnormal Psychology, 124*(2), 343–354.
- Szodoray, P., Nakken, B., Barath, S., Gaal, J., Aleksza, M., Zeher, M., & Bodolay, E. (2008). Progressive divergent shifts in natural and induced T-regulatory cells signify the transition from undifferentiated to definitive connective tissue disease. *International Immunology, 20*(8), 971–979.
- Task Force. (2006). *Psychodynamic diagnostic manual*. Silver Spring, MD: Alliance of Psychoanalytic Organizations.
- Tellegen, A., & Waller, N. G. (1987). Re-examining basic dimensions of natural language trait descriptors. *Ninety-Fifth Annual Convention of the American Psychological Association*. New York, NY.
- Tellegen, A., Ben-Porath, Y. S., McNulty, J. L., Arbisi, P. A., Graham, J. R., & Kaemmer, B. (2003). *MMPI-2 Restructured Clinical (RC) Scales: Development, validation, and interpretation*. Minneapolis, MN: University of Minnesota Press.

- Tellegen, A., Ben-Porath, Y. S., Sellbom, M., Arbisi, P. A., McNulty, J. L., & Graham, J. R. (2006). Further evidence on the validity of the MMPI-2 Restructured Clinical (RC) scales: addressing questions raised by Rogers, Sewell, Harrison, and Jordan and Nichols. *Journal of Personality Assessment*, 87(2), 148–171.
- Trimboli, F., Marshall, R. L., & Keenan, C. W. (2013). Assessing psychopathology from a structural perspective: a psychodynamic model. *Bulletin of the Menninger Clinic*, 77(2), 132–160.
- Trull, T. J., Useda, J. D., Costa, P. T., Jr., & McCrae, R. R. (1995). Comparison of the MMPI-2 Personality Psychopathology Five (PSY-5), the NEO-PI, and the NEO-PI-R. *Psychological Assessment*, 7(4), 508–516.
- Trull, T. J., Widiger, T. A., Lynam, D. R., & Costa, P. T. (2003). Borderline personality disorder from the perspective of general personality functioning. *Journal of Abnormal Psychology*, 112, 193–202.
- van der Maas, H. L., Dolan, C. V., Grasman, R. P., Wicherts, J. M., Huizenga, H. M., & Raijmakers, M. E. (2006). A dynamical model of general intelligence: the positive manifold of intelligence by mutualism. *Psychological Review*, 113(4), 842–861.
- van Kampen, D. (2012). The 5-Dimensional Personality Test (5DPT): relationships with two lexically based instruments and the validation of the absorption scale. *Journal of Personality Assessment*, 94(1), 92–101.
- van Kampen, D., de Beurs, E., & Andrea, H. (2008). A short form of the Dimensional Assessment of Personality Pathology–Basic Questionnaire (DAPP-BQ): the DAPP-SF. *Psychiatry Research*, 160(1), 115–128.
- Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., & Bentall, R. P. (2012). Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin*, 38(4), 661–671.
- Verheul, R., & Widiger, T. A. (2004). A meta-analysis of the prevalence and usage of the personality disorder not otherwise specified (PDNOS) diagnosis. *Journal of Personality Disorders*, 18(4), 309–319.
- Verheul, R., Bartak, A., & Widiger, T. (2007). Prevalence and construct validity of personality disorder not otherwise specified (PDNOS). *Journal of Personality Disorders*, 21(4), 359.
- Vollebergh, W. A., Iedema, J., Bijl, R. V., de Graaf, R., Smit, F., & Ormel, J. (2001). The structure and stability of common mental disorders: the NEMESIS study. *Archives of General Psychiatry*, 58(6), 597–603.
- Wakefield, J. C. (1992). The concept of mental disorder: on the boundary between biological facts and social values. *American Psychologist*, 47(3), 373–388.
- Wakefield, J. C. (2014). Wittgenstein's nightmare: why the RDoC grid needs a conceptual dimension. *World Psychiatry*, 13(1), 38–40.
- Wakefield, J. C., Pottick, K. J., & Kirk, S. A. (2002). Should the *DSM-IV* diagnostic criteria for conduct disorder consider social context? *American Journal of Psychiatry*, 159(3), 380–386.
- Waldron, S., Scharf, R. D., Hurst, D., Firestein, S. K., & Burton, A. (2004). What happens in a psychoanalysis? *International Journal of Psychoanalysis*, 85(2), 443–466.
- Walton, K. E., Roberts, B. W., Krueger, R. F., Blonigen, D. M., & Hicks, B. M. (2008). Capturing abnormal personality with normal personality inventories: an item response theory approach. *Journal of Personality*, 76(6), 1623–1648.
- Watson, D., & Naragon-Gainey, K. (2014). Personality, emotions, and the emotional disorders. *Clinical Psychological Science*, 2(4), 422–442.
- Watson, D., Stasik, S. M., Ellickson-Larew, S., & Stanton, K. (2015). Extraversion and psychopathology: a facet-level analysis. *Journal of Abnormal Psychology*, 124(2), 432.
- Weisner, T. S. (2002). Ecocultural understanding of children's developmental pathways. *Human Development*, 45(4), 275–281.
- Weisz, J. R., Weiss, B., Suwanlert, S., & Chaiyasit, W. (2006). Culture and youth psychopathology: testing the syndromal sensitivity model in Thai and American adolescents. *Journal of Consulting and Clinical Psychology*, 74(6), 1098.
- Westen, D., & Muderrisoglu, S. (2003). Assessing personality disorders using a systematic clinical interview: evaluation of an alternative to structured interviews. *Journal of Personality Disorders*, 17(4), 351–369.
- Westen, D., & Shedler, J. (1999a). Revising and assessing Axis II: I. Developing a clinically and empirically valid assessment method. *American Journal of Psychiatry*, 156(2), 258–272.
- Westen, D., & Shedler, J. (1999b). Revising and assessing Axis II: II. Toward an empirically based and clinically useful classification of personality disorders. *American Journal of Psychiatry*, 156(2), 273–285.
- Westen, D., & Shedler, J. (2007). Personality diagnosis with the Shedler–Westen Assessment Procedure (SWAP): integrating clinical and statistical measurement and prediction. *Journal of Abnormal Psychology*, 116(4), 810–822.
- Westen, D., Shedler, J., Bradley, B., & DeFife, J. (2012). An empirically derived taxonomy for personality diagnosis: bridging science and practice in conceptualizing personality. *American Journal of Psychiatry*, 169(3), 273–284.
- Whooley, O., & Horwitz, A. V. (2013). The paradox of professional success: grand ambition, furious resistance, and the derailment of the *DSM-5* revision process. In J. Paris, & J. Phillips (Eds.), *Making the DSM-5* (pp. 75–92). New York, NY: Springer.
- Widiger, T. A. (2011). The *DSM-5* dimensional model of personality disorder: rationale and empirical support. *Journal of Personality Disorders*, 25(2), 222.
- Widiger, T. A., & Presnall, J. R. (2013). Clinical application of the five-factor model. *Journal of Personality*, 81(6), 515–527.
- Widiger, T. A., & Trull, T. J. (2007). Plate tectonics in the classification of personality disorder: shifting to a dimensional model. *American Psychologist*, 62(2), 71.
- Widiger, T. A., Simonsen, E., Krueger, R., Livesley, W. J., & Verheul, R. (2005). Personality disorder research agenda for the *DSM-V*. *Journal of Personality Disorders*, 19(3), 315.
- Wittchen, H. U., Perkonig, A., Lachner, G., & Nelson, C. N. (1998). Early developmental stages of psychopathology study (EDSP): objectives and design. *European Addiction Research*, 4(1–2), 18–27.

- Wolf, A. W., Schubert, D. S., Patterson, M. B., Grande, T. P., Brocco, K. J., & Pendleton, L. (1988). Associations among major psychiatric diagnoses. *Journal of Consulting and Clinical Psychology, 56*(2), 292.
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: Clinical descriptions and diagnostic guidelines*. Geneva, Switzerland: World Health Organization.
- Wright, A. G., & Simms, L. J. (2014). On the structure of personality disorder traits: conjoint analyses of the CAT-PD, PID-5, and NEO-PI-3 trait models. *Personality Disorders: Theory, Research, and Treatment, 5*(1), 43–54.
- Wright, A. G., Krueger, R. F., Hobbs, M. J., Markon, K. E., Eaton, N. R., & Slade, T. (2013). The structure of psychopathology: toward an expanded quantitative empirical model. *Journal of Abnormal Psychology, 122*(1), 281.
- Wright, A. G., Pincus, A. L., Hopwood, C. J., Thomas, K. M., Markon, K. E., & Krueger, R. F. (2012a). An interpersonal analysis of pathological personality traits in *DSM-5*. *Assessment, 19*(3), 263–275.
- Wright, A. G., Thomas, K. M., Hopwood, C. J., Markon, K. E., Pincus, A. L., & Krueger, R. F. (2012b). The hierarchical structure of *DSM-5* pathological personality traits. *Journal of Abnormal Psychology, 121*(4), 951–957.
- Wygant, D. B., Sellbom, M., Graham, J. R., & Schenk, P. W. (2006). Incremental validity of the MMPI-2 PSY-5 scales in assessing self-reported personality disorder criteria. *Assessment, 13*(2), 178–186.
- Zanarini, M. C., & Frankenburg, F. R. (2001). Attainment and maintenance of reliability of axis I and II disorders over the course of a longitudinal study. *Comprehensive Psychiatry, 42*(5), 369–374.
- Zanarini, M. C., Frankenburg, F. R., Sickel, A. E., & Yong, L. (1996). *The diagnostic interview for DSM-IV personality disorders (DIPD-IV)*. Belmont, MA: McLean Hospital.
- Zanarini, M. C., Skodol, A. E., Bender, D., Dolan, R., Sanislow, C., Schaefer, E., & Gunderson, J. G. (2000). The collaborative longitudinal personality disorders study: reliability of axis I and II diagnoses. *Journal of Personality Disorders, 14*(4), 291–299.

Chapter 13

Theoretical Perspectives of Criminal Behaviors and Developmental Criminology

Chapter Outline

| | | | |
|---|------------|---|------------|
| Introduction | 383 | Farrington's integrated cognitive antisocial potential theory | 390 |
| Antisocial thinking, attitudes and criminal thinking | 384 | Catalano and Hawkins social development model | 391 |
| Theories of criminal behavior | 385 | Intelligence and criminal behavior | 391 |
| Biological and trait theories | 385 | High IQ and crime | 392 |
| Personality theories of criminal behavior | 386 | Risk and protective factors | 393 |
| An overview of developmental criminology | 387 | Measures | 394 |
| Developmental theories of criminal behavior | 388 | Summary | 398 |
| Moffitt's developmental taxonomy | 389 | References | 399 |
| Sampson and Laub's age-graded theory of informal social control and cumulative disadvantage | 390 | | |

INTRODUCTION

From the day we are born we are besieged by aggression in one form or another. Familiarization with aggressiveness easily begins in the first months of life as cuddling is often verbalized or manifested in an aggressive way. Parents often demonstrate their love for their babies via cruel and often morbid expressions, such as “Aren't you a sweet one? I could eat/bite you” and “I want to squeeze you until all your bones break because I love you so much.” This phenomenon is referred to as “cute aggression” (Aragón, Dyer, Bargh, & Clark, 2013).

As toddlers gradually enter the socialization stage, playing occupies a large part of their daily activities. Aggressive manifestations, such as kicking, punching, pushing, hitting, and biting, are often revealed in what is termed rough-and-tumble play in toddlerhood and continue till late elementary schooling.

Corporal, or physical, punishment remains widely used as an acceptable parental discipline technique. Extensive and consistent physical abuse can lead to externalizing and internalizing problems. Later, as children enter the childhood period, schooling becomes a central part of their daily lives and cognitive development is moderated through learning. Through the learning process children become progressively more capable of controlling and managing their actions and impulses.

Furthermore, storytelling and the reading of fairy tales have a regulating role in the management of aggression and violence. The majority of popular classic tales contains some form of violence. Violence often comes in the form of predatory menace, as in *Little Red Riding Hood* (LRRH); parental abuse or maltreatment, as in *Cinderella*, *Snow White*, *Hansel and Gretel*, and *The Juniper Tree*; or in the form of retributive justice for the wrongdoer. For example, “The stepmother pushed the little boy from one place to the next, slapped him here and cuffed him there so that the poor child lived in constant fear. When the unsuspected boy reaches into a chest to get an apple, the stepmother decapitates him” (*The Juniper Tree*). The symbolic nature of fairy tales and their significant role in socioemotional development has been regularly emphasized by several authors from the psychodynamic perspective (e.g., Bettelheim, 1989). Through the process of identification and projection children discard a large amount of aggressive impulses.

Moreover, during elementary schooling, children are often exposed to the media (especially television). It is important to acknowledge the possible deleterious effects of the aggression and violence in the media on children's emotional and personality development (e.g., Krahé, 2012). Research has shown that exposure to aggressive or violent media may result

in increased levels of desensitization to violence, increased levels of defiance, decreased likeliness to engage in prosocial behavior, and problematic peer and parental relationships (Krahé, 2012).

Theoretical attempts to understand and explain aggression often have led to the formulation of several dichotomous classifications, such as reactive–proactive, direct–indirect, physical–verbal, and instrumental–impulsive. Efforts to identify causes of aggression converge on the following: family problems, emotional deprivation, abuse or neglect, maternal depression, intraparental discord, and harsh discipline practices. Risk factors at a later age include substance abuse, delinquency, personality traits, and low intelligence. Although risk factors justify aggression and occasional violence, can they justify extreme forms of violence, such as brutal or sadistic behavior?

Recent research often highlights the subtle interaction between intelligence, personality, aggression, antisocial and criminal thinking styles which are considered precursors to criminal behavior. Aggression comprises a large part of normal personality and underlies personality dimensions, such as achievement, motivation, and assertiveness. In contrast, it can also form the major constituent of externalizing problems. Aggression and its violent manifestations are also implicated in the symptomatology of antisocial and narcissistic personality disorders and psychopathy. Aggression has been found to be closely related to pathological impulsivity, moral disengagement, and perversion.

Aggression, in its various expressions, can have an impact both at an individual and at a collective level. In the history of crime, what has changed through the years? The level of morbidity may have worsened. Crimes have become more perverted, and more sadistic and unpredictable.

The utmost expression of criminal violence is homicide, which is often followed by suicide. Research has identified intricate associations between, and common risk factors for, homicide and suicide; the most important being mental disorders, and, in particular, psychopathy. Furthermore, common social risk factors include family dysfunction, poor socioeconomic conditions, physical and sexual abuse, and substance abuse.

Due to the violent and devastating outcomes of aggression, efforts have consistently focused on the prediction and prevention of violence. The assessment of violence prediction typically involves a mixture of well-designed tools, such as interviews, personality self-report inventories, performance measures, and specialized violence risk-assessment measures. Moreover, assessment also includes the evaluation of protective factors, so as to provide the best possible interventions and treatment options.

ANTISOCIAL THINKING, ATTITUDES AND CRIMINAL THINKING

Attitudes can be important determinants of behavior. In the theory, research, assessment, and treatment of violent offenders, attitude is often used as a synonym for other terms, such as excuses, justifications, rationalizations, neutralizations, and moral disengagement. There is a growing interest in the potential influence of attitude on violent behavior (e.g., Maruna & Mann, 2006; Polaschek, Collie, & Walkey, 2004). More specifically, attitudes are typically defined as evaluations of people, events, or behaviors (e.g., Fazio, 2007). In a metaanalysis of criminal-behavior prediction, it was found that antisocial attitudes and associates provided the strongest correlations with criminal conduct of the six groups of risk factors. In addition to community criminal behavior, antisocial attitudes were found to be among the strongest of 16 domains in the prediction of prison misconduct (Gendreau, Goggin, & Law, 1997). There is limited understanding of the developmental relationship between antisocial beliefs and attitudes and antisocial behavior in childhood and adolescence. Initial findings from cross-sectional, correlational studies demonstrate significant increases in antisocial beliefs and attitudes through late childhood and adolescence (Butler, Leschied, & Fearon, 2007).

From a social–cognitive perspective, deviant cognitions that develop in youth play a significant role in the development of stable antisocial tendencies (Fontaine, 2008). Integrated social–cognitive information-processing models elaborate two distinct but interacting domains that are essential to the development and preservation of antisocial behavior in youth (Fontaine, Rijdsdijk, McCrory, & Viding, 2010): *Off-line* latent cognitive structures comprise beliefs, attitudes, and values that endorse antisocial behavior. *On-line* cognitive decision-making processes comprise a series of mental operations that occur “in the here and now” and within a specific context, such as making a biased hostile attribution (Dodge & Coie, 1987); while the influence of off-line latent cognitive structures is believed to be indirect, “on-line” processes have a direct impact on a young person’s emotions and behavior (Fontaine, 2008; Li, Fraser, & Wike, 2013).

Another factor that is central to criminal behavior is antisocial cognitions (Andrews, Bonta, & Hoge, 1990a; Andrews et al., 1990b), and specifically *criminal thinking* (i.e., a generally irresponsible way of thinking that promotes a criminal lifestyle) (e.g., Mandracchia, Morgan, Garos, & Garland, 2007). Generally, criminals think differently from noncriminals in that criminals demonstrate antisocial thinking, as well as errors in how they process information. Morgan, Batastini, Murray, Serna, and Porras (2015) examined whether criminal thinking is a process dependent on changing internal or external states (i.e., whether criminal thinking is fluid or static). Their findings provided support for criminal thinking as a fixed, trait-dependent construct.

Beck (1976) suggested that dysfunctional thinking operates specifically in automatic thoughts. He posited that automatic thoughts occur reflexively (i.e., spontaneously and unintentionally) and are characterized by negative self-evaluations and self-perceptions. Ellis (1974), on the other hand, posited that maladaptive behavior stems from irrational beliefs. He described irrational beliefs as being dogmatically held, logically unfounded, and absolutistic, and that they create a sense of catastrophe. Building on these early conceptualizations, more recent literature on the potential negative impact of cognitive errors has included a focus on identifying and modifying assumptions (Beck, 2005), core beliefs (Beck, 1995, 2005), schemas (Martin & Young, 2010), and attributions (Laird & Metalsky, 2009).

Research has shown that individuals brought up in an environment encouraging antisocial behavior and criminal acts are more likely to incorporate criminal thinking and attitudes into their cognitive style and consequently are more likely to commit crime (e.g., Holsinger, 1999). Evidence has indicated that criminal thinking and antisocial attitudes and cognitions predict criminal behavior (Holsinger, 1999; Walters, 2005). Various aspects of proactive and reactive criminal thinking have been differentially linked to certain types of criminal behavior. For example, it appears that sexual offenses are primarily associated with *proactive criminal thinking styles*.

The identification of specific thinking patterns associated with problematic emotional reactions and dysfunctional behaviors is at the core of CBT interventions. Cognitive-behavioral therapies (CBT) are considered as the most empirically validated treatments for a large number of disorders (Butler, Chapman, Forman, & Beck, 2006).

THEORIES OF CRIMINAL BEHAVIOR

Criminal behavior, or offending, is generally defined as any overt or covert law-breaking conduct in a given country or state, punishable upon conviction. The two main broad categories are *property crimes* (e.g., fraud, theft) and *violent crimes* (e.g., domestic violence, robbery, homicide, and sex crimes). Other categories of crime include *public order crime* (e.g., public disturbance, illegal drug use, prostitution) and *white-collar crime* (i.e., offenses committed by public officials, or offenses against a corporate entity by individuals who are employed by the corporation). The term *delinquent behavior* (or delinquency) generally refers to offenses committed by adolescents, while the term *criminal behavior* refers to adult offending. The definition of criminal behavior is limited in that it only makes reference to offenses that are detected by the criminal justice system.

The aforementioned types of criminal behavior can be explained in four dimensions: *reckless behavior* (e.g., substance use, risky sexual behavior, risky motor vehicle use, gambling, etc.), *authority conflict* (e.g., at home, at school, etc.), *covert delinquency* (e.g., theft, fraud, etc.), and *overt delinquency* (e.g., violence, vandalism, etc.). In turn, the covariation among these four factors can be explained by a general factor or dimension, which is referred to as *general deviance* or *antisocial syndrome* (Le Blanc, 2009). The distinction between different forms of antisocial behavior is important for developmental criminology, due to the potentially distinct etiologies underlying these different behaviors (Tackett, Krueger, Iacono, & McGue, 2005) and the fact that their development may closely interact across the life course (Le Blanc, 2012).

Domestic violence does not only—or even mostly—consist of acts of physical violence, although these are often present. It includes psychological and emotional tactics, including threats, isolation, and undermining of self-confidence. The severity of its impacts center on the common operation of fear, terror, and control (e.g., Stark, 2007). Domestic violence is a widespread and everyday phenomenon in higher- and lower-income countries alike that appears to cut across boundaries of class, age, ethnicity, and sexual orientation (McCue, 2008). A review of European studies suggests that around one in four women experience domestic violence over their lifetimes, and 6%–10% in any given year (Council of Europe, 2002). Men make up 10%–30% of victims of domestic violence (Hester, 2009; Walby & Allen, 2004). Domestic violence is marked by its repeated and long-term nature, and is a social issue that has serious consequences for the physical and mental health of those who experience it; it is a major cause of family breakup, affects patterns of housing and income, and has far-reaching implications for the well-being, social, and emotional development of children's mental health (Abrahams, 2010; Hester et al., 2006).

Biological and trait theories

There are two major categories of theories: *biological* and *trait theories*. Biological factors include brain functioning (Séguin, Pinsonneault, & Parent, 2015), neurotransmitters, physiological arousal, neurotoxins, genetic influences, and gene–environment interactions (Beaver, Schwartz, & Gajos, 2015). Raine (2013) proposed that genes influence brain structure and brain structures influence violence. According to Loeber and Pardini (2008), the relationship between biological factors and violence is not always direct. These authors suggest that the impact of biological factors on violence is mediated by personality traits, such as anger and impulsivity (e.g., Blair, 2012).

The trait approach to offending postulates that individual differences originate in childhood, that there is relatively a high stability of behaviors over time, and that individual differences are fairly stable over time. According to [Loeber, Byrd, and Farrington \(2015\)](#), individual differences in violence may be initially modest, then increase and later decline over time. What is less clear is the extent of decline along the age–crime trajectory, whether the decline reflects the influence of other factors, such as the growth of internal controls and the decrease of impulsivity and sensation seeking, and how these changes are associated to changes in brain function. According to [Loeber and Farrington \(2012\)](#), changes in internal controls across time can be attributed to more mature judgment, better decision making, better executive functioning, reasoned abstract thinking and planning, better impulse control and consideration of legal consequences, better emotion and self-regulation, less susceptibility to peer influences, and avoidance of self-harm. [Monahan, Steinberg, and Cauffman \(2009\)](#) suggested that increase of self-control during adolescence may explain desistance from delinquent behavior. Desistance from offending cannot be explained solely on a biological basis ([Kazemian, 2015a](#)).

Personality theories of criminal behavior

Psychological, and particularly trait, theories are generally known as *propensity theories* in criminology. There are three kinds of theories suggesting a connection between personality traits and criminal aggressive behavior (CAB). First, there are those postulating that personality traits are essentially descriptive factors (i.e., they are covariates that correlate with antisocial behavior, or differentiate criminals and noncriminals). Second, there are theories positing that personality traits can influence the decision about and perpetration of crimes. Third, there are theories suggesting that early dispositions (temperament or personality traits) have a causal or explanatory contribution, either direct or indirect, in increasing the risk of CAB onset. For these theories, personality traits are risk factors, not simply covariates. [Agnew \(2005\)](#) suggested that two broad personality traits are important factors related to antisocial involvement, namely *low self-control* and *high irritability* (or anger). [Lahey and Waldman \(2003\)](#) also proposed a developmental propensity model to explain the onset of CAB. The authors suggested that *high negative emotionality* and *daring* (boldness, thrill seeking, and recklessness) and *low prosociality* (helpfulness, sympathy for others) during childhood increase the risk of developing later antisocial behavior. [DeLisi and Vaughn \(2014\)](#) proposed that children with *low effortful control* and *high negative emotionality* are at higher risk for developing a perpetual pathway of antisocial behavior.

[Eysenck \(1996\)](#) also proposed a criminological theory in which personality traits play a central role. He proposed that individuals inherit predispositions to behave or react in predictable ways under specific environmental conditions. According to Eysenck, individuals high on the scale of extraversion, neuroticism, and psychoticism (which should arguably have been labeled disinhibition or psychopathy) are more likely to commit crimes.

Psychopathy theory is important for understanding the connections between personality traits and CAB ([DeLisi, 2009](#); [Lynam & Derefinko, 2006](#)). Psychopathy is a complex construct encompassing an individual's personality characteristics. For example, factor analyses of [Hare's \(2003\)](#) Psychopathy Checklist-Revised (PCL-R) items suggested four correlated factors, namely (1) interpersonal functioning (narcissism, Machiavellianism), (2) affective functioning (callousness, unemotionality), (3) impulsive lifestyle (impulsivity, stimulation seeking), and (4) antisocial behavior (past and current). The first three factors are clearly related to personality traits ([Lynam & Derefinko, 2006](#)).

[Le Blanc \(1997, 2005\)](#), in his *offense control theory*, refers to the concept of low self-control. An individual with low self-control will be more likely to prefer routine activities that offer excitement and thrills, which will in turn increase the number of occasions to perpetrate a criminal or antisocial act. In line with other developmental-typological theories ([Moffitt, 1993](#)), [Le Blanc \(2005\)](#) suggested that persistent *antisociality* is primarily a question of early and stable antisocial propensity (personality) rather than opportunities, transitory antisociality is the result of weak propensity and opportunities, and common antisociality is mainly the result of opportunities. This model maintains that certain personality traits are either concurrently correlated to CAB or distinguish criminals from noncriminals. Metaanalytic studies of the Big Five personality dimensions have revealed correlation between personality and CAB. Overall, agreeableness and conscientiousness are the strongest correlates of CAB. Openness is the only trait of the Big Five model that is not clearly related to CAB. A recent metaanalysis confirmed that low agreeableness and conscientiousness and high neuroticism are related to CAB ([Jones, Miller, & Lynam, 2011](#)).

A growing number of studies using typological or person-centered analyses identified three broad personality types: *adjusted*, *overcontrolled*, and *undercontrolled* ([Caspi & Shiner, 2006](#); [Donnellan & Robins, 2010](#)). Individuals classified as undercontrolled types have a personality profile characterized by low agreeableness, low conscientiousness, and slightly higher extraversion. A number of cross-sectional studies with children, adolescents, and adults showed that undercontrolled individuals are those who tend to concurrently show the lowest school achievement and the highest externalizing and conduct problems, as well as delinquent behavior and substance use.

The *personal, interpersonal, and community-reinforcement* (PIC-R) theory was developed specifically to explain criminal behavior. It integrates control and learning perspectives while giving attention to the strongest predictors of criminal behavior. Central to the PIC-R theory are the major four predictors of criminal behavior: antisocial attitudes, antisocial associates, antisocial personality, and a history of antisocial behavior. One can see the link between this theory and others in some of these predictors.

More generally, the PIC-R theory (Andrews & Bonta, 2003, 2006, 2010) suggests that the balance of benefits and costs from a particular antisocial act will determine whether it will be committed or not. There are four types of factors that influence this balance and determine whether a crime is committed: *personal* (e.g., antisocial attitudes, personality), *interpersonal* (e.g., antisocial associates, family), *community* (e.g., neighborhood influences), and *situational* (e.g., opportunities, stressors). For example, the personal factors of antisocial attitudes and personality may influence whether one derives self-reinforcement from a criminal act. In addition, interpersonal factors, such as antisocial associates, may influence whether one receives social reinforcement for a criminal act.

AN OVERVIEW OF DEVELOPMENTAL CRIMINOLOGY

Developmental criminology derives from mainstream criminology and examines the relationship between biological, psychological, and social factors and offending across the life course. Developmental criminologists highlight the importance of within-individual changes instead of between-group differences in the study of offending. A strong emphasis is placed on the use of longitudinal research with repeated measurements to determine the correlations between risk factors and subsequent offending.

A major question in the 1980s was the relationship between *age* and *offending*. The claim that age simply matures people out of crime appeared to be supported by the general tendency for offenders to reduce their rate of offending as they got older. It was argued that some people are more prone to commit crime than others, particularly because their family socialization in the first few years of life had failed to build in them a sufficiently strong capacity for self-control. This *propensity* to offend, it was claimed, does not change over the life course, with crime-prone individuals committing more crime at all ages. Developmental critics of this view argued that crime trajectories or pathways, known as *criminal careers*, are far more varied than this simple model suggests, and that it is necessary to have separate models for exploring such processes as age of crime onset, participation levels, frequency, duration, and desistance from crime, recognizing the different influences at various life phases and stages of criminal careers (France & Homel, 2008).

In the 1990s developmental criminology expanded the concept of risk factors and developed the risk and protective factor paradigm. Protective factors are thought to moderate risk factor effects by assisting people in becoming more resilient against adversities. While causal pathways are complex and prediction at the individual level problematic, evidence emphasizes that as a group children and adolescents with multiple risk factors are more likely to become future offenders (France & Homel, 2008).

Developmental criminology attempts to understand and explain how children grow in and out of crime (Loeber & Stouthamer-Loeber, 1996). Personal capacities and predispositions affect how the environment shapes behaviors, and behavior can in its turn modify biological tendencies. Most youths, especially males, engage in some form of antisocial behavior as they grow into adulthood, following different trajectories on criminal pathways. The two most well known are the *adolescent-limited* (Moffitt, 1993) and the *life-course persistent* (Moffitt, 2003) trajectories. The adolescence trajectory represents the majority of youths who will engage in some form of antisocial activity during adolescence. The criminal career, or “life course persistent,” trajectory represents those offenders with an early history of antisocial behavior that continues into adulthood.

Moffitt (2005a, 2005b) has listed a number of behavioral markers derived from the biological context that may interact with environmental factors. They include *sensation seeking*, *overactivity*, *low self-control*, *emotionality*, and *callousness*. Thus, it appears that biological factors appear to enhance the risk of offending, especially in combination with adverse psychosocial circumstances.

In addition to biological factors, temperament too appears to be associated with future criminal behavior. Today researchers have identified two temperamental traits that can be linked to delinquency and the life-course persistent offender. The first is a *high stimulation*–seeking level combined with low self-control. High stimulation seeking that is well socialized has been found to be predictive of high IQ (Raine, Reynolds, Venables, & Mednick, 2002). On the other hand, unsocialized stimulation seeking, or impulsive/sensation seeking has been found to be associated with antisocial behavior (e.g., Berkowitz, 2008; Glenn, Raine, Venables, & Mednick, 2007). In Moffitt’s *three-factor model*, one of the factors is called *constraint* (Moffitt, 2003). The key indicators of low constraint are impulsiveness and the need for excitement. The second major temperamental characteristic related to criminal behaviors is along a social–emotional dimension; what Moffitt calls *negative emotionality*. The facets of negative emotionality are *aggression* (causes discomfort for others), *alienation*

(feels mistreated), and *stress reaction* (anger and irritability). Regardless of the terminology employed by scholars, some form of “difficult” temperament is common to almost all types of classifications.

Developmental theories of criminal behavior

One of the most stable empirical findings to emerge from decades of criminological research is the relationship between age and crime. Criminal behavior is relatively uncommon in children less than 10 years of age, despite many children displaying what have been described as *precursor behaviors* during this developmental period (Thornberry, 1997). The onset of actual delinquent and criminal behavior occurs in late childhood and early adolescence (around the ages of 10–14), with the prevalence of criminal involvement peaking during the middle-to-late adolescent period (i.e., 16–17 years of age), followed by a rapid decline and subsequent pause for most by the early 20s (Farrington, 1995a; Moffitt, 1993). An important observation here is that minor delinquency during adolescence is statistically normative (Ayers et al., 1999), and only a small proportion of young people continue their criminal careers well into adulthood.

An alternative approach to explaining crime is that proposed by developmental and life-course (DLC) theories of offending (e.g., Catalano & Hawkins, 1996; Farrington, 2005a; Moffitt, 1993, 1997; Sampson & Laub, 1997, 2005; Thornberry, 1997). Developmental theories are dynamic rather than static and are effectively concerned with three main issues: the development of offending and antisocial behavior, risk and protective factors at different ages, and the effects of life events on the course of development. More importantly, at least from a rehabilitative perspective, DLC approaches document and explain within-individual variations in offending throughout life, an approach that is more relevant to causes, prevention, and treatment than the between-individual variations articulated in many of the static theories (e.g., the demonstration that unemployed people commit more crimes than employed people). The utility of the DLC approach was recently highlighted by Farrington (2007).

“DLC theories usually assume that within-individual variations over age in measured offending reflect within-individual variations with age in an underlying theoretical construct, such as antisocial potential or criminal propensity. They suggest that the frequency of offending at any age depends not only on the strength of the underlying construct, but also on environmental factors, such as opportunities and on cognitive (decision-making) processes. Hence, desistance should be influenced by all of these factors” (Farrington, 2007, p. 125).

From a DLC perspective, the focus is on life experiences that mold the individual and send him or her along a particular trajectory or pathway. The various theories generally agree that human development can be understood in terms of four interrelated and fused dimensions (Tobach & Greenberg, 1984). The first is the principle of relative plasticity, which posits that the potential for change exists across the life-span. Second, DLC theorists support the view that the bases for change lie in the relationships that occur within the multiple levels of organization that constitute human life. Despite variations in how these levels have been conceptualized (e.g., Bronfenbrenner, 1979; Ford & Lerner, 1992; Sameroff, 1983), there is a general consensus that they include the biological, individual/psychological, social relational (i.e., families, peer groups, social networks), and sociocultural (e.g., governments, schools, churches) levels. The third principle is the understanding that no level of human organization functions in isolation, but rather, each level functions as a consequence of its fusion or interrelation with other levels. This interdependence means that change at any one level will affect continuity or discontinuity at another level. Finally, given the dynamic nature of the interaction between these levels of human organization, individual development is embedded in the historical period of study.

What the developmental/dynamic perspective illustrates is that criminal behavior is too heterogeneous to be explained by a common set of factors. A DLC approach assumes that different factors may have different effects on the individual offender at different ages. Moreover, such an approach argues that crime data actually contradicts an age-invariant position, which maintains that (1) all antisocial behavior peaks in late adolescence; (2) there is no substantive individual, cohort, historical, or cultural differences in this relationship; and (3) all antisocial behavior declines sharply and continuously throughout life (Sampson & Laub, 1995). Thus, in attempting to understand the continuity and stability of offending behavior across the life span, DLC theorists explore transactions between individual characteristics (e.g., cognitive abilities, temperament) and age-graded developmental contexts, such as social factors (e.g., family and peer relations, school, employment), that can mediate both pro- and antisocial pathways.

Thornberry (1997) has described what he sees as the major advantages to adopting a DLC approach to crime. First, he points out that nondevelopmental approaches fail to identify and offer explanations for many important aspects of crime, including prevalence; age of onset; duration of offending career; escalation and deescalation in terms of frequency and seriousness of criminal involvement; and, finally, desistance from crime. Second, while nondevelopmental approaches examine different causal structures for particular types of offenders (e.g., violent vs. nonviolent), there is a failure to identify types of offenders based on developmental considerations (e.g., life-course persistent vs. adolescence-limited offending).

DLC approaches offer a way to explain the criminological riddle that whereas most antisocial children are not destined to become antisocial adults, antisocial adults are most often antisocial children. Third, nondevelopmental paradigms do not sufficiently examine the precursor behavior of the young (e.g., conduct disorder and antisocial behavior) or the outcomes of such behavior. Finally, nondevelopmental approaches neglect to relate developmental changes, including trajectories and transitions, of the life course as it relates to delinquent behavior.

The DLC approaches described here can be placed within [Loeber and LeBlanc's \(1990\)](#) conceptual framework for the development of juvenile offending. This framework identifies three core concepts of developmental criminology:

1. generic (participation, lambda/frequency, crime mix, seriousness, variety),
2. temporal boundary (age of onset and termination, duration, transfer/crime switching), and
3. dynamic; activation (acceleration, diversification, stabilization), maintenance/aggravation (escalation, developmental), sequence and desistance (deceleration, deescalation, reaching a ceiling specialization).

Where they differ most is in their explanations of desistance. [Farrington \(2005a\)](#), for example, has argued that desistance is dependent upon a decrease in antisocial potential (AP) caused by life events (e.g., marriage, stable employment), while [Catalano and Hawkins \(1996\)](#) see desistance as a function of changes in opportunities, rewards, costs, and bonding that are influenced by life events. [Sampson and Laub \(2005\)](#) have argued that it depends on increased social controls and structured routine activities that emerge when an individual marries, obtains steady employment, or joins the military, while [Moffitt \(1997\)](#) proposes that desistance is a function of adolescent limited offenders achieving adult goals (e.g., material goods) and life events, whereas life-course persistent offenders fail to desist, at least in part, because they select antisocial partners and jobs.

Moffitt's developmental taxonomy

[Moffitt's \(1990a, 1990b, 1993, 1997; Caspi & Moffitt, 1995\)](#) developmental taxonomy of antisocial behavior proposes two discrete types of young offender: adolescence-limited and life-course persistent. The taxonomy is based on research that investigated base rates of persistent and temporary antisocial behavior in a cohort of 1037 children in Dunedin, New Zealand who were born between 1972 and 1973. Moffitt found that approximately 5% of the total sample could be identified as engaging in antisocial behavior that was more than 1 standard deviation above the average of ratings at each of 7 biennial assessments at ages 3, 5, 7, 11, 13, and 15. This contrasted with around two-thirds of the remaining sample being rated as above average on antisocial measures (1) at age 1 or 2, or (2) by only one reporting agent. Thus, [Moffitt \(1993\)](#) concluded that there is a significant difference between the two groups in terms of the stability of antisocial behavior.

The majority of young offenders can be considered adolescence-limited, and while this group may become involved in very serious crime, they do not engage in delinquent behavior prior to or after adolescence. According to [Moffitt \(1993\)](#), adolescence-limited offenders generally have the capacity to suppress antisocial impulses and are, on the whole, law-abiding citizens. Rather than being maladjusted, Moffitt sees this group of young people as exhibiting processes of social mimicry, motivated by a desire to demonstrate maturity and personal independence. For the most part, they engage in low-level offenses (e.g., alcohol use, shoplifting, vandalism) that represent rebelliousness rather than violent forms of delinquency (see [McCabe, Hough, Wood, & Yeh, 2001; Nagin, Farrington, & Moffitt, 1995; and Piquero & Brezina, 2001](#) for an empirical assessment of adolescence-limited offending patterns). Over time, the adolescence-limited offender experiences a lack of motivation for delinquency as biological and social age converge on the path to adulthood (i.e., they exit the “maturity gap”; [Moffitt, 1997](#), p. 26).

In contrast, life-course persistent offenders manifest antisocial behaviors at an early age ([Henry, Caspi, Moffitt, & Silva, 1996; Moffitt & Caspi, 2001](#)). This small group of offenders—approximately 5%—is characterized by persistence in problem behavior from childhood through adulthood, with different manifestations of that problem behavior during different stages of development. Their life-course pattern of offending is said to be linked to pre- and perinatal conditions and factors associated with adverse child rearing conditions during early childhood. According to [Moffitt \(1993\)](#), two types of neuropsychological deficits—verbal intelligence (i.e., reading ability, receptive listening, problem-solving skill, memory, speech articulation, and writing) and executive function (manifested as inattention, hyperactivity, and impulsivity)—give rise to an array of antisocial behaviors. Children with neuropsychological deficits are restless, destructive, and noncompliant, using violent outbursts rather than conversation. The persistence of antisocial behavior over time is attributed to these early problem behaviors. The behaviors tend to restrain the child's opportunities for learning prosocial behavior during formative developmental stages. Moreover, because these behaviors persist into adulthood, they may continue to increase the probability of adult antisocial behavior ([Moffitt, Lynam, & Silva, 1994](#)).

Sampson and Laub's age-graded theory of informal social control and cumulative disadvantage

One of the most influential developmental theories is Sampson and Laub's (1993, 1997, 2003, 2005) *age-graded* theory of informal social control and cumulative disadvantage. Based on findings from the analysis of archival data originally collected by Glueck and Glueck (1950) and a matched comparison group, the theory postulates that informal social controls (e.g., involvement in family, work, school) mediate structural context and explain criminal involvement, even when an underlying level of criminal propensity exists. Crime is considered to be more likely when social bonds to society are weakened or broken. More specifically, informal social controls, which stem from the social relations between individuals and institutions at each stage of the life course, are characterized as a form of social investment or social capital (Coleman, 1988). Social capital "includes the knowledge and sense of obligations, expectations, trustworthiness, information channels, norms, and sanctions that these relations engender" (Hagan, 1998, p. 503). In essence, bonds to society create social capital and interdependent systems of obligations that make it too costly to commit crime (Sampson & Laub, 1993). The individual receives variable amounts of social capital from informal social-control networks, which, in turn, explains continuity in antisocial behaviors across various life stages. Those individuals who are low in social capital (and who have past criminal involvement) "mortgage" future life changes. This process is referred to as cumulative disadvantage. Prosocial adult social bonds (or turning points), can serve to "correct" previously deviant pathways (e.g., juvenile delinquency, unemployment, substance abuse) and thereby place the individual on a trajectory toward more successful outcomes. According to Sampson and Laub (1993, p. 114) criminal careers are characterized by change and dynamism: even the most active offender desists over the life course (e.g., a 60-year-old criminal is not as active and violent as he or she may have been at 17).

Empirical analysis (e.g., Sampson & Laub, 1993) has provided support for the notion of continuity in offending over the life course. For example, in the matched comparison group used in the reanalysis of the Glueck and Glueck (1950) data, there was strong evidence for homotypic continuity from childhood to adulthood among delinquents. For example, arrests in early and middle adulthood were greater for the delinquent subsample than for the nondelinquents. Heterotypic continuity was also evident among the Glueck and Glueck delinquent sample. This continuity has been explained in terms of both childhood propensity and cumulative disadvantage. Sampson and Laub (1993) describe continuity as a "cumulative, developmental model whereby delinquent behavior has a systematic attenuating effect on the social and institutional bonds linking adults to society (e.g., labor force attachment, marital cohesion)..." (p. 138).

Despite this continuity, Sampson and Laub's (1993, 1997, 2003, 2005) research has also shown that change in criminal behavior occurs due to variation in the strength of adult social bonds stemming from life events, such as cohesive marriage, stable employment, and serving in the military, which is independent of criminal propensity. In their view, it is the quality of the relationship or "the social investment or social capital in the institutional relationship, whether it involves family, work, or community setting, that dictates the salience of informal social control at the individual level" (Sampson & Laub, 1993, p. 140). In considering the impact of incarceration and its indirect influence on future crime, they propose that it facilitates crime via subsequent job instability (Sampson & Laub, 1993, 1997; Laub & Sampson, 1995).

Farrington's integrated cognitive antisocial potential theory

Farrington (2005b) has recently developed the *integrated cognitive antisocial potential (ICAP)* theory to explain how early risk factors for antisocial behavior, previously identified in longitudinal research, such as the Cambridge Study (e.g., Farrington, 1992, 1995b, 2003), can be incorporated into a coherent developmental theory of crime. An integration of ideas from a range of other theories, including strain, control, learning, labeling, and rational choice approaches (Cullen & Agnew, 2003), the key construct is AP, defined as the potential to commit antisocial acts. The underlying assumption is that "the translation from antisocial potential to antisocial behavior depends on cognitive (thinking and decision-making) processes that consider opportunities and victims" (Farrington, 2005b, p. 184). AP can be viewed as both a long- and short-term phenomenon, with long-term, persisting, between-individual differences distinguished from short-term within-individual variations. Individuals with high levels of AP are at risk for offending over the life course, while those with low levels tend to have more stable lives.

The model postulates a tendency for long-term AP individuals to commit many different types of antisocial acts, including different types of crime. And while AP levels are fairly consistent over time, they climax in the teenage years because of the effects of maturational factors that directly influence crime rates (e.g., increase in peer influence and decrease in family influence). The risk factors hypothesized to influence long-term AP are the desire for material goods, status among intimates, excitement, and sexual satisfaction (factors that are consistent with strain theory). However, these motivations

only lead to high AP if the individual employs antisocial means to satisfy them. Consequently, offending is the outcome of antisocial methods being used by those who find it difficult to satisfy their needs by legitimate means.

Long-term AP is also said to depend on attachment and socialization processes. For example, AP will be low if parents consistently and contingently reward good behavior and punish that, which is considered bad (although children with low anxiety are thought to be less well socialized, as they have fewer concerns about parental punishment); AP will be higher if children are not attached to (prosocial) parents (e.g., if parents are cold and rejecting) and if the individual is exposed to and influenced by antisocial models (e.g., criminal parents, delinquent siblings, delinquent peers). Long-term AP is also high in impulsive individuals and influenced by significant life events (e.g., it decreases in a context that offers stability and security, such as marriage, while it increases after separation from a partner).

In terms of explaining offending behavior and other types of antisocial acts, the ICAP theory suggests it is an interaction between the individual (and immediate level of AP) and the social environment (in particular criminal opportunities and victims). By contrast, short-term AP varies within individuals according to current causes (e.g., being bored, angry, drunk, or frustrated, or being encouraged by male peers). Criminal opportunities and the availability of victims depend on routine activities; for example, encountering an opportunity or victim may cause a short-term increase in AP, and a short-term increase in AP may also motivate a person to seek out criminal opportunities and victims. However, the likelihood that a crime is committed in a particular context (for a given level of AP) is dependent upon (1) cognitive processes, including an assessment of the subjective benefits and costs, and (2) the individual's stored behavioral repertoire or scripts (based on past experience), an outcome of the learning process, and future cognitive decision-making processes. This is more likely when the consequences are either reinforcing or diminishing. Furthermore, if the consequences involve labeling or stigmatizing the offender, it may be more difficult to legally achieve one's aim and, as a consequence, may serve to increase AP.

Catalano and Hawkins social development model

The *social development model*, developed by Catalano and Hawkins (1996), is based on research that has integrated the role of risk and protective factors for behavior, such as delinquency and substance use, but may also be applied to the onset of other antisocial or risk behaviors. The authors have argued that antisocial behaviors, such as delinquency and drug use, are initiated in childhood or early adolescence. Because early onset predicts the seriousness and persistence of such problem behaviors, a theory that seeks to explain the onset, maintenance, and desistance from such behaviors should focus on causal processes in childhood development. The model argues that an individual learns pro- or antisocial behavior through the socializing agents of family, school, peers, and community. Four main factors are seen as necessary for socialization to occur: there must be perceived opportunities for involvement in activities and interactions with others, followed by the level of involvement and interaction engaged in and experienced by the individual. Successful involvement will be influenced by the skills the individual possesses, and finally the outcome of the interaction will provide reinforcement for the involvement (Ayers et al., 1999; Catalano & Hawkins, 1996; Catalano & Kosterman, 1996).

A social bond forms when the socialization processes are consistent; that is, when reinforcement is consistent with that received for previous, similar involvements with the social unit. Each social unit has a set of norms, beliefs, and values that are common among the majority of its members. The bond an individual forms with a particular socialization agent determines attachments to other people's belief in the values of the unit, and the level of commitment or investment the individual has toward adhering to or supporting the norms and values of the unit (Catalano & Kosterman, 1996).

According to Catalano and Kosterman (1996), the antisocial path of socialization is produced in a number of ways. First, a strong attachment to antisocial others will result in the individual committing to the antisocial values of the group to which they belong. Second, a weak bond to prosocial units will result in diminished rewards for maintaining that bond, the consequences of which is a decrease in negative outcomes for breaching group norms and values. A third means by which antisocial behaviors are produced involves a cost-benefit analysis of the intended behavior, which indicates that there is low risk associated with the behavior. Thus the social development model assumes that factors that influence the nature, strength, and quality of social attachments in the domains of family, peers, school, and community ultimately determine the manifestation of antisocial behaviors.

INTELLIGENCE AND CRIMINAL BEHAVIOR

Individuals with below-average IQs may be considered a vulnerable group for a range of reasons, including being scholastically, vocationally, and socially disadvantaged. Intelligence can also have a pervasive effect on functioning throughout the life course, and not just for those who are considered cognitively impaired (i.e., IQ of below 70). As a result, there is now a growing number of early-intervention programs designed to identify and assist this section of the population successfully

transition through the education system into the workforce and/or live independently in the community. It may be argued that the members of this group remain vulnerable throughout their life courses, and that one particular problem is that they face a great risk of getting into some kind of misconduct. In fact, a large body of scientific literature has focused on attempting to determine the strength of the relationship between lower intellectual functioning and the risk of committing criminal offenses.

Along with sex and age, intelligence is considered to be one of the most consistent predictors of criminal and antisocial behaviors. Research has shown that on average individuals with lower IQ scores are more likely to engage in antisocial behavior (e.g., [Beaver, 2013](#)). Lower overall levels of intelligence have also been found to be associated with a wide range of criminal offenses, such as sexual assault ([Cantor, Blanchard, Robichaud, & Christensen, 2005](#)), murder ([Dwyer & Frierson, 2006](#)), and other forms of interpersonal violence (e.g., [Kearns & O'Connor, 1988](#)). Additional studies have revealed a negative association between intelligence and offensive versatility, inasmuch as offenders with lower levels of intelligence are more likely to engage in a greater variety of criminal acts (e.g., [Frisell, Pawitan, & Långström, 2012](#)).

In perhaps the most comprehensive study examining the IQ–offending association at the macro level, [Rushton and Templer \(2009\)](#) utilized previously estimated national IQ scores ([Lynn & Vanhanen, 2006](#)) and crime statistics from 116 countries. Even after controlling for a host of covariates, the results revealed a significant negative association between intelligence and criminal offending, providing evidence of a robust pattern that persists across geographic regions and cultural contexts.

Despite these findings regarding the relationship between IQ and offending, however, many aspects, such as the functional form, remain unknown. Some perspectives expect a discrete or curvilinear association, while others assume a more incremental or linear pattern. A recent study by [Schwartz et al. \(2015\)](#) contributes to the literature by examining the functional form of the IQ–offending association, utilizing data from a total birth cohort of Finnish males born in 1987. In particular, this data addresses some of the limitations of previous studies by utilizing a wide variety of official measures of crimes and multiple subscales (as well as a composite measure) of intelligence. The results show consistent evidence of mostly linear patterns with some indication of curvilinear association.

One potential explanation for this lack of consensus in the existing literature may have to do with data limitations. Attention should be drawn to four specific limitations. First, previous research has primarily relied upon data collected several decades ago, most notably from the National Longitudinal Survey of Youth (NLSY), which was initially collected in 1979 (e.g., [Mears & Cochran, 2013](#)). Second, most studies have examined criminal offending using vague or overly general measures of criminal behavior. For example, a substantial number of studies have relied on a single comprehensive measure of crime or delinquency without considering more specific types of offending (e.g., [Mears & Cochran, 2013](#)). Third, even in cases where a wider range of offending measures was examined (e.g., [Mears & Cochran, 2013](#)), such studies rely exclusively on self-reported data. While the limitations of both self-report and official-record measures of offending have been documented, the strengths of each measurement strategy seem to complement the other's limitations ([Thornberry & Krohn, 2000](#)).

Finally, the vast majority of previous studies examining the IQ–offending association rely either on a single, comprehensive measure of intelligence or a single subscale ([Herrnstein & Murray, 1994](#); [Mears & Cochran, 2013](#)). While previous studies have indicated that virtually all standardized measures of intelligence tend to tap the same underlying construct (typically referred to as general intelligence, or *g*; [Nisbett et al., 2012](#)), the results of a recent metaanalysis suggest that verbal intelligence may be a better predictor of offending and delinquency relative to other subscales (e.g., performance intelligence; [Isen, 2010](#)). Based on these findings, a more refined approach that involves examining separate subscales along with a composite intelligence measure would constitute an important contribution to the literature.

High IQ and crime

Despite the findings on the relationship between low IQ and crime (e.g., [Bower, 1995](#)), there is little research on crimes of individuals with above-average intelligence. A recent study by [Oleson and Chappell \(2012\)](#) sheds some light on this little-researched population, using a self-report survey of offending administered to 465 adults with genius-level IQ scores and comparing the data from 756 control-group subjects with average IQ scores. The high-IQ sample included representatives from high-IQ societies and thus utilized all three types of genius identified by [Towers \(1990\)](#): *outsiders*, *conformists*, and *dropouts*.

In their study, [Oleson and Chappell \(2012\)](#) focused on eight types of violent crime and their rates of prevalence and incidence. The results showed that high-IQ individuals reported higher rates of prevalence, incidence, and arrest, but lower levels of conviction, than the controls. A significant positive correlation was found between IQ score and lifetime incidence rate for robbery, homicide, and kidnapping for offenders. A significant negative correlation was found between IQ score and incidence of attempted suicide.

Although many studies report that offending is associated with lower intelligence, not all research supports this perspective. The heterogeneity of cognitive and executive functioning observed among juveniles who exhibit antisocial behavior has led researchers to propose a subtype of antisocial youth with relatively efficient cognitive functioning, who engage in higher levels of proactive aggression and delinquency than youth with lower IQs (e.g., Blair, 2004, 2007; Drabick, Bubier, Chen, Price, & Lanza, 2011). Having better cognitive skills may actually facilitate delinquent behaviors, as these individuals may be more capable of recruiting others to conspire in delinquent acts and of finding ways to escape detection by authorities (e.g., Drabick et al., 2011). Thus evidence concerning the directionality of the relation between IQ and offending is mixed, suggesting that IQ may interact with other risk factors (e.g., psychopathy) to differentially predict offending. Hampton, Drabick, and Steinberg's (2014) study demonstrated that among delinquent adolescents, higher IQ is associated with higher levels of offending, both concurrently and over time, and particularly among juveniles who score high in psychopathy. In addition, the study highlights the important role of IQ in moderating the strength of the relation between psychopathy and juvenile offending.

RISK AND PROTECTIVE FACTORS

A view of delinquency as a developmental process has enabled developmental criminology theorists to identify a list of risk factors that either precede or cooccur with its development. Some risk factors appear to be implicated in the underlying causes of problem behavior; others are symptoms, or *markers*. While it is clear that no single risk factor can be said to “cause” delinquency, reviews, and further statistical analyses have served to narrow the field and point to those most likely to contribute to interlinked chains of causation (Loeber, Green, & Lahey, 2003; Farrington, 2004, 2007). Risk factors can relate to the individual themselves, to their families, to their schooling, and to the communities at large (Table 13.1). It is also clear that different combinations of risk factors contribute to different cumulative effects and that the overall risks of antisocial behavior can increase exponentially depending on the number of risk factors to which children are exposed.

TABLE 13.1 Protective Factors Associated With Delinquency and Other Antisocial Behavior (Casey, 2011)

| Level | Risk Factors | Protective Factors |
|------------------------------|--|--|
| Child | Poor problem solving; beliefs about aggression; attributions; poor social skills; low self-esteem; lack of empathy; alienation; hyperactivity/disruptive behavior; impulsivity; prematurity; low birth weight; disability; prenatal brain damage; birth injury; low intelligence; difficult temperament; chronic illness; insecure attachment | Social competence; social skills; above-average intelligence; attachment to family; empathy; problem-solving skills; optimism; school achievement; easy temperament; internal locus of control; moral beliefs; values; self-relative cognitions; good coping style |
| Familial | Psychiatric disorder, especially depression; substance abuse; criminality; antisocial models; family violence and disharmony; marital discord; disorganized negative interaction/social isolation; parenting style; poor supervision and monitoring of the child; discipline style (harsh or inconsistent); rejection of the child; abuse; lack of warmth and affection; low involvement in child's activities; neglect; teenage mothers; single parents; large family size; father absence; long-term parental unemployment | Supportive, caring parents; family harmony; more than 2 years between siblings; responsibility for chores or required helpfulness; secure and stable family; supportive relationship with other adult; small family size; strong family norms and morality |
| School | School failure; normative beliefs about aggression; deviant peer group; bullying; peer rejection; poor attachment to school; inadequate behavior management | Positive school climate; prosocial peer group; responsibility and required helpfulness; sense of belonging/bonding; opportunities for some success at school and recognition of achievement |
| Life events | Divorce and family breakup; war or natural disasters; death of a family member | Meeting significant person; moving to a new area; opportunities at critical turning points or major life transitions |
| Community and social factors | Socioeconomic disadvantage; population density and housing conditions; urban area; neighborhood violence and crime; cultural norms concerning violence as acceptable response to frustration; media portrayal of violence; lack of support services | Access to support services; community networking; attachment to the community; participation in church or other community group; community/cultural norms against violence; strong cultural identity and ethnic pride |

In Australia, the developmental approach informed the *Pathways to Prevention* report (Homel, Lincoln, & Herd, 1999), which sought to develop a policy framework whereby early intervention and the targeting of risk factors in key developmental stages might have an impact upon delinquency and other social problems. The authors articulated risk along a continuum that moves through *remote risk*, *high risk*, and *imminent risk*, ending with the group of youth *at risk*, who are actively engaging in dangerous behaviors. Moreover, it has been argued that “at-risk” adolescents are much more likely to develop antisocial behaviors, to abuse alcohol and drugs, to experience unwanted teen pregnancy, to drop out of school, and to be both the perpetrators and the victims of personal violence.

Another consequence of adopting a developmental approach to explain delinquency has been the theoretical attention paid to influences that might serve as a *buffer* between risk factors and the onset of delinquency. These influences, known as *protective* factors, are thought to mediate or moderate outcomes following exposure to risk factors. In fact, a model of *cumulative protection* has been proposed by Yoshikawa (1994), who argues that the effects of early family support and education extend beyond the known short-term impact on risk factors (e.g., parenting quality, child cognitive ability, parental education status, family size, family income), and could explain why persistent juvenile delinquency can be responsive to change. A list of protective factors is provided in Table 13.1. Although knowledge about protective factors is more restricted than the literature concerning risk, the evidence converges that protective factors may work by (1) preventing risk factors from occurring in a child’s life, (2) interacting with a risk factor to attenuate its effects, and/or (3) breaking the mediating chain by which risk leads to negative behavior.

Measures

The Psychological Inventory of Criminal Thinking Styles

The Psychological Inventory of Criminal Thinking Styles (PICTS) was originally created to assess the eight thinking styles judged to be essential in initiating and maintaining a criminal lifestyle. Over the years it has demonstrated an ability to predict recidivism in released prison inmates.

The PICTS is an 80-item self-report inventory designed to measure criminal thinking as revealed in the following thinking styles: mollification (MO), cutoff (CO), entitlement (EN), power orientation (PO), sentimentality (SN), superoptimism (SO), cognitive indolence (CI), and discontinuity (DS). Each thinking-style scale is composed of 8 items, with the remaining 16 items spread out over 2 validity scales, confusion-revised and defensiveness-revised, as well as a fear of change (FOC) scale.

Item response–theory analyses have shown that the PICTS conforms to a hierarchical latent structure with seven of the eight thinking styles at the bottom of the hierarchy (SN excluded), two higher-order factors (proactive criminal thinking, reactive criminal thinking) in the middle, and a superordinate factor (general criminal thinking) at the top.

The proactive criminal-thinking dimension consists of the scales MO, EN, PO, and SO. MO refers to a justification or rationalization of criminal behavior and a focus on external factors (e.g., I have told myself that I would never have had to engage in criminal behavior if I had a good job). EN describes the perception of oneself as privileged or special (e.g., The way I look at it I’ve paid my dues and am therefore justified in taking what I want). PO reflects the focus on power and control over others (e.g., When not in control of a situation I feel weak and helpless and experience a desire to exert power over others). SO reflects overconfidence in one’s ability to avoid negative consequences (e.g., The more I got away with crime the more I thought there was no way the police or authorities would catch up with me).

CO, CI, and DS comprise the reactive criminal-thinking dimension. CO describes the elimination of deterrents, such as fear, anxiety, and disgust, to criminal behavior (e.g., I have used alcohol or drugs to eliminate fear or apprehension before committing a crime). CI refers to putting little effort into problem solving or critical evaluation of thought (e.g., I tend to put off until tomorrow what would have been done today). DS describes being easily distracted and having trouble following through on good intentions (e.g., There have been times when I have made plans to do something with my family and then canceled these plans so that I could hang out with my friends, use drugs or commit crimes).

The initial version of the PICTS was written in 1989 and covered 32 items; 4 items for each thinking style, rated on a 3-point Likert-type scale (*agree, uncertain, disagree*). A year later, the PICTS was revised, with the addition of two validity scales (confusion, defensiveness). In 1992, the PICTS was revised once again, yielding PICTS Version 3.0, in which the number of items for each scale was doubled from 4 to 8. Revised validity scales (Walters, 2001), factor scales (Walters, 1995), and content scales (Walters, 2002) were later added. Internal consistency, as judged by Cronbach’s α and the mean interitem correlation, is moderate.

The concurrent validity of the PICTS thinking-style and content scales has been examined by correlating these scales with criminal-history indicators and scores on more established criminality measures, such as Factor 2 of the

PCL-R (Hare, 1991) and the Lifestyle Criminality Screening Form (LCSF) (Walters, 1998). With regard to the predictive validity of the PICTS, criterion measures have included disciplinary adjustment while in prison (Walters, 1996; Walters & Elliott, 1999), recidivism following release from prison (Walters, 1997; Walters & Elliott, 1999), and dropping out of psychological programming (Walters, 2003).

Measures of Criminal Attitudes and Associates

Measures of Criminal Attitudes and Associates (MCAA; Mills, Kroner, & Forth, 2002) is a self-report measure of criminal attitudes and associates. It consists of two parts: Part A is a measure intended to quantify criminal associations. Participants are asked to recall the four adults with whom they spend the most free time. Each adult then indicates how much of his or her free time is spent in each associate's company. The participant then answers four questions regarding the degree of criminal involvement of their associates. This provides both a measure of time spent with and criminal involvement for the participants' closest associates. Part A of the MCAA is used to calculate two measures of criminal associates. The first, *number of criminal friends*, is calculated by adding up the number of friends for whom the participant had answered "yes" to any of the questions of criminal involvement. This means the participant could indicate 0–4 criminal associates. The second measure is the *criminal friend index*. This measure is calculated by assigning a value of 1–4 to the percentage of time options available for each identified associate. That number is then multiplied by the number of yes responses to the four questions about criminal involvement. Each of the resulting products is added together to produce the criminal friend index.

Part B is a 46-item measure of attitudes that is composed of 4 scales: violence (12 items), EN (12 items), antisocial intent (12 items), and associates (10 items). Unique to the MCAA is the inclusion of item couplets (within the scales of violence and EN) that tap the same content area but differ in moral tone. For identification purposes, these differences in moral tone are called rationalization and justification. Justification items are more absolute in moral tone and include such phrases as "there is nothing wrong with...." whereas rationalization items explicitly avoid using moral language. There are equal numbers of rationalization and justification items because each content area is evaluated with each level of moral tone. Participants respond to a dichotomous option of agree/disagree. Scores on the violence scale of the MCAA have shown adequate internal consistency in both offenders and student samples (e.g., Mills et al., 2002), are associated with violent criminal history (Mills et al., 2002), and are predictive of violent reoffending (Mills, Anderson, & Kroner, 2004). The violence scale of the Revised Measures of Criminal Attitudes and Associates (MCAA-R-V) consists of 10 self-report items rated on a 4-point scale.

Criminal Attitudes to Violence Scale

The Criminal Attitudes to Violence Scale (CAVS; Polaschek et al., 2004) consists of 20 self-report items rated on a 5-point scale. Ratings are summed up to reach a total score of 20–100. Scores on the CAVS have shown high internal consistency and are associated with a violent criminal history. Nunes, Hermann, Maimone, and Woods (2015) examined whether the MCAA-R-V and the CAVS assess attitudes toward violence and whether attitudes and the cognitions assessed by the MCAA-R-V and the CAVS are independently associated with violent behavior. Exploratory factor analysis revealed that the items in the MCAA-R-V and the CAVS formed correlated but distinct factors from the items of the evaluation of violence, evaluation of violent people, and identification of self-as-violent scales. Regression analyses indicated that evaluation of violence and identification of self as violent correlated with violent behavior independently of the MCAA-R-V and CAVS.

Texas Christian University Criminal Thinking Styles

The Texas Christian University Criminal Thinking Styles (TCU-CTS) scales were designed initially to focus on the Residential Drug Abuse Program (RDAP) cognitive-based curriculum but were further adapted and revised as a result of pilot research conducted by TCU using the original version of the TCU-CTS (Knight, Simpson, & Morey, 2002). Collaboration with the Federal Bureau of Prisons (BOP) also helped to formulate the final version.

The TCU-CTS, developed in conjunction with a multisite study of drug treatment programs, is a 37-item measure composed of 6 subscales. Three of the subscales were adapted from the PICTS: EN, justification (MO), and PO (need for power and control). In addition, the TCU-CTS scales include personal irresponsibility (blaming others), coldheartedness, and criminal rationalization (negative attitudes toward authority) subscales. The initial report (Knight, Garner, Simpson, Morey, & Flynn, 2006) presented strong reliability and descriptive data from a large sample of adult offenders in drug treatment, but no validity data. Subsequent studies have offered mixed support for the validity of the TCU-CTS. For example, in a study of incarcerated adolescents that utilized five of the six TCU-CTS subscales, Dembo, Turner, and Jainchill (2007) found that TCU-CTS scores were substantially correlated with self-reports of family conflict, moderately

correlated with diagnoses of conduct disorder and oppositional defiant disorder, and modestly related to self-reported criminal history. In a small study of young adult offenders in substance-abuse treatment, [Packer, Best, Day, and Wood \(2009\)](#) found that some TCU-CTS subscale scores were positively correlated with some indices of substance use and dependence, and TCU-CTS scores were associated with low self-control. In contrast, TCU-CTS scores were largely unrelated to total time incarcerated, number of previous convictions, and recent offenses. Most recently, drawing on a study of 250 drug-using probationers, [Taxman, Rhodes, and Dumenci \(2011\)](#) reported limited support for the validity and utility of the TCU-CTS. No significant differences were observed on any of the subscales comparing probationers with a non-criminal justice community sample. TCU-CTS scores showed little relationship with known predictors of recidivism, nor did they prospectively predict 6-month follow-up measures of criminal activity. Total TCU-CTS scores were significantly related to scores on self- and treatment-relevant attitudes, including low treatment readiness, hostility, risk taking, low self-efficacy, and low social consciousness.

Measure of Offender Thinking Styles

The Measure of Offender Thinking Styles (MOTS; [Mandracchia et al., 2007](#)) was developed to address the exclusion of noncriminal thinking errors in current measures of offenders' maladaptive thinking. [Mandracchia et al. \(2007\)](#) developed the MOTS. The MOTS incorporated specific thinking patterns described by [Yochelson and Samenow \(1976\)](#), [Walters \(1990\)](#), [Beck \(1976\)](#), and [Ellis \(1992\)](#), and was completed by a large group of incarcerated offenders.

The MOTS consists of 70 items and was developed as a measure of the assessment of thinking scales that perpetuate criminal and other maladaptive behavior. It consists of five scales: an overall scale of criminogenic thinking (i.e., total criminogenic thinking), three subscales of criminogenic thinking (i.e., control, cognitive immaturity, egocentrism), and a scale to detect an inattentive response style (i.e., inattentiveness). The control scale (26 items) represents thinking patterns that address the individual's need for power and control over the individual's own emotions, the environment, and other people. The cognitive immaturity scale (28 items) represents thoughts of self-pity and overreliance on underdeveloped cognitive shortcuts, such as labeling and judging. The egocentrism scale (11 items) represents an individual's extreme feelings of uniqueness, focus on one's self, and overestimation of one's own importance. The total criminogenic thinking scale (65 items) represents the overall level of criminogenic thinking and consists of all the items from the 3 criminogenic thinking subscales. The inattentiveness scale consists of five items that direct a respondent to provide a particular response option (e.g., Answer this item with Agree); these items are not included on the total criminogenic thinking scale.

The MOTS was subsequently revised (MOTS-R; [Mandracchia & Morgan, 2011](#)). Because both the Measure of Offender Thinking Styles-Revised (MOTS-R) and the PICTS focus on offenders' maladaptive cognitions, there is some overlap between the two measures. Unlike the PICTS, however, the MOTS-R cognitive immaturity scale contains strong elements of noncriminal maladaptive thoughts, such as self-deprecation and pessimism. Such noncriminal maladaptive thoughts may not lead directly to criminal behavior but may perpetuate other problems that indirectly predispose a person to criminal activity, such as poor interpersonal relationships, mental illness, and inconsistent employment. As such, the MOTS-R incorporates important types of maladaptive thinking that are disregarded in other measures.

Results of the confirmatory factor analysis of the MOTS-R show some support for a slightly altered, improved version of the three-factor model obtained by [Mandracchia et al. \(2007\)](#). Overall, the internal consistency, scale intercorrelations, and test-retest reliability of the MOTS-R suggest it is a reliable measure. The correlations between the MOTS-R scales and selected scales of the PICTS, CSSM, and MCAA ranged from low to high (i.e., based on interpretive guidelines suggested by [Cohen, 1988](#)), suggesting that the MOTS-R assesses similar, yet distinct, concepts from other measures of criminal thinking and attitudes.

Consistent with the current findings, factor analyses with other measures of criminal thinking and attitudes have repeatedly shown that the structure of offenders' maladaptive thinking is best represented by a small number of factors. The structure of dysfunctional thinking represented by the MOTS-R may prove useful in treatment implementation. On a practical level, the three-factor structure is concise and easily understandable. Specifically, offenders and treatment providers alike may be able to readily detect general themes of power and fear avoidance (i.e., control), lazy or immature thinking (i.e., cognitive immaturity), and a sense of uniqueness and EN (i.e., egocentrism) in offenders' thinking.

The incorporation of these thinking patterns into treatment programs may prove beneficial in altering offenders' overall dysfunctional thinking. Not only may the noncriminal thinking patterns contribute to a pattern of irresponsible behavior, but they may also contribute to negative perceptions of oneself, others, and society in general ([Ellis, 1992](#)). Another way that the MOTS-R may prove to be a useful assessment tool is the potential to predict problematic behavior. Recent studies have shown that criminal thinking is predictive of disciplinary infractions in a correctional setting ([Walters, 2006, 2007a, 2007b; Walters & Mandell, 2007; Walters & Schlauch, 2008](#)).

The Criminogenic Cognitions Scale

The Criminogenic Cognitions Scale (CCS) is a 25-item measure developed in conjunction with research on “general population” jail inmates aimed at examining the link between moral emotions and criminal recidivism (Tangney, Stuewig, & Mashek, 2007). The CCS’s theoretical background is based on restorative justice theory and substantial input from clinicians working with serious offenders. In focus group sessions, clinicians identified key beliefs and cognitive distortions that they aim to address in treatment with repeat offenders. The CCS evaluates five dimensions: (1) notions of EN (When I want something, I expect people to deliver); (2) failure to accept responsibility (Bad childhood experiences are partly to blame for my current situation); (3) short-term orientation (The future is unpredictable and there is no point planning for it); (4) insensitivity to the impact of crime (A theft is all right as long as the victim is not physically injured); and (5) negative attitudes toward authority (People in positions of authority generally take advantage of others). Several dimensions identified by the clinicians appear in previous efforts to conceptualize cognitions associated with criminal activity (Walters, 1995). The CCS, however, is unique in its incorporation of restorative justice theory, most clearly exemplified by the insensitivity-to-the-impact-of-crime and the failure-to-accept-responsibility dimensions.

Criminal Sentiments Scale-Modified

The Criminal Sentiments Scale-Modified (CSS-M; Simourd, 1997) is a 41-item self-report instrument designed to measure “attitudes, values, and beliefs related to criminal behavior” (Wormith & Andrews, 1984). Whereas the PICTS measures the process of criminal thinking (i.e., *how* a criminal thinks), the CSS-M measures the content of criminal thinking (i.e., *what* a criminal thinks; Simourd & Olver, 2002). The CSS-M utilizes a 3-point Likert-type scale with subscales and with the total score being sums of the item scores. Items are scored 2 points if the criminal endorsed an antisocial statement (or rejected a prosocial statement), 0 points if the criminal rejected an antisocial statement (or accepted a prosocial statement), and 1 point for undecided responses (Simourd, 1997; Simourd & Olver, 2002). Scoring the CSS-M results in a total score and five subscales: attitude toward the law (law); attitude toward the court (court); attitude toward the police (police); tolerance for law violations (TLV); and identification with criminal others (ICO; Simourd, 1997; Simourd & Olver, 2002; Simourd & Van De Ven, 1999). The first three subscales (i.e., law, court, police) are combined to form the law-court-police (LCP) subscale. The LCP subscale assesses the criminal’s respect for the law and criminal justice system (Simourd & Olver, 2002). The TLV subscale assesses the criminal’s justification for criminal behavior (Simourd & Olver, 2002). The ICO assesses personal evaluative judgments about other criminals (Simourd & Olver, 2002). Higher scores reflect the presence of greater criminal attitudes (Simourd, 1997; Simourd & Olver, 2002). Several studies established the CSS as a reliable and valid instrument for use with adult offenders (Andrews, Wormith, & Kiessling, 1985; Roy & Wormith, 1985; Wormith & Andrews, 1984). The CSS-M has demonstrated equally reliable and valid results. The CSS-M’s total score has demonstrated adequate-to-good internal consistency ($\alpha = .73$ and $.91$, respectively) and the subscales evidenced moderate-to-high internal consistency (Simourd, 1997; Simourd & Olver, 2002). The CSS-M also evidenced good convergent validity with moderate correlations with established measures of criminal risk (e.g., Level of Service Inventory-Revised, General Statistical Information on Recidivism Scale, Hare Psychopathy Checklist-Revised) (Simourd, 1997). Although correlations for the subscales were lower on some of the measures, all subscales were significantly correlated to a moderate degree (e.g., $.26$ – $.41$) with at least two of the criminal risk measures (Simourd, 1997).

Antisocial Beliefs and Attitudes

The Antisocial Beliefs and Attitudes Scales (ABAS; Butler et al., 2007) assesses youth beliefs and attitudes toward a range of specific illegal behaviors and rule violations as they take place in contexts, such as the home, the school and the community. The ABAS consists of 96 items. Out of these, 68 items were generated by the authors to assess beliefs and attitudes toward social standards of acceptable behavior in the context of interpersonal relationships at home and at school. Twenty-eight (28) items from 5 subscales of the CSS-M were included in the scale to measure beliefs and attitudes toward criminal activity. Factor analysis led to the formation of a three-factor solution comprising of rule noncompliance, peer conflict and Severe Aggression.

Butler, Parry, and Fearon (2014) study provided support for the ABAS as a reliable and valid measure of antisocial thinking, extending earlier findings on a community sample of Canadian children and adolescents to British youth and young offenders. This study improved upon the psychometric development of the ABAS in Butler et al. (2007) by demonstrating that the scale factor structure can be replicated, has adequate test-retest reliability, and is able to distinguish between school children and young offenders (criterion validity). The ability of the ABAS to predict antisocial behavior over and above the CSS-M supports the extension of the antisocial thinking construct beyond criminal sentiments, to the beliefs and attitudes toward social standards of acceptable behavior within the context of young people’s primary interpersonal

relationships. Within this context, there is evidence that rule noncompliance and peer conflict are particularly robust factors in antisocial thinking. The results of this study indicate that the ABAS is a promising measure of antisocial thinking relevant to children and adolescents.

How I Think

The How I Think questionnaire (HIT; [Barriga, Gibbs, Potter, & Liao, 2001](#)) was proposed as an instrument to measure self-serving cognitive distortions. It has a theoretical basis that has been empirically tested with promising results (e.g., [Barriga & Gibbs, 1996](#); [Nas, Brugman, & Koops, 2008](#)) and has also been used for evaluating treatment for adolescents (the EQUIP program; [Gibbs, Potter, & Goldstein, 1995](#); [Gibbs, Potter, DiBiase, & Devlin, 2009](#)). The HIT is based on Gibbs and Potter's ([Gibbs, 1991](#); [Gibbs et al., 1995](#)) four-category typology of self-serving cognitive distortions mentioned previously.

The HIT questionnaire ([Barriga et al., 2001](#)) is a 54-item self-report questionnaire designed to measure self-serving cognitive distortions. Participants respond on a 6-point Likert-type scale (from *agree strongly* to *disagree strongly*), with higher scores reflecting higher levels of cognitive distortions. The questionnaire contains 39 items stating attitudes or beliefs, 8 items controlling for anomalous responses, and 7 items acting as positive fillers; that is, camouflage items without psychometric properties. The 39 items stating attitudes or beliefs are divided into 2 dimensions with 4 subscales each: 1 dimension measuring self-serving cognitive distortions (the subscales self-centered, blaming others, minimizing/mislabeling, and assuming the worst) and 1 measuring antisocial behavior (the subscales opposition-defiance, physical aggression, lying, and stealing). For example, the item "If you don't push people around, you will always get picked on" represents the cognitive distortion of assuming the worst and the behavioral dimension of physical aggression. The scales measuring antisocial behavior correspond to the four categories of antisocial behavior in the conduct disorder and oppositional defiant disorder syndromes in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*; [American Psychiatric Association, 1994](#)). The antisocial behavior scales are categorized into overt versus covert antisocial behavior, where overt antisocial behavior implies a direct confrontation with the victim.

Researchers have previously reported promising psychometric characteristics of the HIT (e.g., [Barriga et al., 2001](#); [Barriga & Gibbs, 1996](#); [Barriga, Hawkins, & Camelia, 2008](#); [Nas et al., 2008](#)) for adolescent samples within various contexts. The research on the HIT for adult groups is, so far, more limited than some studies in correctional facilities ([Hubbard & Pealer, 2009](#); [Liao et al., 2004](#)). The reliability and validity of the HIT for adult groups remains to be investigated. The study from [Wallinius, Johansson, Larden, and Dernevik \(2011\)](#) seems to be the first to report data on the validity and reliability of the HIT questionnaire among adults. Their findings are, with some exceptions, consistent with previous research on adolescents ([Barriga et al., 2001](#); [Barriga & Gibbs, 1996](#)) and provide support for the utility of the HIT questionnaire among adults and adolescents in Sweden. In addition, the discriminant validity of the HIT was supported by the data, which adds to the growing research on cognitive distortions related to antisocial behavior. Moreover, the HIT proved to have a good predictive ability (AUC = .81) on self-reported antisocial behavior among adults. These results are consistent with previous research on similar self-report measures of criminal thinking ([Mills et al., 2004](#); [Walters, 1995](#)). Self-serving cognitive distortions were more strongly correlated with antisocial behavior during childhood than during adulthood, but only marginally so. When the divergent validity of the HIT questionnaire was examined for the adults in terms of its relationship with demographic characteristics, such as age and educational level, the results were overall inconsistent, stressing the need for further examination of these aspects ([Wallinius et al., 2011](#)).

Overall it can be concluded that the convergent, discriminant, and predictive validity of the HIT questionnaire was supported in the [Wallinius et al. \(2011\)](#) study, but that the structural and divergent validity needs further examination before the HIT can be used as a viable instrument within adult forensic practice.

SUMMARY

This chapter presents major theories of criminal behavior. A large section of this chapter is devoted to the important field of developmental criminology explored via a number of theories and models. A number of risk and protective factors are discussed and a large number of measures that assess criminal thinking styles, antisocial beliefs, and attitudes are presented. A large part of this chapter is dedicated to the psychopathology of aggression. It elaborates on two frequently aggressive pathologies, bullying and animal cruelty, that belong to the antisocial personality disorder and psychopathology, both implicated in violence and criminal behavior.

REFERENCES

- Abrahams, H. (2010). *Rebuilding lives after domestic violence: Understanding long term outcomes*. London: Jessica Kingsley.
- Agnew, R. (2005). *Why do criminals offend? A general theory of crime and delinquency*. New York, NY: Oxford University Press.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.
- Andrews, D. A., & Bonta, J. (2003). *The psychology of criminal conduct* (3rd ed.). Cincinnati, OH: Anderson.
- Andrews, D. A., & Bonta, J. (2006). *The psychology of criminal conduct* (4th ed.). Newark, NJ: LexisNexis/Matthew Bender.
- Andrews, D. A., & Bonta, J. (2010). Rehabilitation through the lens of the Risk Needs-Responsivity Model. In F. McNeil, P. Raynor, & C. Trotter (Eds.), *Offender supervision: New directions in theory, research and practice*. Cullompton: Willan Publishing.
- Andrews, D., Bonta, J., & Hoge, R. (1990a). Classification for effective rehabilitation: rediscovering psychology. *Criminal Justice and Behaviour*, *17*(1), 19–52.
- Andrews, D. A., Wormith, J. S., & Kiessling, J. J. (1985). *Self-reported criminal propensity and criminal behaviour: Threats to the validity of assessments of attitudes and personality*. Rockville, MD: National Criminal Justice Reference Service.
- Andrews, D., Zinger, I., Hoge, R., Bonta, J., Gendreau, P., & Cullen, F. (1990b). Does correctional treatment work? A clinically relevant and psychologically informed meta-analysis. *Criminology*, *28*(3), 369–404.
- Aragón, O. R., Dyer, L., Bargh, J. A., & Clark, M. S. (2013). “You’re so cute I could...” *Faux-aggressive responses to cute stimuli*. Four College Conference, Princeton University, NJ.
- Ayers, C. D., Williams, J. H., Hawkins, J. D., Peterson, P. L., Catalano, R. F., & Abbott, R. D. (1999). Assessing correlates of onset, escalation, deescalation and desistence of delinquent behaviour. *Journal of Quantitative Criminology*, *15*(3), 277–306.
- Barriga, A. Q., & Gibbs, J. C. (1996). Measuring cognitive distortion in antisocial youth: development and preliminary validation of the How I Think questionnaire. *Aggressive Behaviour*, *22*(5), 333–343.
- Barriga, A. Q., Gibbs, J. C., Potter, G., & Liau, A. K. (2001). *The How I Think questionnaire manual*. Champaign, IL: Research Press.
- Barriga, A. Q., Hawkins, M. A., & Camelia, C. R. T. (2008). Specificity of cognitive distortions to antisocial behaviours. *Criminal Behaviour and Mental Health*, *18*(2), 104–116.
- Beaver, K. M. (2013). The familial concentration and transmission of crime. *Criminal Justice and Behavior*, *40*(2), 139–155.
- Beaver, K. M., Schwartz, J. A., & Gajos, J. M. (2015). A review of the genetic and gene-environment interplay contributors to antisocial phenotypes. In J. Morizot, & L. Kazemian (Eds.), *The development of criminal and antisocial behaviour: Theory, research, and practical applications*. New York, NY: Springer.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York, NY: International Universities Press.
- Beck, J. S. (1995). *Cognitive therapy: basics and beyond*. New York, NY: Guilford Press.
- Beck, J. S. (2005). *Cognitive therapy for challenging problems: What to do when the basics don’t work*. New York, NY: Guilford Press.
- Berkowitz, L. (2008). On the consideration of automatic as well as controlled psychological processes in aggression. *Aggressive Behaviour*, *34*(2), 117–129.
- Bettelheim, B. (1989). *The uses of enchantment: The meaning and importance of fairy tales*. New York, NY: Vintage Books.
- Blair, R. J. R. (2004). The roles of the orbital frontal cortex in the modulations of antisocial behavior. *Brain and Cognition*, *55*, 198–208.
- Blair, R. J. R. (2007). Dysfunctions of medial and lateral orbitofrontal cortex in psychopathy. *Annals of the New York Academy of Sciences*, *1121*, 1–19.
- Blair, R. J. R. (2012). Considering anger from a cognitive neuroscience perspective. *Wiley Interdisciplinary Reviews: Cognitive Science*, *3*(1), 65–74.
- Bower, B. (1995). Criminal intellects. *Science News*, *147*(15), 232–233, 239.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Butler, A. C., Chapman, J. E., Forman, E. M., & Beck, A. T. (2006). The empirical status of cognitive-behavioural therapy: a review of meta-analyses. *Clinical Psychology Review*, *26*(1), 17–31.
- Butler, S. M., Leschied, A. W., & Fearon, P. (2007). Antisocial beliefs and attitudes in pre-adolescent and adolescent youth: the development of the antisocial beliefs and attitudes scales (ABAS). *Journal of Youth and Adolescence*, *36*(8), 1058–1071.
- Butler, S. M., Parry, R., & Fearon, R. M. P. (2014). Antisocial thinking in adolescents: further psychometric development of the Antisocial Beliefs and Attitudes Scale (ABAS). *Psychological Assessment*, *27*(1), 291–301.
- Cantor, J. M., Blanchard, R., Robichaud, L. K., & Christensen, B. K. (2005). Quantitative reanalysis of aggregate data on IQ in sexual offenders. *Psychological Bulletin*, *131*(4), 555.
- Casey, S. (2011). Elements of psychological maturity and its influence on antisocial and criminal behaviour. *Open Criminology Journal*, *4*(1), 32–39.
- Caspi, A., & Moffitt, T. E. (1995). The continuity of maladaptive behaviour: from description to understanding in the study of antisocial behaviour. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental psychopathology. Risk, disorder, and adaptation* (pp. 472–511). (Vol. 2). New York, NY: Wiley.
- Caspi, A., & Shiner, R. L. (2006). Personality development. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (pp. 300–365). (Vol. 3). New York, NY: Wiley.
- Catalano, R. F., & Hawkins, J. D. (1996). The social development model: a theory of antisocial behaviour. In J. D. Hawkins (Ed.), *Delinquency and crime: Current theories* (pp. 149–197). New York, NY: Cambridge University Press.
- Catalano, R. F., & Kosterman, R. (1996). Modelling the etiology of adolescent substance use: a test of the social development model. *Journal of Drug Issues*, *26*(2), 429–455.
- Cohen, J. (1988). *Statistical analysis for the behavioural sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, 95–120.

- Council of Europe (2002). *Recommendation of the committee of ministers to member states on the protection of women against violence*. Strasbourg, France [Adopted on 30 April 2002, with explanatory memorandum].
- Cullen, F. T., & Agnew, R. (2003). *Criminological theory: Past to present*. Los Angeles, CA: Roxbury.
- DeLisi, M. (2009). Psychopathy is the unified theory of crime. *Youth Violence and Juvenile Justice*, 7(3), 256–273.
- DeLisi, M., & Vaughn, M. G. (2014). Foundation for a temperament-based theory of antisocial behaviour and criminal justice system involvement. *Journal of Criminal Justice*, 42(1), 10–25.
- Dembo, R., Turner, C. W., & Jainchill, N. (2007). An assessment of criminal thinking among incarcerated youths in three states. *Criminal Justice and Behaviour*, 34(9), 1157–1167.
- Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, 53(6), 1146–1158.
- Donnellan, M. B., & Robins, R. W. (2010). Resilient, overcontrolled, and undercontrolled personality types: issues and controversies. *Social and Personality Psychology Compass*, 4(11), 1070–1083.
- Drabick, D. A., Bubier, J., Chen, D., Price, J., & Lanza, H. I. (2011). Source-specific oppositional defiant disorder among inner-city children: prospective prediction and moderation. *Journal of Clinical Child & Adolescent Psychology*, 40(1), 23–35.
- Dwyer, R. G., & Frierson, R. L. (2006). The presence of low IQ and mental retardation among murder defendants referred for pretrial evaluation. *Journal of Forensic Sciences*, 51(3), 678–682.
- Ellis, A. (1974). Experience and rationality: the making of a rational-emotive therapist. *Psychotherapy: Theory, Research & Practice*, 11(3), 194–198.
- Ellis, A. (1992). Group rational-emotive and cognitive-behavioural therapy. *International Journal of Group Psychotherapy*, 42(1), 63–80.
- Eysenck, H. J. (1996). Personality and the experimental study of education. *European Journal of Personality*, 10(5), 427–439.
- Farrington, D. P. (1992). Explaining the beginning, progress and ending of antisocial behaviour from birth to adulthood. In J. McCord (Ed.), *Facts, frameworks and forecasts: Advances in criminological theory* (pp. 253–286). (Vol. 3). New Brunswick, NJ: Transaction Publishers.
- Farrington, D. P. (1995a). The challenge of teenage antisocial behaviour. In M. Rutter (Ed.), *Psychosocial disturbances in young people: Challenges for prevention* (pp. 83–130). Cambridge, UK: Cambridge University Press.
- Farrington, D. P. (1995b). The development of offending and antisocial behaviour from childhood: key findings from the Cambridge Study in Delinquent Development. *Journal of Child Psychology and Psychiatry*, 36(6), 929–964.
- Farrington, D. P. (2003). Key results from the first 40 years of the Cambridge Study in Delinquent Development. In T. P. Thornberry, & M. D. Krohn (Eds.), *Taking stock of delinquency: An overview of findings from contemporary longitudinal studies* (pp. 137–183). New York, NY: Kluwer-Plenum.
- Farrington, D. P. (2004). Conduct disorder, aggression and delinquency. In R. M. Lerner, & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 627–664). New York, NY: Wiley.
- Farrington, D. P. (Ed.). (2005a). *Integrated developmental and life-course theories of offending*. New Brunswick, NJ: Transaction Publishers.
- Farrington, D. P. (2005b). Childhood origins of antisocial behaviour. *Clinical Psychology and Psychotherapy*, 12(3), 177–190.
- Farrington, D. P. (2007). Advancing knowledge about desistance. *Journal of Contemporary Criminal Justice*, 23(1), 125–134.
- Fazio, R. H. (2007). Attitudes as object-evaluation associations of varying strength. *Social Cognition*, 25(5), 603–637.
- Fontaine, R. G. (2008). On-line decision making and antisocial behaviour: some essential but neglected issues. *Clinical Psychology Review*, 28(1), 17–35.
- Fontaine, N. M., Rijdsdijk, F. V., McCrory, E. J., & Viding, E. (2010). Etiology of different developmental trajectories of callous-unemotional traits. *Journal of the American Academy of Child Adolescent Psychiatry*, 49(7), 656–664.
- Ford, D. L., & Lerner, R. M. (1992). *Developmental systems theory: An integrative approach*. Newberry Park, CA: Sage.
- France, A., & Homel, R. (2008). Developmental criminology. In B. Goldson (Ed.), *Dictionary of youth*. London, UK: Willian Publishing.
- Frisell, T., Pawitan, Y., & Långström, N. (2012). Is the association between general cognitive ability and violent crime caused by family-level confounders? *PLoS One*, 7(7), e41783.
- Gendreau, P., Goggin, C., & Law, M. (1997). Predicting prison misconducts. *Criminal Justice and Behaviour*, 24(4), 414–431.
- Gibbs, J. C. (1991). Sociomoral developmental delay and cognitive distortion: implications for the treatment of antisocial youth. In W. M. Kurtines, & J. L. Gerwitz (Eds.), *Handbook of moral behaviour and development* (pp. 95–110). (Vol. 3). Hillsdale, NJ: Erlbaum.
- Gibbs, J. C., Potter, G. B., DiBiase, A. M., & Devlin, R. S. (2009). The EQUIP program: social perspective-taking for responsible thought and behaviour. In B. Glick (Ed.), *Cognitive behavioural interventions for at-risk youth* (pp. 1–47). Kingston, NJ: Civic Research Institute.
- Gibbs, J. C., Potter, G. B., & Goldstein, A. P. (1995). *The EQUIP program: Teaching youth to think and act responsibly through a peer helping approach*. Champaign, IL: Research Press.
- Glenn, A. L., Raine, A., Venables, P., & Mednick, S. A. (2007). Early temperamental and psychophysiological precursors of adult psychopathic personality. *Journal of Abnormal Psychology*, 116(3), 508–518.
- Glueck, S., & Glueck, E. T. (1950). *Unravelling juvenile delinquency*. New York, NY: Commonwealth Fund.
- Hagan, J. (1998). Life course capitalization and adolescent behavioural development. In R. Jessor (Ed.), *New perspectives on adolescent risk behaviour* (pp. 499–517). Cambridge: Cambridge University Press.
- Hampton, A. S., Drabick, D. A., & Steinberg, L. (2014). Does IQ moderate the relation between psychopathy and juvenile offending? *Law and Human Behavior*, 38(1), 23.
- Hare, R. D. (1991). *The Hare Psychopathy Checklist-Revised*. North Tonawanda NY: Multi-Health Systems.
- Hare, R. D. (2003). *The Hare Psychopathy Checklist-Revised* (2nd ed.). Toronto, Canada: Multi-Health Systems.
- Henry, B., Caspi, A., Moffitt, T. E., & Silva, P. A. (1996). Temperamental and familial predictors of violent and non-violent criminal convictions: age 3 to 18. *Developmental Psychology*, 32(4), 614–623.
- Herrnstein, R. J., & Murray, C. (1994). *The bell curve: Intelligence and class structure in American Life*. New York, NY: Free Press, 1–25.

- Hester, M. (2009). *Who does what to whom? Gender and domestic violence perpetrators*. Bristol: University of Bristol/Northern Rock Foundation.
- Hester, M., Westmarland, N., Gangoli, G., Wilkinson, M., O'Kelly, C., Kent, A., & Diamond, A. (2006). *Domestic violence perpetrators: Identifying needs to inform early intervention*. Bristol: University of Bristol/Northern Rock Foundation.
- Holsinger, A. M. (1999). Assessing criminal thinking: attitudes and orientations influence behaviour. *Corrections Today*, 61(1), 22–25.
- Hommel, R., Lincoln, R., & Herd, B. (1999). Risk and resilience: crime and violence prevention in Aboriginal communities. *Australian and New Zealand Journal of Criminology*, 32(2), 182–196.
- Hubbard, D. J., & Pealer, J. (2009). The importance of responsivity factors in predicting reductions in antisocial attitudes and cognitive distortions among adult male offenders. *Prison Journal*, 89(1), 79–98.
- Isen, J. (2010). A meta-analytic assessment of Wechsler's P>V sign in antisocial populations. *Clinical Psychology Review*, 30(4), 423–435.
- Jones, S. E., Miller, J. D., & Lynam, D. R. (2011). Personality, antisocial behaviour, and aggression: a meta analytic review. *Journal of Criminal Justice*, 39(4), 329–337.
- Kazemian, L. (2015a). Desistance from crime and antisocial behaviour. In J. Morizot, & L. Kazemian (Eds.), *The development of criminal and antisocial behaviour: Theory, research and practical applications* (pp. 295–312). New York, NY: Springer.
- Kearns, A., & O'Connor, A. (1988). The mentally handicapped criminal offender. A 10-year study of two hospitals. *British Journal of Psychiatry*, 152(6), 848–851.
- Knight, K., Garner, B. R., Simpson, D. D., Morey, J. T., & Flynn, P. M. (2006). An assessment for criminal thinking. *Crime & Delinquency*, 52(1), 159–177.
- Knight, K., Simpson, D. D., & Morey, J. T. (2002). *TCU-NIC cooperative agreement: Final report*. Fort Worth Texas: Christian University.
- Krahé, B. (2012). Report of the media violence commission. *Aggressive Behavior*, 38, 335–341.
- Lahey, B. B., & Waldman, I. D. (2003). A developmental propensity model of the origins of conduct problems during childhood and adolescence. In B. B. Lahey, T. E. Moffitt, & A. Caspi (Eds.), *Causes of conduct disorder and juvenile delinquency* (pp. 76–117). New York, NY: Guilford Press.
- Laird, R. S., & Metalsky, G. I. (2009). Attribution change. In W. T. O'Donohue, & J. E. Fisher (Eds.), *General principles and empirically supported techniques of cognitive behaviour therapy* (pp. 133–137). Hoboken, NJ: Wiley.
- Laub, J. H., & Sampson, R. J. (1995). The long-term effects of punitive discipline. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 247–258). Cambridge: Cambridge University Press.
- Le Blanc, M. (1997). A generic control theory of the criminal phenomenon: the structural and dynamic statements of an integrative multilayered control theory. In T. P. Farrington (Ed.), *Developmental theories of crime and delinquency. Advances in criminological theories* (pp. 215–286). (Vol. 7). New Brunswick, NJ: Transaction Publishers.
- Le Blanc, M. (2005). An integrative personal control theory of deviant behaviour: answers to contemporary empirical and theoretical developmental criminology issues. In T. P. Farrington (Ed.), *Integrated developmental and life-course theories of offending. Advances in criminological theories* (pp. 125–163). (Vol. 14). New Brunswick, NJ: Transaction Publishers.
- Le Blanc, M. (2009). The development of deviant behaviour, its self-regulation. *Journal of Criminology and Penal Reform*, 91(4–5), 117–136.
- Le Blanc, M. (2012). Twenty-five years of developmental criminology: what we know, what we need to know. In R. Loeber, & B. C. Welsh (Eds.), *The future of criminology* (pp. 124–133). New York, NY: Oxford University Press.
- Li, J., Fraser, M. W., & Wike, T. L. (2013). Promoting social competence and preventing childhood aggression: a framework for applying social information processing theory in intervention research. *Aggression and Violent Behaviour*, 18(3), 357–364.
- Liau, A. K., Shively, R., Horn, M., Landau, J., Barriga, A. Q., & Gibbs, J. C. (2004). Effects of psychoeducation for offenders in a community correctional facility. *Journal of Community Psychology*, 32(5), 543–558.
- Loeber, R., Byrd, A. L., & Farrington, D. P. (2015). Why developmental criminology is still coming of age: the influence of biological factors on within-individual change. In J. Morizot, & L. Kazemian (Eds.), *The development of criminal and antisocial behaviour* (pp. 65–73). New York, NY: Springer.
- Loeber, R., & Farrington, D. P. (2012). *From juvenile delinquency to adult crime: Criminal careers, justice policy and prevention*. New York, NY: Oxford University Press.
- Loeber, R., Green, S. M., & Lahey, B. B. (2003). Risk factors for adult antisocial personality. In D. P. Farrington, & J. W. Coid (Eds.), *Early prevention of adult antisocial behaviour* (pp. 79–108). Cambridge, England: Cambridge University Press.
- Loeber, R., & Le Blanc, M. (1990). Toward a developmental criminology. In M. Tonry, & M. Norris (Eds.), *Crime and justice: A review of research* (pp. 375–473). (Vol. 12). Chicago, IL: Chicago University Press.
- Loeber, R., & Pardini, D. (2008). Neurobiology and the development of violence: common assumptions and controversies. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1503), 2491–2503.
- Loeber, R., & Stouthamer-Loeber, M. (1996). The development of offending. *Criminal Justice and Behaviour*, 23(1), 12–24.
- Lynam, D. R., & Derefinko, K. J. (2006). Psychopathy and personality. In C. J. Patrick (Ed.), *Handbook of psychopathy* (pp. 133–155). New York, NY: Guilford Press.
- Lynn, R., & Vanhanen, T. (2006). *IQ and global inequality*. Augusta, GA: Washington Summit Publishers.
- Mandracchia, J. T., & Morgan, R. D. (2011). Understanding criminals' thinking: further examination of the Measure of Offender Thinking Styles-Revised. *Assessment*, 18, 442–452.
- Mandracchia, J. T., Morgan, R. D., Garos, S., & Garland, J. T. (2007). Inmate thinking patterns: an empirical investigation. *Criminal Justice and Behaviour*, 34, 1029–1043.
- Martin, R., & Young, J. E. (2010). Schema therapy. In K. S. Dobson (Ed.), *Handbook of cognitive-behavioural therapies* (3rd ed., pp. 317–346). New York, NY: Guilford Press.
- Maruna, S., & Mann, R. E. (2006). A fundamental attribution error? Rethinking cognitive distortions. *Legal and Criminological Psychology*, 11(2), 155–177.

- McCabe, K. M., Hough, R., Wood, P. A., & Yeh, M. (2001). Childhood and adolescent onset conduct disorder: a test of the developmental taxonomy. *Journal of Abnormal Child Psychology*, 29(4), 305–316.
- McCue, M. L. (2008). *Domestic violence*. Oxford: ABC-CLIO.
- Mears, D. P., & Cochran, J. C. (2013). What is the effect of IQ on offending? *Criminal Justice and Behavior*, 40(11), 1280–1300.
- Mills, J. F., Anderson, D., & Kroner, D. G. (2004). The antisocial attitudes and associates of sex offenders. *Criminal Behaviour and Mental Health*, 14(2), 134–146.
- Mills, J. F., Kroner, D. G., & Forth, A. E. (2002). Measures of Criminal Attitudes and Associates (MCAA): development, factor structure, reliability, and validity. *Assessment*, 9(3), 240–253.
- Moffitt, T. E. (1990a). Juvenile delinquency and attention-deficit disorder: developmental trajectories from age 3 to 15. *Child Development*, 61(3), 893–910.
- Moffitt, T. E. (1990b). The neuropsychology of delinquency: a critical review of theory and research. In N. Morris, & M. Tonry (Eds.), *Crime and justice* (pp. 99–169). (Vol. 12). Chicago, IL: University of Chicago Press.
- Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behaviour: a developmental taxonomy. *Psychological Review*, 100(4), 674–701.
- Moffitt, T. E. (1997). Adolescence-limited and life-course-persistent offending: a complementary pair of developmental theories. In T. P. Thornberry (Ed.), *Developmental theories of crime and delinquency: Advances in criminological theory* (pp. 11–54). (Vol. 7). New Brunswick, NJ: Transaction Publishers.
- Moffitt, T. E. (2003). Life-course-persistent and adolescence-limited antisocial behaviour: a 10-year research review and a research agenda. In B. Lahey, T. E. Moffitt, & A. Caspi (Eds.), *The causes of conduct disorder and serious juvenile delinquency*. New York, NY: Guilford Press.
- Moffitt, T. E. (2005a). The new look of behavioural genetics in developmental psychopathology: gene-environment interplay in antisocial behaviours. *Psychological Bulletin*, 131(4), 533–554.
- Moffitt, T. E. (2005b). Genetic and environmental influences on antisocial behaviours: evidence from behavioural-genetic research. *Advances in Genetics*, 55, 41–104.
- Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. *Development and Psychopathology*, 13(2), 355–375.
- Moffitt, T. E., Lynam, D. R., & Silva, P. A. (1994). Neuropsychological tests predicting persistent male delinquency. *Criminology*, 32(2), 277–300.
- Monahan, K. C., Steinberg, L., & Cauffman, E. (2009). Affiliation with antisocial peers, susceptibility to peer influence, and antisocial behavior during the transition to adulthood. *Developmental Psychology*, 45(6), 1520–1530.
- Morgan, R. D., Batastini, A. B., Murray, D. D., Serna, C., & Porras, C. (2015). Criminal thinking. A fixed or fluid process? *Criminal Justice and Behaviour*, 42(10), 1045–1065.
- Nagin, D. S., Farrington, D. P., & Moffitt, T. W. (1995). Life-course trajectories of different types of offenders. *Criminology*, 33(1), 111–139.
- Nas, C. N., Brugman, D., & Koops, W. (2008). Measuring self-serving cognitive distortions with the How I Think questionnaire. *European Journal of Psychological Assessment*, 24(3), 181–189.
- Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F., & Turkheimer, E. (2012). Intelligence: new findings and theoretical developments. *American Psychologist*, 67(2), 130.
- Nunes, K. L., Hermann, C. A., Maimone, S., & Woods, M. (2015). Thinking clearly about violent cognitions: attitudes may be distinct from other cognitions. *Journal of Interpersonal Violence*, 30(8), 1322–1347.
- Oleson, J. C., & Chappell, R. (2012). Self-reported violent offending among subjects with genius-level IQ scores. *Journal of Family Violence*, 27(8), 715–730.
- Packer, G., Best, D., Day, E., & Wood, K. (2009). Criminal thinking and self-control among drug users in court mandated treatment. *Criminology & Criminal Justice*, 9(1), 93–110.
- Piquero, A. R., & Brezina, T. (2001). Testing Moffitt's account of adolescence-limited delinquency. *Criminology*, 39(2), 353–370.
- Polaschek, D. L. L., Collie, R. M., & Walkey, F. H. (2004). Criminal attitudes to violence: development and preliminary validation of a scale for male prisoners. *Aggressive Behaviour*, 30(6), 484–503.
- Raine, A. (2013). *The anatomy of violence: The biological roots of crime*. New York, NY: Pantheon Books.
- Raine, A., Reynolds, C., Venables, P. H., & Mednick, S. A. (2002). Stimulation seeking and intelligence: a prospective longitudinal study. *Journal of Personality and Social Psychology*, 82(4), 663–674.
- Roy, R. E., & Wormith, J. S. (1985). *The effects of incarceration: Measuring criminal sentiments*. Ottawa: Ministry of the Solicitor General of Canada.
- Rushton, J. P., & Templer, D. I. (2009). National differences in intelligence, crime, income, and skin color. *Intelligence*, 37(4), 341–346.
- Sameroff, A. J. (1983). Developmental systems: contexts and evolution. In W. Kessen (Ed.), *Handbook of child psychology. History, theory and methods* (pp. 237–294). (Vol. 1). New York, NY: Wiley.
- Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
- Sampson, R. J., & Laub, J. H. (1995). Understanding variability in lives through time: contributions of life-course criminology. *Studies on Crime and Crime Prevention*, 4(2), 143–158.
- Sampson, R. J., & Laub, J. H. (1997). A life-course theory of cumulative disadvantage and stability of delinquency. In T. P. Thornberry (Ed.), *Advances in criminological theory: Developmental theories of crime and delinquency theory* (pp. 133–162). (Vol. 7). New Brunswick, NJ: Transaction Publishers.
- Sampson, R. J., & Laub, J. H. (2003). Life-course desisters? Trajectories of crime among delinquent boys followed to age 70. *Criminology*, 41(3), 301–339.
- Sampson, R. J., & Laub, J. H. (2005). A life-course view of the development of crime. *Annals of the American Academy of Political and Social Science*, 602(1), 12–45.

- Schwartz, J. A., Savolainen, J., Aaltonen, M., Merikukka, M., Paananen, R., & Gissler, M. (2015). Intelligence and criminal behavior in a total birth cohort: an examination of functional form, dimensions of intelligence, and the nature of offending. *Intelligence*, *51*, 109–118.
- Séguin, J. R., Pinsonneault, M., & Parent, S. (2015). Executive function and intelligence in the development of antisocial behaviour. In J. Morizot, & L. Kazemian (Eds.), *The development of criminal and antisocial behaviour* (pp. 123–135). Switzerland: Springer International Publishing.
- Simourd, D. J. (1997). The Criminal Scale-Modified and Pride in Delinquency Scale: psychometric properties and construct validity of two measures of criminal attitudes. *Criminal Justice and Behaviour*, *24*(1), 52–70.
- Simourd, D. J., & Olver, M. E. (2002). The future of criminal attitudes research and practice. *Criminal Justice and Behaviour*, *29*(4), 427–446.
- Simourd, D. J., & Van De Ven, J. (1999). Assessment of criminal attitudes: criterion-related validity of the Criminal Sentiments Scale-Modified and Pride in Delinquency Scale. *Criminal Justice and Behaviour*, *26*(1), 90–106.
- Stark, E. (2007). *Coercive control: How men entrap women in personal life*. New York, NY: Oxford University Press.
- Tackett, J. L., Krueger, R. F., Iacono, W. G., & McGue, M. (2005). Symptom-based subfactors of DSM-defined conduct disorder: evidence for etiologic distinctions. *Journal of Abnormal Psychology*, *114*(3), 483–487.
- Tangney, J. P., Stuewig, J., & Mashek, D. J. (2007). Moral emotions and moral behaviour. *Annual Review of Psychology*, *58*(1), 345–372.
- Taxman, F. S., Rhodes, A. G., & Dumenci, L. (2011). Construct and predictive validity of criminal thinking scales. *Criminal Justice and Behaviour*, *38*(2), 174–187.
- Thornberry, T. P. (1997). Introduction: some advantages of developmental and life-course perspectives for the study of crime and delinquency. In T. P. Thornberry (Ed.), *Advances in criminological theory. Developmental theories of crime and delinquency* (pp. 1–10). (Vol. 7). New Brunswick, NJ: Transaction Publishers.
- Thornberry, T. P., & Krohn, M. D. (2000). The self-report method for measuring delinquency and crime. *Criminal Justice*, *4*(1), 33–83.
- Tobach, E., & Greenberg, G. (1984). The significance of T.C. Schneirla's contribution to the concept of levels of integration. In E. Tobach (Ed.), *Behavioural evolution and integrative levels* (pp. 1–8). Hillsdale, NJ: Erlbaum.
- Towers, G. M. (1990). The outsiders. *LUCID: The Mensa Truth SIG Dialogue*, *10*(2), 6–16.
- Walby, S., & Allen, J. (2004). *Domestic violence, sexual assault and stalking: Findings from the British Crime Survey*. London: Home Office Research, Development and Statistics Directorate.
- Wallinius, M., Johansson, P., Larden, M., & Dernevik, M. (2011). Self-serving cognitive distortions and antisocial behaviour among adults and adolescents. *Criminal Justice and Behaviour*, *38*(3), 286–301.
- Walters, G. D. (1990). *The criminal lifestyle: Patterns of serious criminal conduct*. Newbury Park, CA: Sage.
- Walters, G. D. (1995). The Psychological Inventory of Criminal Thinking Styles (PICTS). Part I: reliability and preliminary validity. *Criminal Justice and Behaviour*, *22*(3), 307–325.
- Walters, G. D. (1996). The Psychological Inventory of Criminal Thinking Styles: Part III. Predictive validity. *International Journal of Offender Therapy and Comparative Criminology*, *40*(2), 105–112.
- Walters, G. D. (1997). Predicting short-term release outcome using the LCSF and PICTS. *Journal of the Mental Health in Corrections Consortium*, *43*(3 & 4), 18–25.
- Walters, G. D. (1998). The Lifestyle Criminality Screening Form. *Journal of Offender Rehabilitation*, *27*(3–4), 9–23.
- Walters, G. D. (2001). Revised validity scales for the Psychological Inventory of Criminal Thinking Styles (PICTS). *Journal of Offender Rehabilitation*, *32*(4), 1–13.
- Walters, G. D. (2002). Current and historical content scales for the Psychological Inventory of Criminal Thinking Styles (PICTS). *Legal and Criminological Psychology*, *7*(1), 73–86.
- Walters, G. D. (2003). Predicting criminal justice outcomes with the Psychopathy Checklist and Lifestyle Criminality Screening Form: a meta-analytic comparison. *Behavioral Sciences & the Law*, *21*(1), 89–102.
- Walters, G. D. (2005). Predicting institutional adjustment with the Lifestyle Criminality Screening Form and Psychological Inventory of Criminal Thinking Styles. *International Journal of Forensic Mental Health*, *4*(1), 63–70.
- Walters, G. D. (2006). Appraising, researching and conceptualizing criminal thinking: a personal view. *Criminal Behaviour and Mental Health*, *16*(2), 87–99.
- Walters, G. D. (2007a). Measuring proactive and reactive criminal thinking with the PICTS: correlations with outcome expectancies and hostile attribute biases. *Journal of Interpersonal Violence*, *22*(4), 1–15.
- Walters, G. D. (2007b). Predicting institutional adjustment with the Psychological Inventory of Criminal Thinking Styles composite scales: replication and extension. *Legal and Criminological Psychology*, *12*(1), 69–81.
- Walters, G. D., & Elliott, W. N. (1999). Predicting release and disciplinary outcome with the Psychological Inventory of Criminal Thinking Styles: female data. *Legal and Criminological Psychology*, *4*(1), 15–21.
- Walters, G. D., & Mandell, W. (2007). Incremental validity of the Psychological Inventory of Criminal Thinking Styles and Psychopathy Checklist: screening version in predicting disciplinary outcome. *Law and Human Behaviour*, *31*(2), 141–157.
- Walters, G. D., & Schlauch, C. (2008). The Psychological Inventory of Criminal Thinking Styles and Level of Service Inventory-Revised: screening version as predictors of official and self-reported disciplinary infractions. *Law and Human Behaviour*, *32*(5), 454–462.
- Wormith, J. S., & Andrews, D. A. (1984). *Criminal sentiments and criminal behaviour: A construct validation*. Ottawa: Solicitor General Canada.
- Yochelson, S., & Samenow, S. E. (1976). *The criminal personality, volume I: A profile for change*. New York, NY: Jason Aronson.
- Yoshikawa, H. (1994). Prevention as cumulative protection: effects of early family support and education on chronic delinquency and its risks. *Psychological Bulletin*, *115*(1), 28–54.

Chapter 14

General Overview of Violence Risk Assessment and Corresponding Measures

Chapter Outline

| | | | |
|--|------------|--|------------|
| Historical overview and violence risk assessment framework | 405 | Specialized measures for dangerousness risk assessment | 420 |
| Developments in assessment approaches of risk prediction | 406 | General violence | 420 |
| Unstructured clinical judgment approach | 406 | Violence Risk Assessment Guide | 420 |
| Actuarial risk assessment approach | 406 | Structured Assessment of Protective Factors for Violence Risk | 421 |
| Structured professional clinical judgment approach | 407 | The Classification of Violence Risk | 422 |
| The dynamic-actuarial approach | 407 | The Historical Clinical Risk Management-20—3rd edition | 422 |
| The integrated-actuarial approach | 407 | Level of Service Inventory Revised | 423 |
| The 4 generations theory of instrument development | 408 | The Short-Term Assessment of Risk and Treatability | 423 |
| Risk factors | 408 | Two-Tiered Violence Risk Estimates | 424 |
| Causes of offending | 409 | Sexual violence | 424 |
| Promotive and protective factors | 409 | Sex Offender Risk Appraisal Guide | 424 |
| Risk–Need–Responsivity model | 410 | STATIC-99, Static-99R, Static-2002R | 425 |
| The eight central classification | 411 | Sexual Violence Risk-20 | 425 |
| Issues in the accuracy of violence risk assessment | 412 | The Violence Risk Scale—Sexual Offender Version | 426 |
| Predictive validity of violence risk assessment | 413 | Youth violence | 426 |
| Issues in the prediction and assessment of violence | 414 | Structured Assessment for Violence Risk in Youth | 426 |
| Metaanalytic studies of violence risk assessment | 415 | Personality measures | 427 |
| Cross-cultural applications of risk assessment: the case of China | 417 | Personality Assessment Inventory | 427 |
| Overview of violence risk assessment measures | 417 | The Rorschach performance assessment system in risk assessment | 428 |
| Purpose, structure and validation of instruments | 418 | Summary | 430 |
| Selecting an instrument | 419 | References | 430 |
| Reporting risk assessment | 419 | | |

HISTORICAL OVERVIEW AND VIOLENCE RISK ASSESSMENT FRAMEWORK

With the increasing recognition of the destructive role of violence for public health (Brundtland, 2002; Krug, Mercy, Dahlberg, & Zwi, 2002), the prediction of violence or violence risk assessment has been the subject of considerable clinical and research interest. Recent surveys revealed that over 60% of general psychiatric patients are routinely assessed for violence risk (Pescosolido et al., 2010), rising to 80% in forensic psychiatric hospitals (Khiroya, Weaver, & Maden, 2009). The criminal justice systems have welcomed the use of risk assessment to assist in decisions regarding sentencing and release (Harrison, 2010; Simon, 2005).

Within a few decades, the field of violence risk assessment has been increasingly expanded and transformed (e.g., Andrews & Bonta, 2006; Singh, Grann, Lichtenstein, Långström, & Fazel, 2012). The development of new risk assessment measures, the role of protective factors, the continuous study of risk/need factors, the implementation of risk assessment instruments in management of risk and in intervention or treatment planning are among the most common research topics.

Psychological risk assessments are frequently requested for individuals who have violated social norms or when they appear dangerous or unpredictable. Risk assessments involve estimating the probability of a future event based on secondary indicator variables. The key issues of violence risk assessment are the selection of factors to assess and the methods for combining the factors into a global evaluation of risk and involve subjective judgments about uncertain motives or behaviors (Hanson, 2009). Thus evaluators should take into account the uncertainty inherent in the behaviors being assessed and the measurement error inevitable in all psychological assessment. Risk may be estimated as “low,” “moderate,” or “high” (Heilbrun et al., 2004).

An interesting finding in recent research is that only a small proportion of violence committed by people with mental illness is directly caused by symptoms (Skeem, Manchak, & Peterson, 2011). Research on the association between serious mental illness (SMI) and violence produced controversial findings whereby empirical literature demonstrated that individuals with serious mental illness (SMI) as a group are at higher risk of violence than individuals without SMI (e.g., Elbogen & Johnson, 2009; Fazel, Lichtenstein, Grann, Goodwin, & Långström, 2010).

Moreover, some risk assessments focus on the perpetrator, whereas others focus on the victim and the risk that they will be revictimized. Some risk assessment measures provide information “regarding the nature, form, and degree of the danger” of violence (Kropp, 2004, p. 677), whereas other tools allow the assessor to make a probability report regarding the likelihood of recidivism (Hilton, Harris, & Rice, 2010), and others support both goals of risk assessment.

The performance of a violence risk assessment incorporates the reference to a standard list of risk factors that have been found to be empirically valid (e.g., age, past violence, substance abuse). Such lists help the clinician to determine the risk factors that the clinician selects while conducting the assessment process. The majority of risk assessment tools “were originally developed by forensic mental health professionals to be used in forensic mental health settings” (Storey, Gibas, Reeves, & Hart, 2011, p. 554). Risk assessment tools employed in criminal justice settings are generally based on various psychological and psychosocial risk factors. These risk factors are typically derived from empirical evidence with specific samples or based on theory and literature reviews (e.g., Hanson, Helmus, & Bourgon, 2008).

According to Monahan and Skeem (2015) the violence risk assessment process can be conceptualized as having four components: (1) identifying empirically valid (and legally acceptable) risk factors, (2) developing a method for scoring these risk factors, (3) establishing a procedure for combining scores on the risk factors, and (4) producing an estimate for violence risk. Monahan et al. (2006) developed the classification of violence risk (COVR, an actuarially based software program) to operationalize three components of the risk assessment process (identification measurement and combination of risk factors).

DEVELOPMENTS IN ASSESSMENT APPROACHES OF RISK PREDICTION

There are five major approaches in the typical assessment of violence risk.

Unstructured clinical judgment approach

In this approach, the professional collects information and the risk assessment is the outcome of his or her subjective impressions and experiences. The major advantage of this approach is that the professional considers the offender’s specific behaviors and circumstances in the development of specific violence prevention strategies (Kropp, 2008). Limitations include lack of predictive or incremental validity and interscorer reliability and transparency.

Actuarial risk assessment approach

The actuarial approach is at the opposite end of the unstructured clinical judgment (UCJ) approach. Risk factors are identified through various statistical procedures and are selected according to the strength of their association with violence. Within the actuarial approach, there are more specific approaches used. One such approach is the pure actuarial prediction approach as described earlier. Another approach is the clinically adjusted approach that “starts with an established actuarial score and then considers factors external to the actuarial scheme” (Hanson & Morton-Bourgon, 2009, p. 3). This approach rests on the use of predictive or risk factors derived from empirical research (e.g., Guy, Douglas, & Hart, 2015). These risk factors are assigned a numerical value, and a total score is derived through an algorithm (Singh, Grann, & Fazel, 2011). The total score is then used to estimate the probability of recidivism with a specific period (Singh et al., 2011a). The assessor can further evaluate the examinee’s risk level in comparison to other offenders (Kropp, 2008).

The major advantage of the actuarial approach is that it has better predictive validity than the other two approaches (Hilton et al., 2010). Risk factors are identified through various statement procedures and are selected based on the strength

of their association with violence. This procedure of item selection is known as the empirical item selection approach (Guy et al., 2015a). The defining feature of this model is the “derivation and use of reproducible, unvarying rules for amalgamating predictive factors” (p. 42).

A disadvantage of the actuarial approach is that risk factors are selected on the basis of a single data set and thus factors may not generalize or be applicable to other samples. Blair, Marcus, and Boccaccini (2008) examined the decrease in predictive validation for the VRAG, SORAG, and Static 99 when they were applied to new samples (i.e., cross-validation). Another limitation concerns the instability in the estimates of the probability of violent recidivism (Mills, Jones, & Kroner, 2005).

Hart and Cooke (2013) investigated the precision of individual risk estimates employing actuarial risk assessment instruments (ARAI). The authors concluded that ARAIs cannot be applied to estimate the specific probability of future violence with any reasonable degree of precision. Thus group-based estimates of risk cannot be applied with confidence to a specific individual with that group.

Structured professional clinical judgment approach

As an alternative to actuarial prediction, another method that has emerged in recent decades and is routinely in practice is the structured professional judgment (SPJ) model (Douglas, Ogloff, & Hart, 2003). This model can be considered a guided clinical approach that focuses on empirically validated risk factors to violence. One of the more widely known SPJ tools commonly utilized with forensic psychiatric patients in California and Washington is the HCR-20 (Webster, Douglas, Eaves, & Hart, 1997).

In this approach, examiners follow a set of guidelines that include specific risk factors to be considered (static-dynamic). The guidelines also include “recommendations for information gathering, communicating opinions and implementing violence prevention strategies” (Kropp, 2008, p. 207). The SPJ approach is considered more flexible than the actuarial approach because the risk factors chosen are based on empirical evidence. Outcomes of this type of risk assessment are more generalizable than actuarial tools that were developed from specific samples (e.g., prisoner inmates, or sex offenders). Moreover, this approach is more consistent and transparent than UCJ while they maintain some flexibility and professional judgment (Braff & Sneddon, 2007). Examples of SPJ measures include the HCR-20, the SARA, and the SVR-20. SPJ measures generally contain a mix of static and dynamic risk factors. The inclusion of dynamic risk factors within the assessment process allows clinicians to target factors that may be changed through intervention.

This method of risk assessment has been criticized for decisions based on subjective judgments (even though they are based on empirically tested risk factors) (Quinsey, Harris, Rice, & Cormier, 2006). Instead of obtaining an unbiased numerical score based on the number and type of risk factors present, clinicians are instead encouraged to use their professional experience to examine the risk factors present and determine an overall risk level (Skeem & Monahan, 2011). Clinicians’ judgments often invalidate the assessment process and have been found to moderate the predictive accuracy of such measures (e.g., Vrana, Sroga, & Guzzo, 2008) and disproportionately target sex offenders (Wormith, Hogg, & Guzzo, 2012). There is also evidence that communicating risk judgments in terms of a categorization (e.g., low, moderate, and high) results in overestimated risk for reoffending (Mills & Kroner, 2006). This overestimation persisted even after the raters were supplied with base rate information for the offenses in question. This categorical overestimation does not influence the actuarial approach since the risk probability is obtained from the total score and is not assigned by the rater.

The dynamic-actuarial approach

A fourth and relatively new approach to risk assessment is the use of actuarial measures that can be modified with evidenced change in dynamic risk variables. This approach has been described as dynamic-actuarial (Mills, 2005). An example of this approach is reflected in measures, such as the combined STATIC-99, STABLE-2007, and ACUTE-2007 (Hanson, Harris, Scott, & Helmus, 2007).

The integrated-actuarial approach

The fifth approach to risk assessment is the integrated-actuarial approach, which integrates four qualities of risk assessment: actuarial risk estimates derived from sample populations, dynamic risk factors, recommendations for treatment and intervention, and strategies to manage risk (Mills, Kroner, & Morgan, 2011). The actuarial risk estimates serve as an anchor from which risk judgments can be made with associated probabilities of reoffending over set time-points. These risk

estimates have been shown to be a more accurate approach in assessing risk (Mills et al., 2011). The inclusion of dynamic risk factors in this approach facilitates effective interventions. Furthermore, this approach addresses two important issues within the risk assessment field. First, the importance of having an anchor for risk judgments is addressed by the inclusion of an actuarial-based risk indicator section. Second, the inclusion of the dynamic risk management items without the assignment of categorical judgments of risk serve as a guide.

THE 4 GENERATIONS THEORY OF INSTRUMENT DEVELOPMENT

Andrews and Bonta (2010) describe the ways the assessment of offenders has changed over the last 3 decades. They present “3 generations” of risk assessment and recently a 4th generation has been proposed (Andrews, Bonta, & Wormith, 2006; Bonta & Wormith, 2013).

First-Generation (1G) Risk Assessment: Professional Judgment (or Clinical Approach): At the end of the information-gathering process, the staff member arrives at a judgment regarding the offender’s risk to the community and his/her treatment needs. The main feature of this approach is that the reasons for the decision are subjective, often intuitive, and they are not empirically validated.

Second-Generation (2G) Risk Assessment: Actuarial, Static Risk Scales: Recent metaanalyses have confirmed the power of empirical, statistical approaches over the clinical approaches. 2G instruments are evidence based, but they have two major limitations. Most of these instruments have no theoretical framework and they consist almost entirely of static, historical items. Static risk factors do not change and, therefore this type of factors does not reveal the complexity of recidivism, does not allow the evaluation of changes in risk over time, and thus fails to identify areas of intervention (Wong & Gordon, 2006). Examples of 2G instruments include the VRAG (Harris, Rice, & Quinsey, 1993), the Salient Factor Score (SFS; Hoffman, 1994) the Statistical Information on Recidivism (SIR) scale (Nuffield, 1982), and the Offender Group Reconviction Scale (OGRS; Copas & Marshall, 1998).

Third-Generation (3G) Assessment: Risk/Need Scales: 3G instruments combine both static and dynamic items and are associated theoretically and empirically with criminal behavior. Moreover, these types of assessments are able to measure the offender’s needs. Two examples of risk/need tools are the Wisconsin Risk and Needs assessment tool (WRN; Baird, Heinz, & Bemus, 1979) and the Level of Service Inventory-Revised (LSI-R; Andrews & Bonta, 1995). The LSI-R has been expanded into another 3G instrument, the Level of Service/Risk, Need Responsibility (LS/RNR; Andrews, Bonta, & Wormith, 2008).

Fourth-Generation (4G) Risk Assessment: The Integration of Case Management with Risk/Need Assessment: The 4G assessments include static and dynamic risk factors. In relation to 3G tools, 4G measures incorporate the “responsivity” principle, which posits that interventions should be aligned with the offender’s motivations and abilities. Moreover, 4G instruments allow for reassessment during the case management process, thus enabling the assessment of possible behavior changes over time.

RISK FACTORS

A risk factor is a variable that increases the chances that an individual will behave in a harmful manner (Blackburn, 2000). Risk factors may fall within four broad categories: (1) *dispositional factors*, such as psychopathic or antisocial personality characteristics, cognitive variables and demographic data; (2) *historical factors*, such as adverse developmental history, prior history of crime and violence prior hospitalization, and poor treatment compliance; (3) *contextual antecedents* to violence, such as criminogenic needs, deviant social networks, and lack of social supports; (4) *clinical factors*, such as psychological disorders, poor level of intellectual functioning, and substance abuse (e.g., Andrews & Bonta, 1998; McGuire, 2000).

The majority of risk assessment tools evaluate two types of risk factors: *static* and *dynamic*. Static risk factors are fixed and unchangeable, such as demographic factors (e.g., age and gender), childhood history, and criminal history. Dynamic risk factors are psychological and behavioral characteristics that are potentially variable, such as anxiety, negative self-concept, neuroticism, or leading an erratic life-style.

Monahan and Skeem (2014) proposed a somewhat different classification of risk factors: *fixed marker* (unchangeable), *variable marker* (unchangeable by intervention), *variable risk factor* (changeable by intervention), and *causal risk factor* (changeable by intervention; when changed reduces recidivism). Out of the four types of risk factors, only causal risk factors are directly relevant to risk reduction—that is, treatment-relevant risk factors are causal risk factors. “Unless a variable risk factor has been shown to be causal, there is little reason to assume that reducing the risk factor will reduce violence” (Monahan & Skeem, 2015, p. 18). The best way to ensure that a risk factor is causal is through *randomized control trial*

(RCT) in which a targeted intervention was shown to be effective in changing one or more variable risk factors and the resulting changes were shown to reduce the likelihood of posttreatment recidivism.

Causes of offending

Much has been written about the known causes of offending and criminal behavior (e.g., [Farrington & Loeber, 2013](#); [Murray, Farrington, & Eisner, 2009](#); [Sampson, Winship, & Knight, 2013](#)). The major threats to the interpretation of causes include the following issues ([Loeber, Byrd, & Farrington, 2015](#)):

- Reliance on correlates rather than predictors of offending.
- Underestimating third factors that predict outcomes but that are not causal.
- The presence of inadequate comparison group for between–group comparisons.
- Establishing causes between individuals rather than causes within individuals. Studies on between–individual differences suffer from more potential confounds than studies on within-individual differences.
- Choice of sample: inferences about causation may vary depending on whether the sample was a normative sample or on whether the sample was derived from a special population, such as prisoners. Normative studies are best for the study of causes of the onset, continuity and desistance from offending. In contrast, selected samples (e.g., prisoners, delinquents, psychopaths) are more useful for the study of the causes of recidivism or the causes of desistance among former offenders.

Best measures for the assessment of causality are quasi-experimental methods or randomized trials in which some participants receive a particular intervention that aims at the modification of reported causal factors, whereas randomized controls receive no intervention.

Promotive and protective factors

Promotive factors are often confused with protective factors. Promotive factors act in the opposite direction of risk factors (i.e., predict desistance via a main effect, across high- and low-risk cases), whereas protective factors moderate the impact of risk factors (i.e., predict desistance via an interaction, particularly in high-risk cases; [Masten, 2014](#)). Thus, promotive factors reduce the probability of reoffending, whereas protective factors reduce the probability of reoffending among persons exposed to risk factors ([Farrington, Loeber, & Ttofi, 2012](#)). Protective factors include supportive intimate relationships, hope and self-efficacy, and prosocial identity ([Serin, Lloyd, & Hanby, 2010](#); [Ullrich & Coid, 2011](#)). The following [Table 14.1](#) presents the different types of risk and protective factors.

It is important to both reduce risk factors and increase protective and promotive factors. In the presence of risk factors, it is also possible that protective factors can offset risks. [Fergus and Zimmerman \(2005\)](#) include the following assets (protective factors) compensating for risk factors:

In reference to adolescent violent behavior, assets that have compensated for individual-level risk factors include prosocial beliefs compensating for antisocial socialization ([WHO, 1999](#)), religiosity compensating for interest in gang involvement ([McNeill, 1976](#)), and anger-control skills compensating for risk-taking behavior ([Social Security Administration, 2003](#); OASDI Trustees Report). Two dimensions of racial identity—*public regard and centrality*—are assets that [Caldwell, Kohn-Wood, Schmeelk-Cone, Chavous, and Zimmerman \(2004\)](#) found to protect against the effects of racial discrimination on violent behavior both compensated for and protected against the risk factor for violent behavior of getting in a fight, whereas paternal support has been protective ([Fergus & Zimmerman, 2005](#)). Finally, the resource *parental monitoring* has compensated for the effects of risk-taking behavior on violent behavior ([Social Security Administration, 2003](#)). *Anger-control skills* compensate for the effects of peer delinquent behavior for predicting adolescent violent behavior ([Social Security Administration, 2003](#)). *Perceived social status* was found to moderate (i.e., a protective factor) the relationship between peer delinquent behaviors and adolescent violent behavior ([Fergus & Zimmerman, 2005](#)). Adolescents' *religiosity* also compensated for the risk of peer substance use ([Karon, Fleming, Steketee, & De Cock, 2001](#)) and exposure to violence for violent behavior ([McNeill, 1976](#)). *Parental factors* are also consistent resources to help youth overcome risks for violent behavior. *Maternal support* protected youth from the negative influences of peer violent behavior ([Fergus & Zimmerman, 2005](#)). *Parental monitoring* and paternal support were found to compensate for peer violent behavior ([Karon et al., 2001](#)). *Parental monitoring* also compensated for the risk of living in a risky neighborhood ([Social Security Administration, 2003](#)). *Maternal and paternal support* also compensated for and protected youth from the negative consequences of exposure to violence ([Fergus & Zimmerman, 2005](#)).

TABLE 14.1 Different Types of Risk and Protective Factors

| Type of Factor | Description |
|---|--|
| Correlate | A factor that is shown to be correlated with antisocial behavior |
| Risk factor | A correlate that is shown to precede antisocial behavior; predicts increases in, or the occurrence of, antisocial behavior through a direct or main effect |
| Static risk factor (or fixed marker) | A risk factor that cannot change or be changed |
| Dynamic risk factor (or variable risk factor) | A risk factor that can change or be changed |
| Dynamic marker (or variable marker) | A risk factor that can change or be changed, but researchers have not (yet) shown that changing it alters the risk of antisocial behavior |
| Causal risk factor | A risk factor that can change and, when changed, has been shown to alter the risk of antisocial behavior |
| Vulnerability factor (or precipitating factor) | A factor acting as a moderator that increases the magnitude of a predictive relationship between a risk factor and antisocial behavior |
| Promotive factor (or compensatory factor) | A factor predicting a decrease in, or the nonoccurrence of, antisocial behavior through a direct or main effect |
| Protective factor | A factor acting as a moderator that decreases the magnitude of a predictive relationship between a risk factor and antisocial behavior |
| Proximal risk factor | A risk factor present closer in time to antisocial behavior than other risk factors |
| Distal risk factor | A risk factor separated by long period of time from antisocial behavior |
| Activation factor | A factor associated with increases in both the frequency and variety of antisocial behavior over time |
| Aggravation factor | A factor associated with increases in seriousness in antisocial behavior over time |
| Desistance factor | A factor associated with decreases in frequency, variety, or seriousness in antisocial behavior over time |
| Source: Reprinted from Morizot, J., & Kazemian, L. (2015). Introduction: understanding criminal and antisocial behavior within a developmental and multidisciplinary perspective. In J. Morizot & L. Kazemian (Eds.), <i>The development of criminal and antisocial behavior: Theory, research and practical applications</i> (pp. 1–16). Cham, Switzerland: Springer International Publishing, with permission. | |

Researchers have also found assets and resources that compensate for cumulative risk factors for violent behavior. [Borowsky, Ireland, and Resnick \(2002\)](#) found among 13,781 7th- through 12th-grade adolescents studied over 2 years that *academic performance, parental presence, parent-family connectedness, and school connectedness*, alone and in combination, compensated for the cumulative effects of prior violent behavior, violence victimization, substance use, and school problems on violent behavior. Other researchers have found that cumulative measures of assets and resources compensate for cumulative risk factors ([Fergus & Zimmerman, 2005](#)).

[Tofei et al. \(2016\)](#) in their methodological research study synthesize results from major prospective longitudinal studies that examined the way intelligence can function as a protective factor against offending and violence. Metaanalytic results of studies on interactive protective factors suggest that a higher level of intelligence can predict low levels of offending differentially within the high risk and the low risk groups.

RISK–NEED–RESPONSIVITY MODEL

The development of risk assessment measures has been significantly influenced by the Risk–Need–Responsivity model (RNR) to assessment and treatment of individuals in the justice system ([Bonta & Andrews, 2007](#)). The RNR approach argues that the punitive criminal justice systems have failed to reduce recidivism and has resulted in the increase of incarceration ([Andrews & Bonta, 2010](#)). The RNR proposes a diversion in focus toward a more individualized approach and the rehabilitation of offenders. The RNA model is associated to general personality and cognitive social learning perspectives (GPCSL) on human behavior.

The risk principle identifies the importance of accurately assessing risk of recidivism for each offender ([Bonta & Andrews, 2007](#)). Using these determinations of risk, it is then possible to classify offenders into low-, moderate-, and high-risk groups. The need principle emphasizes the importance of determining which individual needs should be the focus of intervention and then devoting resources to address those needs ([Andrews & Bonta, 2010](#)). The need principle distinguishes between dynamic needs and static needs and stresses the importance of designing interventions to address criminogenic

needs; that is, those dynamic needs that, if addressed, are likely to lead to a reduction in recidivism risk (Dowden & Andrews, 1999a). Finally, the responsivity principle recognizes that different individuals have different strengths and deficits that may impact the effectiveness of particular treatment approaches for that person (Dowden & Andrews, 1999b). To successfully address the criminogenic need domains among high-risk offenders and reduce recidivism, it is critical to consider *both general responsivity* (i.e., emphasizing the importance of providing therapeutic factors known to be generally effective, including a strong therapeutic relationship and a cognitive-behavioral approach) *and specific responsivity* (i.e., matching treatment to offender characteristics, including personality and demographic characteristics, as well as factors related to ability and motivation; Andrews & Bonta, 2010).

The eight central classification

Andrews and Bonta (2010) developed the best-established risk/need factors in the prediction of criminal behavior by producing the “central eight” factors. They acknowledged that other classifications of risk/need are possible and that general risk/need factors cannot necessarily capture all the details of individual histories or case-specific etiologies. The central eight consists of the “big four” and the “modest four.”

The following provide a narrative summary of the Central Eight risk/need factors, beginning with the big four and followed by the moderate four. It shows the dynamic aspects of each risk factor (Andrews & Bonta, 2010).

1. **History of Antisocial Behavior.** This includes early involvement in a number and variety of antisocial activities in a variety of settings, such as at home and outside of home. Major indicators include being arrested at a young age, a large number of prior offenses, and rule violations while on conditional release.
2. **Antisocial Personality Pattern (APP)** defined according to the Multidimensional Personality Questionnaire (Caspi et al., 1994; Patrick, Curtin, & Tellegen, 2002). The APP includes weak constraint (low on traditionalism, or endorsing high moral standards; low on harm avoidance, or low on avoiding excitement and danger; low on self-control; low on being reflective and playful), and negative emotionality (aggression, or causing discomfort in others; alienation and feeling mistreated; stress reaction dominated by anger and irritability).
Defined according to *the Five Factor Model* (Miller & Lynam, 2001; Digman, 1990): APP is characterized by low agreeableness (hostile, spiteful, jealous, self-centered, indifferent to others, antagonistic), and low conscientiousness (lack persistence, impulsive, weak planning, weak constraint, criminal values).
Dynamic need and promising intermediate targets of change: The dynamic aspects of personality are weak self-control skills, weak anger-management skills, and poor problem-solving skills, and the intermediate targets are to build up those skills.
3. **Antisocial Cognition.** This set of variables includes attitudes, values, beliefs, rationalizations, and a personal identity that is favorable to crime. The cognitive-emotional states associated with crime are anger and feeling irritated, resentful, and/or defiant. Specific indicators would include identification with criminals, negative attitudes toward the law and justice system, a belief that crime will yield rewards, and rationalizations that specify a broad range of conditions under which crime is justified (e.g., the victim deserved it, the victim is worthless).
4. **Antisocial Associates.** This risk/need factor includes both association with procriminal others and relative isolation from anticriminal others. This risk/need factor is sometimes called “social support for crime.”
5. **Family/Marital Circumstances.** The key to assessing both family of origin for young people and marital circumstances for older people is the quality of the interpersonal relationships within the unit (parent-child or spouse-spouse) and the behavioral expectations and rules in regard to antisocial behavior, including monitoring, supervision, and disciplinary approaches. In assessments of youths, the two key parenting variables are nurturance/caring and monitoring supervision. On the part of the young people themselves, look for the young person caring about the parent and caring about the parent’s opinions. In the case of marriage (or its equivalent), look for a high-quality relationship (mutual caring, respect, and interest) in combination with anticriminal expectations (Do you know where your spouse is?). The risk factor is poor-quality relationships in combination with either neutral expectations with regard to crime or procriminal expectations.
6. **School/Work.** Yet again we place a major emphasis on the quality of the interpersonal relationships within the settings of school and/or work. Generally, the risk/need factors are low levels of performance and involvement and low levels of rewards and satisfactions. *Strength:* Strong attachments to fellow students/colleagues along with authority figures in combination with high levels of performance and satisfaction at school/work.
7. **Leisure/Recreation.** This factor is related to low levels of involvement and satisfaction in anticriminal leisure pursuits.
8. **Substance Abuse.** The risk/need factor involves problems with alcohol and/or other drugs (tobacco excluded). Current problems with substances indicate higher risk than a prior history of abuse.

TABLE 14.2 The Central Eight Risk/Need Factors in a General Personality and Cognitive Social Learning Theory

| Risk/Need Factor | Description |
|--------------------------------|--|
| Criminal history | Early onset of antisocial behavior, high frequency, variety of antisocial acts |
| Procriminal attitudes | Thoughts, values and sentiments supportive of criminal conduct |
| Antisocial personality pattern | Low self-control, hostile, pleasure/thrill seeking, disregard for others, callous |
| Procriminal associates | Friends and acquaintances who model, encourage and support criminal behavior and thoughts |
| Education/employment | Difficulties in school and work settings with peers and authority, poor performance, lack of interest and ambition |
| Family/marital | Marital instability, poor parenting skills, criminality within the family and marital relationship |
| Substance abuse | Alcohol and/or drug abuse, substance abuse interfering with positive behaviors and relationships within the context of school, work and family |
| Leisure/recreation | Lack of prosocial pursuits |

Source: Reprinted from Bonta, J., & Wormith, J. S. (2013). Applying the Risk–Need–Responsivity principles to offender assessment. In L. A. Craig, L. Dixon, & T. A. Gannon (Eds.), *What works in offender rehabilitation: An evidence-based approach to assessment and treatment* (pp. 69–93). Wiley, with permission. Copyright 2013 John Wiley & Sons Inc.

Although the field of risk assessment initially began with UCJs that yielded poor predictions (e.g., Monahan, 1981) significant progress has been made since then. The most prevalent risk/need classification scheme is the central eight risk/need factors (Table 14.2). The extensive body of research regarding modern violence risk assessment has provided significant practical advances for the clinicians involved in undertaking such assessments in real-world settings. Several structured assessment tools have been designed to assist clinicians in assessing violence risk (e.g., Douglas, Hart, Webster, & Belfrage, 2013). In recent years, however, a plethora of instruments have been published that are not effectively characterized by a clinical-actuarial dichotomy. Rather, the risk-assessment process now exists on a continuum of rule-based structure, with completely unstructured (clinical) assessment occupying one pole of the continuum, completely structured (actuarial) assessment occupying the other pole, and several forms of partially structured assessment lying between the two (Skeem & Monahan, 2011).

ISSUES IN THE ACCURACY OF VIOLENCE RISK ASSESSMENT

Accuracy in risk assessment plays a major role in identifying the small group of individuals thought to pose a very high risk of harm to society and in monitoring their level of risk during and after treatment (Douglas, Yeomans, & Boer, 2005). Accurate prediction for violence, even from the same data, can be largely influenced by the *analytical method* (Elbogen & Johnson, 2009; Van Dorn, Volavka, & Johnson, 2012), suggesting that the key causes of violence are not yet fully grasped. Additional research has also raised concerns that involvement in these studies by original authors of the risk assessment tools may have led to inflated estimates of accuracy (Singh et al., 2011a); and that, with some offender populations, predictive efficacy is no better than chance (Coid, Ullrich, & Kallis, 2013).

Although risk assessment methodologies have become increasingly sophisticated, they can still err to a significant extent when used to predict recidivism. Traditionally, the accuracy of risk assessment has been measured in terms of *true positives* (persons predicted to recidivate who in fact do reoffend) and *true negatives* (persons predicted to be nondangerous who avoid reoffending) and their opposites: *false positives* and *false negatives*. A related measure of accuracy involves calculating sensitivity (the proportion of reoffenders who were predicted to reoffend) and specificity (the proportion of nonoffenders who were predicted to be nonoffenders). In practice, false positive and sensitivity rates generally far exceed false negative and specificity rates, both because the relatively lower base rate for reoffending makes true positives harder to identify than true negatives and because evaluators are more inclined to err in the direction of confinement rather than release.

The accuracy of a test may be estimated in a number of ways. Many involve computations on the basis of a single cutoff value for misses, false negatives and thus employ, the four key values (hits, misses, false alarms and true negatives) in various ways with being able to consider true negatives directly.

Another method of measuring accuracy is the computation of the *Receiver or Related Operating Characteristic curve* (ROC), which plots true positive rates over false positive rates. The relative operating characteristic curve (ROC) has been long applied to the prediction of violent recidivism (Mossman, 1994); ROC is a measure of affect size that is unaffected

by variations in selection ratio based rate and thus allowing for direct comparisons of the accuracies of different tests used with different selection ratios and base rates. ROCs yield additional measures of effect size that lend themselves to easy interpretation. Finally, once the true size and shape of a test's ROC are estimated (the relative costs of errors are worked out), the absolute best selection ratio (cutoff score) can be calculated for any given base rate. For all these reasons, ROC AUC has become the generally accepted index of accuracy in the field of violence risk assessment (Harris, Rice, Quinsey, & Cormier, 2015).

Another measure of effect size is the *Common Language Effect Size* (CLES). CLES can be derived once d is known (McGraw & Wong, 1992). CLES is the probability that if a recidivist and nonrecidivist were chosen at random, the recidivist has the higher score. According to Rice and Harris (1995), CLES and ROC AUC are conceptually and mathematically equivalent. The *area under this curve* (AUC) provides a measure of the extent to which a given cutoff score provides information that is superior to mere chance. An AUC value below .5 means that the evaluation technique produces results worse than chance, whereas an AUC value of 1 indicates perfect accuracy. An AUC of .75 means that a person with a higher score on the instrument is 75% more likely to reoffend than a person with a lower score.

Another method of measuring accuracy relies on the diagnostic odds ratio (DOR), or the ratio of the odds that a prediction of reoffending is accurate relative to the odds that such a prediction is inaccurate. A 100:1 DOR would mean perfect accuracy. Because it is not dependent on the base rates, the DOR is often used in metaanalyses of risk assessment instruments. According to one metaanalysis, the DOR for the SAVRY is higher than the DOR for any of the eight other instruments routinely used in forensic field, probably in part because the SAVRY was designed to evaluate risk in a specific population (violent juveniles) (Singh et al., 2011a). That means that modern risk assessment techniques, which produce true positive rates of 50%–85%, obtain results much better than chance.

Bayesian networks (BNs), sometimes also called *belief networks* or *causal probabilistic networks*, can be applied to model complex problems, in which variables and knowledge from different sources need to be integrated within a single causal framework (Heckerman, Mamdani, & Wellman, 1995; Jensen, 1996). The use of BNs for risk assessment and risk management of violent behavior has not previously been studied in this field of research, yet it resembles other areas of critical risk assessment and decision making where well developed BNs have provided significant improvements (Fenton & Neil, 2012).

The risk of violent reoffending should be accurately measured and, more importantly, well managed with causal interventions to reduce this risk after release. The well-established predictors in this area of research are typically based on regression models or even some rule-based methods with no statistical composition, and these have proven to be unsuitable for simulating causal interventions for risk management. In collaboration with the medical practitioners of the *Violence Prevention Research Unit* (VPRU), *Queen Mary University of London*, Constantinou, Freestone, Marsh, Fenton, and Coid (2015) have developed a Bayesian network (BN) model for this purpose, which they call Decision Support for Violence Management–Prisoners (DSVM-P). The BN model captures the causal relationships between risk factors, interventions, and violence, and demonstrates significantly higher accuracy (cross-validated AUC score of .78) compared to well-established predictors (AUC scores ranging from .665 to .717) within this area of research, with respect to whether a prisoner is judged suitable for release. Specifically, the BN model demonstrates a cross-validated AUC score of .78, and this compares well against well-established predictors, such as the VRAG, HCR20v2 and PCL-R, which demonstrate AUC scores ranging from .665 to .717 when employed within the same dataset. The implications are extended to the interventional modeling case in the sense that the BN demonstrates how actions are supported by the model, with respect to determining whether a prisoner's risk of violence can be managed to acceptable levels after release on the basis of some causal intervention, such as treatment, therapy and/or medication (Constantinou et al., 2015). Even more important, the BN model also allows for specific risk factors to be targeted for causal intervention for risk management of future reoffending.

Predictive validity of violence risk assessment

Performance indicators utilized to measure predictive validity can generally be classified into three categories: (1) those that indicate the ability to accurately identify groups of individuals most likely to commit an antisocial act, (2) those that indicate the ability to accurately identify groups of individuals least likely to commit an antisocial act, and (3) those that indicate predictive abilities overall (Singh et al., 2011a).

The first category of performance indicators measures whether assessments completed using a given instrument correctly identify groups of individuals who will commit an antisocial act. Examples include the *positive predictive value* (PPV) and the *number needed to detain* (NND). These performance indicators are typically based on true positive and false positive information, though indices, such as sensitivity also include false negative information (Altman & Bland, 1994a). The second category of performance indicators measures whether assessments correctly identify groups of individuals

will not commit an antisocial act. Examples include the negative predictive value (NPV) and the number safely discharged (NSD). These performance indicators are typically calculated using true negative and false negative information, though there are exceptions, such as specificity, which includes false positive information (Altman & Bland, 1994b). Acceptable false positive and false negative rates are context-specific (Smits, 2010); thus, benchmarks for interpreting these two categories of performance indicators have not been established in the risk assessment literature (Altman & Bland, 1994a, 1994b). The third category of performance indicators provides global estimates of predictive validity by combining information on the frequency of true and false positives, as well as true and false negatives (Glas, Lijmer, Prins, Bonsel, & Bossuyt, 2003). They are routinely reported with dispersion parameters, such as standard errors or confidence intervals, and either comparisons against chance estimates (P values) or benchmarks to assist in interpretation (e.g., Ferguson, 2009). Examples of global performance indicators include the correlation coefficient (r ; the strength and direction of the association between risk classification and antisocial outcome), the odds ratio (OR; the ratio of the odds of an antisocial act in the high-risk group compared with the odds of an antisocial act in the low risk group), the hazard ratio (HR; the ratio of hazards at a single time for those who engaged in an antisocial act and those who did not), and the area under the curve (AUC; the probability that a randomly selected individual who committed an antisocial act received a higher risk classification than a randomly selected individual who did not).

A variety of factors may influence the statistical methodologies used and performance indicators reported in predictive validity studies, such as the assessment approach. There are two general approaches to structured risk assessment: actuarial and SPJ. In the prediction-focused actuarial approach, weighted scores are assigned to criminal history, sociodemographic, and/or clinical factors empirically associated with the likelihood of antisocial behavior. These weighted scores are used to classify individuals into risk bins that correspond to probabilistic estimates of future antisocial behavior (Quinsey et al., 2006). In contrast, SPJ instruments aim to inform the development of individualized risk formulations and comprehensive risk management plans (Hart & Logan, 2011). As part of this process, the instruments act as *aide-memoires*, guiding assessors to estimate risk across one of three final risk judgments (low, moderate, or high) after reviewing risk and/or protective factors (Douglas et al., 2003; Webster, Nicholls, Martin, Desmarais, & Brink, 2006). Recent metaanalytic evidence suggests that actuarial and SPJ tools produce assessments with comparable predictive validity levels (Fazel, Singh, Doll, & Grann, 2012).

Although several dozen systematic reviews have examined the predictive validity of risk assessment instruments, none has examined how this psychometric property has been measured (Singh & Fazel, 2010). To address this scientific gap, Singh, Desmarais, and Van Dorn (2013) conducted a second-order systematic review to investigate the analytic and reporting practices used in 47 studies concerning 25 risk assessment instruments. Published studies were identified from two recent systematic reviews and descriptively analyzed to identify those statistical methods and performance indicators most commonly used to investigate predictive validity. The consistency with which those methods and performance indicators were defined and interpreted was also explored, as were sources of between-study variability in measurement practices.

There were four principal findings of this review. First, the use of analytic methodologies (ROC curve analysis, correlational analysis, logistic regression, survival analysis) and performance indicators (AUC, r , OR, and HR) measuring a risk assessment instrument's global accuracy were much more common than those that measure the ability of an instrument to accurately identify groups of individuals at higher or lower risk of committing antisocial acts. Second, approximately two-thirds of the reviewed articles provided no definition of either the ROC curve or the AUC. Regarding interpretation, benchmarks for small, moderate, or large AUCs varied, even when the same source was cited. Third, although virtually all the included instruments were designed to either assign individuals to probabilistic risk bins or to assist in producing final risk judgments, fewer than half of the articles reported the predictive validity of such bins or judgments. When the predictive validity of risk bins or final risk judgments were examined, the bins or judgment categories recommended in the instruments' manuals were used in only a third of cases.

Issues in the prediction and assessment of violence

There are several major complications to overcome in violence prediction, some of which are the problems inherent in trying to predict low-frequency events, vis-a-vis who will be the perpetrator of violence and when he or she will act violently. Predicting any low-frequency event is a difficult task. Making such predictions tends to overidentify suspected perpetrators, that is, committing many false positive errors (Yang, Wong, & Coid, 2010). Even with a moderately accurate method of prediction, predicting low- or very-low-frequency events, such as serious violence (e.g., mass murder, serial killing, or predatory child sexual abuse) will inevitably result in a high false-positive error rate, that is, identifying many people that appear violent but, in fact, are not (e.g., Fazel et al., 2012).

Another issue that has generated much recent debate is related to the margins of error surrounding individual risk assessments. “On the basis of empirical findings, statistical theory and logic, it is clear that predictions of future offending cannot be achieved, with any degree of confidence, in the individual case” (Cooke & Michie, 2010, p. 259). Hanson and Howard (2010) demonstrate that the wide margin of error is the result of having only two options (violent or not violent). According to Hart (2001, 2003), actuarial risk-assessment tools conceptualize violent risk solely in terms of probability of future violence, ignoring other aspects of risk, such as the possible nature, severity, imminence, duration, or frequency of future violence. “The violence risk assessment field may be reaching a point of diminishing returns in instrument development. It has long been argued that there may be a ‘sound barrier’ to predictive validity in this area, such that the correlation between risk estimates and criterion measures will rarely exceed .40” (Menzies, Webster, & Sepejak, 1985, p. 115).

Although the “sound barrier” for accurate violence risk prediction may reach a higher level than it is now (Singh & Petrila, 2013), the “contingencies of life” will determine the upper limit on what is possible in the many risk assessment contexts. According to Monahan and Skeem (2014), the most promising methodologies for incremental advances in violence risk assessment may include violent victimization (Sadeh, Binder, & McNiel, 2013), implicit measures (Knock et al., 2010), patient self-perceptions (Skeem, Manchak, Lidz, & Mulvey, 2013), and the incorporation of risk factors from the neurosciences (Aharoni et al., 2013).

Metaanalytic studies of violence risk assessment

The past 20 years have witnessed the development of specialized tools for the prediction and management of violence for use with a variety of populations (Heilbrun, Yasuhara, & Shah, 2009). The increasingly severe sanctions for those identified as being at high risk for violence together with career repercussion for professionals who made erroneous clinical judgments (Maden, 2007) have highlighted the significance on the accuracy of risk prediction from both research and policy perspectives. A key question regarding the prediction of violence is, “which is the best tool for violence prediction?” There are two approaches used in comparative studies of the predictive ability of various instruments: (1) comparison of two or more measures with indices of predictive efficacy, such as AUC or correlational statistics, (2) metaanalysis of a fixed-effects model to pool data from different studies for comparison.

Studies conducted with the first approach have compared the PCL-R (Hare et al., 1990) the Violence Risk Appraisal Guide (VRAG; Quinsey, Harris, Rice, & Cormier, 1998), the Violence Risk Assessment Scheme (HCR-20; Webster et al., 1997), the Level of Service Inventory-Revised (LSI-R; Andrews & Bonta, 1995), the Psychopathy Check List: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995), the Lifestyle Criminality Screening Form (LCSF; Walters, White, & Denney, 1991), General Statistical Information on Recidivism (GSIR; Nuffield, 1982), Sexual Violence Risk-20 (SVR-20; Boer, Hart, Kropp, & Webster, 1997), and Static 99 (Hanson & Thornton, 2000). However, these studies have produced inconsistent results, varying from no difference (e.g., Edens, Poythress, & Lilienfeld, 1999; Kroner & Mills, 2001), to large but inconsistent differences in favor of one or more instruments (e.g., Douglas, Ogloff, Nicholls, & Grant, 1999; Hilton, Harris, & Rice, 2001; Gendreau, Goggin, & Smith, 2002; Loza & Green, 2003; Stadtland et al., 2005). Such inconsistencies may be attributable, in part, to variations between the studies, including sample characteristics (e.g., age, gender, size of sample, length of follow-up) and criterion variables (general vs. violent recidivism vs. institutional infractions) and sample (mental health vs. criminal justice vs. a mixture of both), not to mention potential proprietary biases that were unaccounted for in the studies.

Metaanalyses conducted with random-effects models are now considered to be a standard approach for dealing with heterogeneity among studies and have, in many cases, outdated fixed-effects models (Hunter & Schmidt, 2000). It is widely accepted in metaanalysis that study heterogeneity originating from differences in study settings can be controlled for, but similar heterogeneity that originates from other sources may not be measurable or controlled for (*random effects* that include all sources of differences attributable to heterogeneity without clearly identifying the specific attributes). Most researchers nowadays routinely apply Q statistic to test for overall random effects between studies and use weighted mean effect size to adjust for them (e.g., Edens, Skeem, & Douglas, 2006; Guy, Edens, Anthony, & Douglas, 2005).

A large number of metaanalyses reviewed (e.g., Walters, 2003, 2006; Edens et al., 2006; Schwalbe, 2007), found inconsistent to no difference among instruments they compared. To deal with the heterogeneity factor, the authors of these studies, employed random-effects models to calculate weighted-effect sizes and by examining the effects of one moderator at a time by a stratified analytic approach. On the basis of subsample data, such analysis has two obvious drawbacks: (1) reduced statistical power to detect differences in predictive efficacy and (2) unexplained variation in effect sizes due to differences in moderators that could not be included in the stratification, which, in practice, usually involves no more than two moderators at a time. Both drawbacks could lead to large standard errors and wide confidence intervals in effect sizes and, hence, could potentially obscure moderate differences between two instruments. The WLS regression analysis

reported by [Schwalbe \(2007\)](#) with restrictive study selection criteria could be effective in estimating effects of multiple moderators by using all available data.

A recent metaanalysis ([Walters, 2006](#)) compared an aggregate category of selected structured/actuarial risk tools (HCR-20, LSI-R, PCL-R, VRAG and the Lifestyle Criminality Screening Form (LCSF; [Walters et al., 1991](#)), with a number of self-report measures specific to risk prediction (PICTS; [Walters, 1995, 1996](#)), (Self-Appraisal Question SAQ; [Loza, 2005](#)) whereas others reflected general clinical constructs of personality and emotional functioning [e.g., NEO PI-R, Multidimensional Anger Inventory (MAI), Beck Hopelessness Scale]. Walters' findings supported the predictive validity of self-report measures in risk assessment but only on constructs that were empirically linked to risk (e.g., antisocial attitudes). Walters suggested that the combination of content-relevant self-report measures with actuarial/structured risk instruments could enhance the validity of risk assessment.

Another metaanalysis ([Campbell, French, & Gendreau, 2009](#)) examined which instruments are more effective in predicting future violence within prison settings and in the community. Further objectives of this metaanalysis were to compare the predictive utility of risk measures depending on which generation they represented, the type of items (static vs. dynamic), their method of administration, and their content relevance to corrections. Although the study evaluated employed more than 70 different risk measures, only instruments with ≥ 40 effect size estimates per outcome of interest were evaluated to emphasize individual tools for which the largest amount of data were available. These measures included the HCR-20- (for misconduct, for recidivism), LSI/LSI-R (for recidivism), PCL/PCL-R (for recidivism), SIR scale (for recidivism) and VRAG (for recidivism). Instruments comprised primarily of dynamic risk items generated the strongest effect size for violent recidivism. In examining the mean effect size magnitudes for individual instruments with ≥ 10 effect sizes, it was clear that each predicted violent recidivism with at least a moderate degree of success. Most of the instruments appeared to be similar in their predictive power. The only exception was that the VRAG had a predictive advantage over both the HCR-20 & the SIR scale.

Unlike the prediction of violent recidivism, there was much more variability within the individual risk measures in their ability to predict institutional violence. An aggregate category of criminal history indexes produced the most precise mean effect size. In terms of standardized risk tools, the HCR-20 had the greatest number of effect sizes and produced the largest mean effect size for institutional violence. In contrast to the violent recidivism data, 2G instruments had an advantage over 3G measures in predicting instrumental violence—that is, measures examining criminal history and other static variables were more informative than other types of assessments.

The metaanalytic study of [Yang et al. \(2010\)](#) attempted to improve a number of the previously mentioned methodological issues. First, they compared the efficacy of nine widely used instruments to predict violent behavior, including the PCL-R, the PCL:SV, the HCR-20, the VRAG, the Violence Risk Scale (OGRS), the Matrix 2000 for Violence (RM2000V), the LSI/LSI-R, the General Statistical Information for Recidivism (GSIR), and the VRS, as well as seven subscales: PCL-R Factor 1 and Factor 2, the 10-item historical subscale, the 5-item clinical subscale, and the 5-item risk management subscale of the HCR-20; and the static and dynamic scales of the VRS.

Overall, the primary objective was to determine which are the most effective violence prediction tools, among the instruments included in the study, after addressing the methodological issues of earlier metaanalyses. Furthermore, they intended to evaluate the predictive efficacy of 2G (static) and 3G (dynamic) tools, together with comparisons between theoretically derived and empirically derived tools.

[Fazel et al. \(2012\)](#) conducted a systematic review and metaanalysis of the predictive validity of tools commonly used in violence risk prediction of sexual and criminal behavior. First, they identified the nine most commonly used tools in risk assessment. Actuarial instruments included the Level of Service Inventory-Revised (LSI-R; [Andrews & Bonta, 1995](#)), the Psychopathy Checklist-Revised (PCL-R; [Hare, 2003](#)) the Sex Offender Risk Appraisal Guide (SORAG; [Quinsey et al., 2006](#)), the Static-99 ([Hanson & Thornton, 2000](#)), and the Violence Risk Appraisal Guide (VRAG; [Harris et al., 1993](#); [Quinsey et al., 1998](#)). Structured clinical judgment (SCJ) tools included the historical, clinical, risk management-20 (HCR-20^{V3}; [Douglas et al., 2013](#)); the Sexual Violence Risk-20 (SVR-20; [Boer et al., 1997](#)); the Spousal Assault Risk Assessment (SARA; [Kropp, Hart, Webster, & Eaves, 1999](#)); and the Structured Assessment of Violence Risk in Youth (SAVRY; [Borum, Bartel, & Forth, 2002](#)). We divided tools into three categories: those designed to predict violent offending (HCR-20, SARA, SAVRY, and VRAG), sexual offending (SORAG, Static-99, and SVR-20), and any criminal offending (LSI-R and PCL-R). Although the PCL-R was originally developed to diagnose psychopathic personality disorder, it has become widely used for risk assessment purposes, because numerous studies have found the PCL-R score to be statistically significantly associated with criminal and antisocial outcomes ([Leistico, Salekin, DeCoster, & Rogers, 2008](#)).

Second, a systematic search was carried out to identify studies that measured the predictive validity of the nine tools from data based from 1995 to 2011. To be included in the metaanalysis, studies had to report rates of true positives, false negatives, true negatives, and false negatives at a given cutoff score for the outcome that the tool was designed to predict.

Fazel et al. (2012) employed a range of accuracy estimates to report on the predictive validity of the risk assessment instruments. Such estimates included the diagnostic odds ratio, sensitivity, specificity, area under the curve, positive predictive value, negative predictive value, the number needed to detain to prevent one offence, as well as a novel performance indicator that the authors developed for the purposes of this review, the number safety discharged. Moreover, the authors investigated heterogeneity utilizing meta-regression and subgroup analyses.

Risk assessments were conducted on 73 samples comprising 24,847 participants from 13 countries, of whom 5,879 (23.7%) offended over an average of 49.6 months. When used to predict violent offending, risk assessment tools produced low to moderate positive predictive values (median 41%, interquartile range 27%–60%) and higher negative predictive values (91%, 81%–95%), and a corresponding median number needed to detain of 2 (2–4) and number safely discharged of 10 (4–18). Instruments designed to predict violent offending performed better than those aimed at predicting sexual or general crime. Although risk assessment tools are widely used in clinical and criminal justice settings, their predictive accuracy varies depending on how they are used. They seem to identify low risk individuals with high levels of accuracy, but their use as sole determinants of detention, sentencing, and release is not supported by the current evidence. Further research is needed to examine their contribution to treatment and management.

CROSS-CULTURAL APPLICATIONS OF RISK ASSESSMENT: THE CASE OF CHINA

Until late 2012 there were no national mental health laws in China and no legislation to mandate the assessment of violence risk in individuals with serious mental disorders. To apply a risk assessment, two criteria must be met: (1) the individual is diagnosed with a serious mental disorder and (2) the individual poses a threat to either self or others. Traditionally, mental health professionals in China have tended to rely on UCJ when assessing violence risk in psychiatric patients (Ho et al., 2013). SCJ tools are gradually being introduced in China as part of a range of measures to be introduced and resources to be directed toward those at highest risk of negative outcomes.

Although the majority of risk assessment tools are imported from the West their applications on Chinese subjects are viable. A recent review concluded that some SCJ tools provide high levels of reliability and validity in Chinese samples, such as the Chinese version of the Historical, Clinical, Risk Management-20 (HCR-20) and the Violence Risk Screening-10 (V-RISK-10) (Gu, Singh, Yun, & Hu, 2014). However, this review was limited in four ways: (1) it focused on mentally disordered offenders rather than general psychiatric patients and offender populations, (2) it did not consider three popular tools currently used to assess violence risk in China (i.e., the Violence Risk Scale-Chinese version [VRS-C], the Psychopathy Checklist-Revised [PCL-R] and the Broset Violence Checklist [BVC]), (3) it did not compare the predictive validity of Chinese-developed instruments to Western-developed ones and (4) the review lacked clear inclusion and exclusion criteria.

In a recent study, Zhou et al. (2016) conducted a systematic review study to examine (1) the current state of risk assessment research in China, (2) the instruments most frequently used to assess aggression and violence risk in China, and (3) whether these instruments are associated with a similar degree of predictive validity as that found in Western samples. A total of 15 risk assessment tools were identified, 7 involving instruments originally standardized and validated in Western samples and 8 developed in Chinese samples. Data on both reliability and validity were extracted from 24 studies involving 15,681 participants.

Using Cronbach's α , there was evidence of good reliability for five instruments: the BVC, PCL-R, HCR-20, V-RISK-10 and the LSI-R, and excellent reliability for two instruments: the VRS and HCR-20. According to the ICC, there was evidence of good reliability for the VRS and HCR-20, and excellent reliability for the V-RISK-10, the PCL-R, the VRS and the BVC. Only one study using the HCR-20 reported the test-retest reliability. Information on validity was reported in 12 studies (50%) using the following statistics: AUC, sensitivity and specificity and positive and negative predictive values. Using the AUC, there was evidence of poor validity for the V-RISK-10, the VRS and the HCR-20 over a 12-month follow-up period. There was evidence of moderate validity for the BVC, V-RISK-10, the HCR-20 over a 6-month follow-up period and the CRAT-P.

First, although Western-developed instruments, such as the HCR-20, demonstrated good reliability in this review, predictive validity estimates were often noticeably lower than those found in Western samples (Singh, Serper, Reinharth, & Fazel, 2011), suggesting there is little evidence to support the use of current instruments for the prediction of future violence risk in China at present.

OVERVIEW OF VIOLENCE RISK ASSESSMENT MEASURES

Desmarais, Johnson, and Singh (2016) present a comprehensive analysis of the 1970–2012 risk assessment for future crime and recidivism research in the United States. The authors identified 19 different risk assessment instruments that have been evaluated in 53 studies representing 72 unique samples of adult offenders in correctional settings. Although their analysis

underscored the value and effectiveness of such measures, they were unable to identify any single tool as the “best” or “most accurate.” They concluded that the predictive validity of each instrument may vary as a function of offender characteristics, settings, and specific desired recidivism goals.

Despite their advantages, risk assessment measures have some important limitations. For example, the time period for which these measures predict risk is limited. Also, the relative risk estimates obtained for an individual are heavily reliant on whether the individual being assessed matches the sample on which the risk estimates are based or matches research samples. For example, in attempting to assess risk of reoffense for a female sex offender, one cannot reliably depend on the typical actuarial risk assessment measures because validity evidence for these measures is based solely on male offenders. These measures have also been criticized for relying on a single regression equation (Steadman et al., 2000) that is presumed to be useful across diverse populations. Moreover, recent research has noted the limitations of actuarial measures (Hanson & Morton-Bourgon, 2009; Harris & Lurigio, 2007). As a result, violent risk assessment has moved toward a more SPJ model (Harris & Lurigio, 2007; Torrey et al., 2008). Recent metaanalyses have identified over 120 different risk assessment tools currently used in general and psychiatric settings (Singh & Fazel, 2010). These measures range from internationally utilized tools, such as the Historical, Clinical, Risk Management-20 (HCR-20; Webster et al., 1997) to locally developed and implemented risk measures, such as the North Carolina Assessment of Risk (NCAR; Schwalbe, Fraser, Day, & Arnold, 2004).

During the last 2 decades, much attention has been focused on the development of standardized risk assessment tools. The main reason for this tendency was the improvement of quality, validity, and efficiency of violence risk assessment. Some of these instruments are specifically designed to predict dangerousness, such as the Violence Prediction Scheme (VPS; Wong & Gordon, 2006) and the HCR-20 (Webster et al., 1997). Occasionally, instruments were developed to predict a specific form of violence, such as intimate-partner violence (Spousal Assault Risk Assessment Guide-SARA; Kropp, Hart, Webster, & Eaves, 1995). Moreover, general recidivism risk measures (e.g., Level of Supervision Inventory-Revised LSI-R; Andrews & Bonta, 1995) have been shown to predict future violence with reasonable accuracy (Gendreau et al., 2002).

According to Bonta (2002) there are different formats of risk assessment, such as paper and pencil methods (e.g., the Criminal Sentiments Scale CSS; Andrews & Wormith, 1984; the Self-Appraisal Questionnaire-SAQ; Loza, Dhaliwal, Kroner, & Loza-Fanous, 2000), file review methods (e.g., VRAG; Harris et al., 1993) and interview based approaches combined with file reviews (e.g., LSI-R, HCR-20). Some of these approaches measure a single construct relevant to risk (e.g., antisocial attitudes as measured by the modified CSS; Simourd, 1997), whereas others tap multiple domains associated with reoffending (e.g., the LSI-R assesses 10 risk need domains). The challenges in formulating risk judgments based on the use of several instruments emphasize the need for research that identifies the most appropriate risk instruments for a specific offender population, forensic setting and assessment purpose.

Purpose, structure and validation of instruments

Risk assessment instruments differ in the sentencing goal(s) they are meant to fulfill: Some are designed exclusively to predict recidivism (assess “risk”), whereas others are meant to inform risk reduction (assess “needs”). Prediction-oriented tools are designed for efficient prediction, whereas reduction-oriented tools (like the LSI-R used in Utah) include variable risk factors to address in supervision and treatment. As the emphasis on risk reduction increases, so should the emphasis on variable (or evidently causal) risk factors.

According to Skeem and Monahan (2011), distinctions between risk and needs (and associated generations of tools) may create more confusion than understanding. Basically, tools differ in the sentencing goal they are meant to fulfill and in their emphasis on variable risk factors. Risk assessment tools also differ in the extent to which they structure or replace professional judgment with actuarial rules and formulae (Skeem & Monahan, 2011). Specifically, tools vary in whether they specify rules for generating two, three, or all four of the following components of the risk assessment process: (1) identifying empirically valid (and legally acceptable) risk factors, (2) determining a method for measuring (scoring) these risk factors, (3) establishing a procedure for combining scores on the risk factors, and (4) producing an estimate of recidivism risk.

Some tools concentrate solely on the identification and measurement processes, allowing professionals to form their own judgment to combine scores and evaluate whether an offender is low, medium, or high risk (e.g., the HCR-20; Guy, Kusaj, Packer, & Douglas, 2015). Others, like the LSI-R, aim at the identification, measurement, and combination of risk factors, but allow a “professional override” of the calculated risk estimate. Completely actuarial tools, like the Virginia risk assessment (Farrar-Owens, 2013) encompass all four components of the process (e.g., Rice, Harris, & Lang, 2013). Once an individual’s risk has been calculated, the risk assessment process is complete.

Instruments used at sentencing also differ with respect to their evidence base (Desmarais et al., 2016). Although some have been rigorously studied and evaluated by independent parties, many have not. As noted by Gottfredson and Moriarty (2006), fundamental requirements for developing, cross-validating, and applying risk-assessment tools are “routinely ignored or violated.” Unless a tool is validated in a *local system*—and then periodically *revalidated*—there is little assurance that it works. Variables that predict recidivism in a jurisdiction with ample services for offenders may not predict recidivism in a resource-poor jurisdiction. Similarly, when a variable becomes relatively common in the general population and loses its specificity to offending (e.g., having a tattoo; being physically abused), predicting of recidivism is decreased.

Selecting an instrument

Although several violence risk measures are available, the advantage of using one measure over another remains unclear. Yang et al. (2010) conducted a metaanalysis of 2G and 3G risk assessment tools and their components. The tools included in this study differ along important dimensions often used to categorize risk tools (Andrews et al., 2006; Campbell et al., 2009). Some are considered 2G tools with mostly static/unchangeable risk predictors [Violence Risk Assessment Guide (VRAG); Harris et al., 1993; General Statistical Information for Recidivism (GSIR); Bonta, Harman, Han, & Cormier, 1996; Risk Matrix 2000 for Violence (RM2000V); Thornton, 2007]; and the Offender Group Reconviction Scale (OGRS; Copas & Marshall, 1998), whereas others are regarded as 3G tools with mostly dynamic risk predictors [Level of Service Inventory and revised version (LSI/LSI-R); Andrews & Bonta, 1995; Historical, Clinical, and Risk Management Violence Risk Assessment Scheme (HCR-20); Webster et al., 1997; and the Violence Risk Scale (VRS); Wong & Gordon, 2006]. The tools selected for inclusion also differ according to whether their risk predictors have been largely theoretically derived [Psychopathy Checklist-Revised (PCL-R); Hare, 2003; HCR-20; LSI-R; and VRS], identified empirically (GSIR, RM2000V, and OGRS), or represent a combination of the two (VRAG).

Yang et al. (2010) found that the predictive efficiencies of these nine risk assessment instruments were essentially “interchangeable.” Point estimates of each instrument’s accuracy tended to fall within a narrow band bounded by overlapping confidence intervals: The Area Under the Curve (AUC) across instruments ranged from .65 to .71 (Yang et al., 2010), suggesting a 65%–71% chance that a randomly selected recidivist obtained a higher score on the instrument than a randomly selected nonrecidivist. Although it is imperfect, the AUC is a measure of predictive efficiency that it widely applied in the risk assessment field because it facilitates comparison across studies that vary in base rates of recidivism. AUCs in the range typically observed for risk assessment tools (i.e., .65–.71) may be viewed as “medium” effects (e.g., Rice & Harris, 2005).

Two factors may help explain the similar predictive performance of well-validated instruments. First, it is possible that each instrument reaches a “natural limit” to predictive utility, beyond which it cannot improve. Some evidence suggests that a limiting process makes recidivism impossible to predict beyond a certain level of accuracy (Coid et al., 2010). A scale can reach this limit quickly with a few maximally predictive items, before reaching a sharp point of diminishing returns. The limit can, however, be reached in alternative ways (e.g., fixed markers vs. variable risk factors). Second, well-validated tools may manifest similar performance because they tap “common factors” or shared dimensions of risk, despite their varied items and formats. Factor analyses suggested that the instruments tap four overlapping dimensions: *criminal history, an irresponsible lifestyle, psychopathy and criminal attitudes, and substance-abuse-related problems*. Each of these dimensions was similarly predictive of recidivism.

Reporting risk assessment

It is possible to express relative risk in terms of risk ratios (hazard ratios) when the absolute recidivism rates are unknown. For example, Mr. X could be described as being 2.5 times more likely to reoffend violently than the typical offender. In general, relative risk estimates would be expected to be more stable across settings than estimates of absolute risk because variance resulting from base rates is removed. Risk ratios are difficult to interpret, however, in the absence of base rate information. Most decision makers care whether the risk for violence increases from 3.0% to 7.5%, or from 30% to 75% (Hanson, 2009).

In general, relative risk estimates would be expected to be more stable across settings than estimates of absolute risk as variance from base rates is eliminated. Risk ratios are difficult to interpret, however, in the absence of base-rate information. Typically, the evaluators of risk assessment reports ask for more than simply a number. Not only do decision makers want an estimate of the likelihood of failure but they also want an estimate of the potential consequences and what actions should be taken to minimize the risk. Hanson (2009) proposes a list of features that risk assessment should aim at retrieving:

- Assess risk factors whose nature, origins, and effects can be understood.
- Enable reliable and valid assessment of clinically useful causal factors.
- Provide precise estimates of recidivism risk.

TABLE 14.3 Factors, Measures, and Scales to Consider in Multimodal Risk Assessment

1. Historical: history of acting out in a violent manner, abusive or substance abusing father, problems with anger, substance abuse, residing in a disadvantaged neighborhood, *gender*, and *psychiatric diagnosis*
2. Clinical: openness and eagerness to participate, confabulation or exaggeration despite alternative evidence, grandiosity or callousness, self-report consistent with other sources of information
3. Actuarial and structured professional judgment tools: PCL-R, VRAG, COVR, Static-99R, Structured Risk Assessment: Forensic Version—Light, START, HCR-20
4. Self-report measures: MMPI-2 (Scales 4, 6, 8, 9 and *O-H*), PAI (AGG, DOM, VPI, ANT, BOR)
5. Performance measures:
 - a. Rorschach Aggression Indicators: AGC, *AGM (AG)*, *AGP*, AG Potential, MOR and MAP,
 - b. Rorschach Idiographic Assessment of Aggression:
 - Cognitive processing (Complexity, R, F%, Blends, Sy, M, MC, MC-PPD)
 - Thought disorder (EII-3, TP-Comp, WSumCog, SevCog, X-%, WD-%)
 - Distress or despair (m, Y, MOR, YTVIC', CritCont%)
 - Interpersonal relationship (SR, PHR/GPHR, M-, V-Comp, H, MAP, PER, r)

For the factors (*gender* and *psychiatric diagnosis*), self-report scales (MMPI-2 *O-H*), and Rorschach aggression indicators (*AGM (AG)*, *AGP*, MOR) appearing in italics, there is mixed supportive evidence based on specific characteristics or circumstance.

Source: Stanfill, M. L., O'Brien, S., & Viglione, D. J. (2013). Multimethod violence risk assessment. In C. J. Hopwood & R. F. Bornstein (Eds.), *Multimethod clinical assessment*. New York, NY: Guilford Press.

- Allow all relevant factors to be considered.
- Inform the development of treatment targets and risk management strategies.
- Allow the assessment of both long term and short-term changes in risk.
- Incorporate protective factors and risk factors.
- Facilitate engaging the patient/offender in the assessment process.
- Be easy to implement in a broad range of settings.

Specialized measures for dangerousness risk assessment

Using a multimethod approach to assessment offers the possibility of collecting data derived from multiple sources. The more cohesive the assessment process, the more potentially accurate the risk prediction of violence is. A comprehensive risk assessment should also incorporate the patient's history through a clinical interview. Historical variables that had a positive relationship with risk for future violence included previous violent acts, serious physical abuse during childhood, a violent father, a substance abuser or criminal; living at a disadvantaged neighborhood and having a history of intense and undercontrolled anger (Monahan et al., 2001). Clinical interviews are also critical for the completion of other measures commonly used in risk evaluations. Furthermore, Stanfill, O'Brien, and Viglione (2013) summarize the factors (Table 14.3), measures, and scales to consider in multimodal risk assessment in five broad categories.

GENERAL VIOLENCE

Violence Risk Assessment Guide

The Violence Risk Appraisal Guide (VRAG; Harris et al., 1993; Quinsey et al., 1998) is a 12-item actuarial risk assessment tool, developed using a sample of mentally disordered offenders. It has been validated for use in a wide variety of populations, such as sex offenders (Harris et al., 2003b; Langton et al., 2007), civil psychiatric patients (Harris, Rice, & Camilleri, 2004), mentally disordered (Gray, Fitzgerald, & Taylor, 2007), and non-North American offender samples (Doyle, Dolan, & McGovern, 2002; Urbaniok, Noll, Grunewald, Steinbach, & Endrass, 2006; Kroner, Stadtland, & Eidt, 2007). The ability of the VRAG to predict violent behavior among criminal and mentally disordered male inmates has been well-established (Glover, Nicholson, Bernfeld, & Quinsey, 2002; Kroner & Mills, 2001). The VRAG was developed exclusively on a sample of male offenders. In that study (Harris, Rice, & Cormier, 2002) it was found that the instrument failed to predict criminal violence among women. Harris et al. (2004) examined VRAG data on 423 male and 318 female civil psychiatric patients who participated in the MacArthur Violence Risk Assessment Project. A modified VRAG was employed in this study owing to a lack of information needed to score several VRAG items.

The VRAG is an actuarial instrument developed on a sample of 618 male offenders with mental disorders and subsequently convicted offenders assessed in a maximum-security psychiatric hospital in Ontario, Canada. The instrument was

shown to yield a high degree of accuracy [relative operating characteristic (ROC) area of .76] for the development sample in the prediction of a subsequent criminal act of violence over an average time at risk of 7 years. The ability of the VRAG to predict subsequent criminal violence among criminal offenders with mental disorders has been replicated in more than 25 studies in at least 5 different countries (see www.mhcop-research.com/ragreps for a complete list of replications).

The VRAG has been shown to predict future criminal violence over mean follow-up periods ranging from 15 months (Quinsey, Book, & Skilling, 2004) to 10 years (Rice & Harris, 1995) and in samples with base rates of violent recidivism ranging from 22% (Rice & Harris, 2002) to 57% (Rice & Harris, 1995). It has also been shown to predict time until the first violent reoffense and severity of violent offense (e.g., Harris et al., 2002, 2003b). In addition to violent recidivism, the VRAG has been shown to exhibit predictive validity for the outcomes of general criminal recidivism (Loza, Villeneuve, & Loza-Fanous, 2002; Nugent, 2001), institutional misconduct (Kroner & Mills, 2001; McBride, 1999), institutional violence (Nadeau, Nadeau, Smiley, & McHattie, 1999; Nichols, Vincent, Whittemore, & Ogloff, 1999), and sexual recidivism (Barbaree, Seto, Langton, & Peacock, 2001; Harris et al., 2003b). The predictive accuracy of the VRAG has been shown to be greater in studies in which there is little or no variance in follow-up time, scoring reliability is high, and no VRAG items are omitted or approximated (Harris & Rice, 2003). Under such optimal conditions, the predictive accuracy of the VRAG in predicting violent recidivism has been shown to exceed an ROC area of .85 (Dempster, Hart, & Boer, 2002; Pham, 2002).

Rice et al. (2013) in their study evaluated the accuracy of the VRAG in a sample of 1261 offenders, fewer than half of whom were participants in the development sample, then developed and validated a revised and easier-to-score instrument (the VRAG-R). They examined the accuracy of both instruments over fixed durations of opportunity ranging from 6 months to 49 years and examined outcome measures pertaining to the overall number, severity, and imminence of violent recidivism. Both instruments were found to predict dichotomous violent recidivism overall and at various fixed follow-ups with high levels of predictive accuracy (receiver operating characteristic areas of approximately .75) and to significantly predict other violent outcomes.

Structured Assessment of Protective Factors for Violence Risk

The design of the Structured Assessment of Protective Factors for violence risk (SAPROF; De Vogel, de Ruiter, Bouman, & de Vries Robbe, 2007) was intended to respond to clinicians as an SPJ (Douglas, 2009) checklist. It was intended as a positive dynamic addition to structured risk assessment in forensic clinical practice and is always used in combination with a SPJ risk evaluation instrument, like the HCR-20 (Webster et al., 1997). The instrument was developed based on literature on protective and contextual factors, qualitative research findings within forensic clinical treatment, and pilot studies among several Dutch forensic psychiatric institutions.

The SAPROF consists of 2 static and 15 dynamic protective factors organized within 3 scales according to their general background: the *Internal factors* (e.g., Coping, Self-control), the *Motivational factors* (e.g., Work, Attitudes toward authority), and the *External factors* (e.g., Social network, Professional care). Items are rated on a 3-point scale (0–2), reflecting the extent to which they are present as a protective factor for violence risk for a given patient in a specific situation. Additionally, factors can be indicated as particularly important for the individual in two ways. Factors that provide much protection at the time of assessment can be marked as *key factors*, whereas factors that are seen as potential targets for treatment intervention can be marked as *goal factors*.

Being mainly dynamic in nature, the SAPROF aims to not only assess protective factors, but to especially inform treatment of potential goals for interventions. By doing so, the SAPROF can offer valuable guidance in narrowing the gap between risk assessment and risk management. In 2007, the SAPROF was implemented into general risk assessment practice for violent and sexually violent offenders in the Van der Hoeven Kliniek, the Netherlands, to complement traditional risk assessment with the HCR-20 and SVR-20 (Boer et al., 1997).

The use of a positive instrument with a focus on the healthy aspects and strengths of a patient and his or her environment encourages positive communication between staff and patients and enhances treatment motivation in both patients and clinicians. Although the main objective of the SAPROF is violence prevention by informing risk management, validation studies to date have provided confirmation of the reliability and predictive validity of the SAPROF as an instrument for the structured assessment of protective factors. Retrospective validation studies in male violent and sexually violent patients showed that the SAPROF can be reliably coded and that both the SAPROF total score and the Final Protection Judgment have good predictive validity for the short-term to medium-term (1–3 years) prediction of nonrecidivism in violent offenses after discharge from treatment.

Initial studies have shown good predictive validities of the SAPROF factors for desistance from violence for short- to medium-term follow-up (1-year Area Under the Curve (AUC) = .85; 3-year AUC = .75), as well as for long-term follow-up (11-year AUC = .73) after discharge from clinical treatment for forensic psychiatric patients (De Vries Robbé, de Vogel,

& de Spa, 2011; De Vries Robbé, De Vogel, & Stam, 2012). In addition, evidence was found for its predictive validity for not committing inpatient violence (AUC = .85) and self-harm (AUC = .77) during treatment (Abidin et al., 2013) and for predicting discharge (AUC = .81) from forensic psychiatric treatment (Davoren et al., 2013). Equally good predictive validity results were found for patients with a history of violent offending as for patients with a history of sexual offending (De Vries Robbé, de Vogel, & Douglas, 2013). Moreover, when the SAPROF was combined with the HCR-20 incremental predictive validity was found for recidivism in violent offending after treatment.

A recent study (De Vries Robbé, de Vogel, Douglas, & Nijman, 2015) investigated the usefulness of the joint assessment of the HCR-20 and the SAPROF for measuring changes in dynamic risk and protective factors during treatment. The aim was to evaluate the predictive validity of treatment progress as measured by the tools (i.e., reductions in risk factors and improvements in protective factors) for treatment success. Treatment success was defined as no new convictions for violent offenses at short- and long-term follow-up after discharge from forensic psychiatric treatment. It was expected that participants who showed greater improvement in their risk and protective factor scores during treatment would show lower rates of violent recidivism after treatment. More specifically, it was hypothesized that dynamic risk factors and protective factors would change over time during treatment and that improvements on risk factors and protective factors would be negatively related to violent recidivism after treatment. The study demonstrated the sensitivity of the HCR-20 and the SAPROF to change and shows that improvements on dynamic risk and protective factors are associated with lower violent recidivism long after treatment.

The Classification of Violence Risk

The Classification of Violence Risk (COVR) was developed with the goal of offering clinicians an actuarial “tool” to assist in their predictive decision-making. The COVR is an interactive software program designed to estimate the risk that an acute psychiatric patient will be violent to others over the next several months after discharge from the hospital. Using a laptop or desktop computer, the COVR guides the evaluator through a brief chart review and a 5–10 min interview with the patient. After the requested information has been entered, the COVR generates a report that contains a statistically valid estimate of the patient’s violence risk, including the confidence interval for that estimate and a list of the risk factors that the COVR took into account to produce the estimate (Monahan et al., 2006, p. 721).

COVR enables researchers to assess individuals based on 40 risk factors (Webster et al., 1997). However, because of the nature of the iterative classification tree (ICT) method, the specific questions an individual is asked will depend on his answers to prior questions. As such, risk factors that may be used to assess risk in some individuals may not be used to assess risk in other individuals.

Although COVR may be suitable for the purposes of civil commitment hearings, it is not yet ready for use in the context of the criminal law. Until researchers establish that COVR’s impressive results with acute psychiatric inpatients generalize to criminal populations, its legal application will be limited. It seems that COVR’s success thus far serves as an illustrative example of the potential power and promise of actuarial models of violence risk assessment.

The Historical Clinical Risk Management-20—3rd Edition

The Historical Clinical Risk Management-20 (HCR-20) was developed to help structured decisions about violence risk. Since the first publication (1995) and second version (1997), it has become the world’s most widely used and best validated violence risk assessment instrument. It has been translated into 20 languages and adopted or evaluated in more than 35 countries. Version 3 was developed over the past 5 years on the basis of extensive clinical beta testing and empirical evaluation. Very recently the HCR-20 has been revised into the HCR-20 Version 3 (HCR-20^{V3}; Douglas et al., 2013). The revision of the HCR-20 offers additional possibilities for assessing changes during clinical treatment.

The HCR-20 contains 20 risk factors: 10 historical factors, 5 dynamic clinical factors, and 5 dynamic risk management factors. The dynamic factors aim to provide risk evaluations sensitive to personal and situational changes. Items are scored on a 3-point scale (0–2), with higher scores reflecting the presence of a risk factor. HCR-20 V3 contains extensive guidelines for the evaluation of not only the presence of 20 key violence risk factors, but also their relevance to the examinee at hand. It also contains information to help evaluators construct meaningful formulations of violence risk, future risk possibilities, appropriate risk-management plans, and informative communication of risk.

According to a recent survey by Singh (2013) of 2135 clinicians from 44 countries, the HCR-20 is the most widely used and studied dynamic SPJ risk assessment tool for the structured assessment of violence risk in clinical practice. Studies on the dynamic factors of the HCR-20 have shown good predictive validities for violence at short- and long-term follow-up and have demonstrated their usefulness for treatment guidance and evaluation of violence risk (Douglas, Blanchard, Guy,

Reeves, & Weir, 2010; Guy, Packer, & Warnken, 2012; O’Shea, Mitchell, Picchioni, & Dickens, 2013). However, few studies have investigated the relationship between *changes* in dynamic risk factors and treatment progress or reductions in violence risk. Several studies demonstrated a correspondence between lower dynamic risk scores and lower security levels (Müller-Isberner, Webster, & Gretenkord, 2007) and concluded that the clinical and risk management scales were a useful measure to estimate progress in forensic psychiatric inpatient treatment. Other studies demonstrated the changeability of the dynamic factors during treatment (Olsson, Strand, Kristiansen, Sjolting, & Asplund, 2013) and found associations between changes in clinical and risk management scores and short-term aggression (Douglas, Strand, & Belfrage, 2011; Michel et al., 2013).

Level of Service Inventory Revised

One of the most popular and widely used risk/needs assessments is the Level of Service Inventory instruments (LSI) (e.g., LSI-R, LSI-OR, LS/CMI). The various versions of the LSI are used in approximately 900 criminal justice agencies in North America (e.g., Lowenkamp, Lovins, & Latessa, 2009) with a variety of offender groups inside the institutions (e.g., Lowenkamp, Holsinger, & Latessa, 2001), as well as with offenders on community supervision (e.g., Raynor, 2007). The LSI instruments are founded on a General Personality and Cognitive Social Learning (GPCSL) theory of criminal behavior, which links criminal behavior to an individual’s assessment of the costs and benefits associated with prosocial versus pro-criminal alternatives. Based on this theory, when an individual perceives that the benefits of criminal behavior outweigh the costs (or outweigh the benefits of a prosocial alternative), this behavior is more likely to occur (Andrews & Bonta, 2010). This theory informs risk assessment as, when one conducts an assessment of risk, in essence, of evaluating the costs and benefits associated with the individual’s criminal behavior. For example, if an individual affiliates with peers who support criminal behavior, this individual will receive/perceive positive feedback for this type of behavior.

The LSI instruments are theoretically and practically structured according to the General Personality and Cognitive Social Learning (GPCSL) and the Central Eight risk/need factors. The first section of the LSI assessments, which is the general Level of Service Assessment, consists of 43 items (summed to generate the total risk score) and is organized into subscales that draw directly on to the Central Eight (Andrews, Bonta, & Wormith, 2004). The LSI instruments have consistently demonstrated acceptable psychometric properties (e.g., Bonta & Motiuk, 1992), as well as the prediction of both general and violent recidivism (e.g., Gendreau et al., 2002).

Although the GPCSL, and, therefore, the LSI, is presented as applicable to all offenders (as it intentionally pays little attention to race or gender), given its development using, primarily, male, Caucasian offenders, criticisms have been made concerning the racialized nature of the factors considered under this theory (e.g., Hannah-Moffat, 2013). Critics suggest that although factors typically included in risk assessment tools, such as the Central Eight, do not directly make reference to race. Therefore, the ability of the GPCSL and the LSI to account for and understand factors related to the criminal behavior of non-White offenders is often questioned (Hannah-Moffat & Maurutto, 2010; Martel, Brassard, & Jaccoud, 2011).

The Short-Term Assessment of Risk and Treatability

The Short-Term Assessment of Risk and Treatability (START) is one risk assessment tool that has attempted to “address the needs of mentally and personality disordered clients in a more complete fashion than has been attempted in other structured professional guidelines” (Webster, Martin, Brink, Nicholls, & Desmarais, 2009, p. 3). Raters are required to consider 20 dynamic items in terms of risk (termed *vulnerabilities*) and protective factors (termed *strengths*). The START authors define protective factors as “assets at the disposal of the individual (e.g., a supportive family), which become protective factors when the client makes use of them to reduce the risk” (Webster et al., 2006, p. 756). The START’s authors suggest that strengths and weaknesses can coexist in relation to each item (Webster et al., 2009). Reflecting this theoretical standpoint, each START item is scored separately in relation to both strengths and weaknesses on two unipolar 3-point scales, where 0 indicates no/minimal vulnerability or strength evident, 1 indicates moderate vulnerability/strength, and 2 indicates high vulnerability/strength. For example, a patient who abuses substances but is seeking treatment and recognizes the consequences of addiction would warrant rating on both the strength and the vulnerability scale for the “substance abuse” item (Webster et al., 2006).

The START also allows clinicians to identify any additional case-specific factors, critical vulnerabilities, key strengths, signature risk signs, and medical conditions an individual may hold. Finally, raters are required to make specific risk estimates (low, medium, or high) about the likelihood of each one of seven identified risk outcomes occurring: violence to others, self-harm, suicide, substance abuse, victimization, self-neglect, and unauthorized absence. There are few guidelines about how these estimates should be made, only that “reliance is placed not on the summed START

vulnerability or strength scores but on the overall impression after all factors have been considered and taken into account” (Webster et al., 2009, p. 32). A rating of low risk indicates no or minimal risk, moderate indicates greater than average risk, and high indicates a relatively imminent and serious threat. When an urgent decision is needed and there is insufficient time for a thorough review of the evidence, clinicians are advised to make a dichotomous decision about whether there are Threats of Harm that are Real, Enactable, Acute, and Targeted (THREAT). These risk estimates should be used to predict the likelihood of each outcome occurring over a maximum of 3 months. The START should then be repeated as it is intended as a measure of dynamic risk to predict short-term behaviors and report change through time (Webster et al., 2009).

Two-Tiered Violence Risk Estimates

The Two-Tiered Violence Risk Estimates Scale (TTV; Mills et al., 2011) was developed to address important issues within the field of risk assessment and to support an integrated-actuarial approach to risk assessment. The TTV enhances the process of assessment by including both actuarial risk indicators and dynamic risk management items within one measure. Items for the measure were chosen in a manner similar to the HCR-20, where (items were chosen based on their relevance in the literature) and items that were consistent across measures (Mills et al., 2011).

The TTV contains two subscales with a total of 23 items. The first section contains actuarial historical factors pertaining to violence risk. This section is referred to as the Actuarial Risk Estimate (ARE). It contains 10 historical risk factors that are statistically weighted according to empirical evidence: childhood antisocial behavior, adolescent antisocial behavior, age at first adult conviction, prior incarcerations, prior convictions for assaultive behavior, community supervision failure, history of alcohol abuse, failure to complete high school, criminal associations, and interpersonal difficulties. The second section of the TTV contains dynamic risk factors associated with managing risk, called the Risk Management Indicators (RMI). They were designed to be measured more than once to track changes on the different indicators. The items in the RMI address the risk management aspect of the integrated-actuarial model.

The RMI contains 13 dynamic risk factors: employment, financial, substance abuse, mental health, family instability, associates, attitudes, leisure, resistance to intervention, mood, social support, environment, and stressors. If an item is present and the offender has already received some form of intervention to address this risk factor, then this item would be scored as being present and requires monitoring. If the item is present, but there have been no intervention efforts or if it is extreme and intervention has not been effective, it is scored as present and requires intervention.

SEXUAL VIOLENCE

Sex Offender Risk Appraisal Guide

The Sexual Offender Risk Appraisal Guide (SORAG; Quinsey et al., 1998) is an actuarial risk assessment tool for sexual offenders and was developed by the Canadian forensic researcher Vernon L. Quinsey and his coworkers. This instrument is a modification of the *Violence Risk Appraisal Guide* (VRAG) that was developed to predict violent and sexual recidivism among male offenders; 10 of the 14 items of the SORAG are the same items as in the VRAG. The instrument consists of 14 weighted items. After scoring these, the evaluator adds up the item scores and gets the total score of the SORAG. Based on the total score the evaluator can allocate the offender to one of nine risk categories. By means of these risk categories it is possible to infer to empirically calculated probabilities of violent (including sexual) recidivism after 7 and 10 years, respectively.

Although the results of the predictive accuracy of the SORAG have been reasonably consistent across studies, Bartosh, Garby, Lewis, and Gray (2003) suggested that the predictive validity of the instrument varied depending on the type of sexual offender. According to these authors, the SORAG could significantly predict sexual, violent, and overall recidivism for extrafamilial child molesters (AUC values ranged from .70 to .93) and for incest offenders (AUC ranged from .72 to .91). With regard to rapists and hands-off offenders, however, the SORAG showed much lower predictive power (AUC ranged from .46 to .71). Ducro and Pham (2006), retrospectively, evaluated the predictive accuracy of the SORAG on Belgian sexual offenders committed to a forensic facility. For the total sample the instrument showed strong predictive validity for general (AUC = .70) and violent (AUC = .72) recidivism and moderate predictive validity for sexual recidivism (AUC = .64). Depending on offender subgroup and recidivism criterion the AUC values ranged from .64 to .77. The results of Bartosh et al. (2003) and Ducro and Pham (2006) support the evidence that the SORAG shows good predictive validity, whereas the results varied depending on sex offender type.

STATIC-99, Static-99R, Static-2002R

Static-99 (Hanson & Thornton, 2000) was designed to assess risk of sexual and violent recidivism in adult sex offenders presently or previously convicted of at least one sex offence. It was derived from the Structured Anchored Clinical Judgments-Minimum Criteria (SACJ-Min; Grubin, 1998) and the Rapid Risk Assessment for Sex Offence Recidivism (RRA-SOR; Hanson, 1997). These two instruments were combined to create Static-99 on the finding that the predictive power of the aggregate was superior to that of the original scales, respectively. Static-99 comprises 10 static items that cover prior offences, offender-victim relationship, sex of victim, and demographics (age and relationship history). The items are coded on the basis of information obtained from official criminal records. All items except one (number of prior sex offences) are rated 1 or 0 as a function of whether the item applies. The Static-99 score can range from 0 to 12. Risk is categorized according to the score as follows: low (0–1), moderate-low (2–3), moderate-high (4–5), and high (6 or more).

Though Static-99 is supposed to be fast and easy to use, interrater reliability on the instrument has varied. Indeed, whereas it has been very good in some studies (Bartosh et al., 2003; Hanson, 2005; Harris, Phenix, Hanson, & Thornton, 2003; Sjöstedt and Långström, 2001), it has proved weaker in others (Ducro & Pham, 2006). This situation might be explained by the fact that the information contained in criminal records, especially with regard to juvenile offences, is not always complete or unequivocal. Indeed, the psychometric qualities of this type of instrument depend on the quality of the information contained in records.

The predictive validity of Static-99 has varied also by sex offender type. Generally speaking, it has been shown to be good for general recidivism among sex offenders who victimize adults and among sex offenders who victimize minors (Ducro & Pham, 2006) and particularly among extrafamilial sex offenders who victimize minors (.72; Bartosh et al., 2003).

Static-99R (Hanson & Thornton, 2000; Helmus, Thornton, Hanson, & Babchishin, 2012) is an empirically derived actuarial risk assessment tool designed to predict sexual recidivism in adult male sex offenders. It has 10 items, and the total score (ranging from –3 to 12) can be used to place offenders in one of four risk categories: low (–3 to 1), moderate-low (2–3), moderate-high (4–5), and high (6+). The Static-99R items are identical to those of Static-99 with the exception of updated age weights.

Static-2002R. Similar to Static-99R, Static-2002R (Hanson & Thornton, 2003; Helmus et al., 2012) is an empirical actuarial risk assessment tool for adult male sex offenders. It consists of 14 items divided into 5 main subscales: age at release, persistence of sex offending, sexual deviance, relationship to victims, and general criminality. The total score can be used to place offenders in one of five risk categories: low (–2 to 2), low-moderate (3–4), moderate (5–6), moderate high (7–8), and high (9+). The items are identical to those of Static-2002 with the exception of updated age weights. Previous research found that Static-2002 was significantly more predictive of sexual, violent, and any recidivism than Static-99 (Hanson, Helmus, & Thornton, 2010). In contrast, Static-99R and Static-2002R have similar predictive accuracy (Babchishin, Hanson, & Helmus, 2011).

Sexual Violence Risk-20

The Sexual Violence Risk-20 (SVR-20; Boer et al., 1997) is one of the most commonly used SPJ instruments for risk assessment in sexual offenders. According to a survey conducted by Archer, Buffington-Vollum, Stredny, and Handel (2006) about the psychological test use patterns among forensic psychologists, the Static-99 (Hanson & Thornton, 2000) and the SVR-20 are the most widely used measures for risk assessment of adult male sexual offenders. The recently published safer society survey (McGrath, Cumming, Burchard, Zeoli, & Ellerby, 2010) about current practices in sexual-offender management in North America also confirmed this widespread use of the SVR-20 but likewise pointed out that the acceptance of the instrument depends on geographical regions. According to McGrath et al. (2010) the use of the SVR-20 seems to be more accepted in Canada than in the United States.

The SVR-20 was developed after a thorough search of the empirical literature and using the clinical and forensic expertise of a number of professionals (Boer et al., 1997). To identify relevant risk factors, three general principles were applied: the risk factor had to be (1) supported by scientific research, (2) consistent with theory and professional recommendations, and (3) legally acceptable, that is, consistent with human and civil rights (Hart & Boer, 2009). The SVR-20 consists of 20 items and three domains: *psychosocial adjustment* (11 items: sexual deviance, victim of child abuse, psychopathy, major mental illness, substance use problems, suicidal or homicidal ideation, relationship problems, employment problems, past nonsexual violent offenses, past nonviolent offenses, and past supervision failure), *sexual offenses* (7 items: high density sex offenses, multiple sex offense types, physical harm to victim[s] in sex offenses, use of weapons or threats of death in sex offenses, escalation in frequency or severity of sex offenses, extreme minimization or denial of sex offenses, and attitudes that support or condone sex offenses), and *future plans* (2 items: lack of realistic plans and negative attitude toward

interventions). During the final risk judgment, the individual offender is classified as having a *low*, *moderate*, or *high risk*, also indicating the priority of intervention needed (i.e., supervision and treatment).

There is little known about the psychometric properties of the SVR-20 (De Vogel, de Ruiter, van Beek, & Mead, 2004). However, current studies and reviews provide first indications for its reliability, its (predictive) accuracy, and its cross-cultural transferability (e.g., Hanson & Morton-Bourgon, 2009; Hart & Boer, 2009; Rettenberger, Hucker, Boer, & Eher, 2009). Hart and Boer (2009) identified eight independent international examinations in five different countries testing the interrater reliability of the SVR-20. Overall, the reliability of the SVR-20 has been regarded as very good. At least eight independent studies have been published proving the cross-cultural transferability and the predictive accuracy of the SVR-20 using commonly accepted effect sizes (e.g., Barbaree, Langton, Blanchard, & Boer, 2008; Pérez, Redondo, Martínez, García, & Andres, 2008; Rettenberger, Matthes, Boer, & Eher, 2010).

Nevertheless, some authors have criticized the current research status of the SVR-20 in particular, and other SPJ methods in general (e.g., Andrews & Bonta, 2006; Craig et al., 2008; Hart & Boer, 2009; Rettenberger et al., 2009, 2010). Hart and Boer (2009), for example, noted that researchers usually make risk ratings retrospectively on the basis of file information.

Although the SVR-20 could not be found to reach predictive accuracy for specific offender subtypes and recidivism criteria, it was found to yield a higher predictive accuracy for sexual recidivism in the extrafamilial child molester subsample than did the Rapid Risk Assessment for Sexual Offense Recidivism (RRASOR) (Hanson, 1997), the Static-99 (Hanson & Thornton, 2000), the Sex Offender Risk Appraisal Guide (SORAG) (Quinsey et al., 2006), and the Psychopathy Checklist-Revised (PCL-R) (Hare, 2003).

The Violence Risk Scale—Sexual Offender Version

The Violence Risk Scale (VRS-50; Wong, Olver, Nicholaichuk, & Gordon, 2003) was developed to assist service providers who work with high risk/high need sexual offenders to integrate risk assessment/prediction/management and treatment. The VRS-20 is also designed to measure the modified stages of change model, to measure the degree of risk change as a result of treatment. The theoretical framework of this measure rests on Andrews and Bonta (2010), Psychology of Criminal Conduct, the principles of effective correctional treatment, relapse prevention theory (e.g., Ward & Hudson, 1998) and the transtheoretical model of change (TTM; Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992).

The VRS-20 consists of 7 static and 17 dynamic variables and each variable is rated on a 4-point scale. Higher ratings indicate that the variable is more closely linked to inappropriate sexual or nonsexual behaviors. A factor analysis of the dynamic items led to the formation of three broad factors: Sexual Deviance, Criminality & Treatment Responsivity (Olver, Wong, Nicholaichuk, & Gordon, 2007). The factor structure of the instrument is consistent with the major risk factor domains identified in the literature: sexual deviance, antisociality, prooffense attitudes, and cognitions.

In a study by Canales, Olver, and Wong (2009) the Violence Risk Scale—Sexual Offender Version (VRS-SO) Sexual Deviance factor demonstrated stronger and significant prediction among the child-victim subgroup than in the aggregate group. Although the VRS-SO Sexual Deviance factor predicted better and demonstrated stronger convergent validity with deviance indexes in the child-victim subgroup than in the aggregated offender group, it is important to emphasize that the items loading on this factor were not written with child interests in mind.

In another study Olver et al. (2016) examined the psychometric properties of VRS-SO. Exploratory factor analysis (EFA) of 13 nonredundant Static-99R and VRS-SO static items generated three factors labeled, Youthful Aggression, Sexual Criminality, and General Criminality. The factor and total scores converged with Static-99R and VRS-SO dynamic factor scores. Scores on the VRS-SO static items, EFA-derived factors, and total score each significantly predicted 5- and 10-year sexual, violence, and general recidivism through ROC analyses. Cox regression survival analyses showed all three factors uniquely predicted sexual recidivism to varying degrees in the overall sample; however, only Youthful Aggression and General Criminality uniquely and significantly predicted violent and general recidivism in the overall sample and among sexual offender subgroups.

YOUTH VIOLENCE

Structured Assessment for Violence Risk in Youth

Violence is a serious social problem that is often encountered in the youth justice system. Identifying those adolescents who are at the highest risk for future violence is an important step toward effective rehabilitation. A newly developed

instrument, the Structured Assessment for Violence Risk in Youth (SAVRY; Borum et al., 2002) is specifically intended to assist in the assessment of violence risk in adolescents between the ages of 12 and 18. The SAVRY structure was modeled after the Historical Clinical Risk-20 (HCR-20; Webster et al., 1997), a tool that provides 20 historical, clinical, and risk-management variables empirically supported in the literature as correlates of violence. One item termed *psychopathy* was originally part of the measure but was changed to *low empathy and remorse*. The manual indicates that this was done to eliminate the need for specialized training to code this item and to make the SAVRY more user friendly.

The SAVRY is based on the SPJ model and contains 24 items drawn from the existing research on adolescent development and youth violence. The SAVRY risk items are grouped into three domains: Historical (10 items), Social/Contextual (6 items), and Individual/Clinical (8 items). The final SAVRY risk rating (low, moderate, or high) represents a structured judgment regarding the risk for future violence. Although the final risk ratings are not linked to specific scores or base rates in the population, empirical studies often find a linear relationship between the number of risk factors and violence risk (Borum et al., 2002). The SAVRY identifies dynamic and modifiable risk factors that can assist in intervention. By including dynamic risk factors, the detection of change with specific risk items and overall risk level is possible.

Meyers and Schmidt (2008) examined the predictive validity of the SAVRY, in a sample of 121 juvenile offenders. The SAVRY was found to have strong predictive validity, across gender and ethnicity. The SAVRY obtained ROC values of .75 and .66 for general and violent recidivism, respectively, for 1 year, and values of .76 and .77 for general and violent recidivism, respectively, for 3-year follow-up. For nonviolent recidivism, the ROC values were .80 for 1 year and .68 during 3 years.

PERSONALITY MEASURES

Broadband instruments, such as the MMPI-2 (Butcher, Graham, Tellegen, & Kaemmer, 1989) and the Personality Assessment Inventory (PAI; Morey, 2007), attempt to assess the frequency, depth, breadth, and the severity of psychiatric problems or behaviors (Stanfill, O'Brien, & Viglione, 2014). Although these measures are not specifically designed to identify who is at risk to become violent, personality assessment tools provide personality that help in the planning of intervention and in the evaluation of treatment progress. One advantage of such tools, is their ability to assess response styles or response bias—that is, how sincere and direct is the individual or whether responses have been influenced by other factors, such as positive or negative impression management poor concentration. Broadband instruments can contribute to a nomothetic understanding of dangerousness and self-harm as they provide information about constructs that have been shown to be associated to dangerousness and self-harm. One such variable is sustained and persistent mental illness. Some research has shown a link between mental illness and violence (e.g., Harris & Lurigio, 2007; Monahan, 1993). Such types of disorder commonly include Antisocial Personality Disorder or psychopathy. Extensive examinations of the clinical practice that emerges from the profile, experts can distinguish the extent to which personality factors affect an individual's risk for dangerousness or self-harm. Moreover, personality inventories tap personality constructs found to be associated with risk violence, such as aggressiveness, impulsivity, antisocial attitudes, negative self-concept, anxiety, introversion, and so forth.

Despite the lengthy and extensive history of research associated with the MMPI and, the MMPI-2, little has been done linking MMPI-2 scales with aggression, violence, or dangerousness risk (e.g., Heilbrun & Heilbrun, 1995). Some evidence was presented suggesting that the Anger Content scale and a composite of Scales F, 4, and 9, might be correlated with aggressive tendencies, although the predictive value was slight (O'Laughlin & Schill, 1994). Verona and Carbonell (2000) found the Overcontrolled Hostility scale useful in discriminating women offenders categorized as violent on a single occasion from those who showed repeated violence or no violence.

Personality Assessment Inventory

The PAI (Morey, 1991, 2007) has become increasingly popular in risk-assessment evaluations. In addition to validity scales, clinical scales (and their corresponding subscales, treatment consideration scales, and interpersonal scales) the PAI includes other scales of forensic utility to assess potential malingering, as well as scales to assess risk of both dangerousness and self-harm. For example, the Suicide Potential Index (SPI) was developed to include common features that have been linked to suicide. The PAI consists of 344 items that comprise .22 nonoverlapping scales and multiple configural indicators. The PAI includes several scales that are conceptually relevant to risk assessment. The Antisocial Feature (ANT) scale was designed to measure psychopathic and antisocial personality traits and is comprised of three subscales: Egocentricity (ANT-E), Antisocial Behaviors (ANT-A) and Stimulus Seeking (ANT-S).

The Aggression (AGG) scale provides an assessment of “attitudinal and behavioral features relevant to aggression, anger and hostility” (Morey, 2007, p. 44). Researchers have found that scores on AGG are predictive of postrelease recidivism (e.g., Boccaccini, Murrie, Hawes, Simpler, & Johnson, 2010) and institutional misconduct (e.g., Newberry & Shuker, 2012). Although extensive PAI research has focused on ANT and AGG the Violent Potential Index (VPI) scale is also associated to risk assessment. The AGG is also comprised of three subscales: Aggressive Attitude (AGG-A), Verbal Aggression (AGG-V) and Physical Aggression (AGG-P). The Suicide (SPI) and Violence (VPI) Potential Indices were developed by identifying the 20 features of the PAI profile that were found to be most associated with suicide and violence risk, respectively. Research has supported the validity and psychometric status of these indices (Hopwood, Baker, & Morey, 2008; Sinclair et al., 2012).

A recent metaanalysis of the PAI cited 17 studies relating the PAI to the prediction of institutional violence and misconduct and 21 studies examining violent behavior (Gardner, Boccaccini, Bitting, & Edens, 2015). That review provided evidence for the predictive validity of multiple PAI scales and subscales. In particular, scores on the ANT and AGG consistently emerged as small to moderate predictors of misconduct ($d = .26-.39$, $d = .23-.40$, respectively). Larger effects were noted for correctional overtreatment settings. Findings from the metaanalysis revealed that the ANT and AGG scores were the most consistent and robust predictors of all types of institutional disciplinary infractions and, to a lesser extent, criminal recidivism. In one of the most comprehensive studies of the PAI in the correctional setting conducted to date, Hahn (2007) tested the predictive validity of PAI scores among 14,671 general population inmates in a state correctional system. Results from his study indicated moderate relationships between physically aggressive misconduct and the PAI content-relevant ANT, AGG, dominance (DOM), and VPI scales.

Reidy, Sorensen, and Davidson (2016) further demonstrate that the PAI has a distinct advantage over similar measures (e.g., MMPI-2) and structured risk appraisal methods (e.g., Historical, Clinical, Rehabilitation-20, PCL-R) that metaanalyses have shown to be poorly predictive of prison violence (Gendreau, Goggin, & Law, 1997; Guy et al., 2005). However, one should be cautious when interpreting the utility of PAI scales based on improvement in fit based on AUCs because this form of analysis is not dependent on base rates (Mossman, 1994). Yet, base rates vary with the severity of the infraction being predicted. The more severe the violence predicted, the lower the base rate (Cunningham & Reidy, 1999; Cunningham, Reidy, & Sorensen, 2008; Edens, Buffington-Vollum, Keilen, Roskamp, & Anthony, 2005; Sorensen & Cunningham, 2007). As the base rate decreases, the ability to predict behavior decreases, and the probability of false positives increases for any given PAI scale.

A growing body of research has addressed the utility of PAI clinical and treatment scales in forensic and correctional populations. However, most studies include small samples from distinct offender groups (e.g., sex offenders, mentally ill offenders, psychiatric inpatient offenders). The few studies addressing general population inmates typically consist of relatively small samples, with the exception of that of Hahn (2007). In this study, this deficiency was addressed by investigating the largest sample of incarcerated offenders to have completed the PAI as part of prison classification. Additionally, use of such a large sample of general population prison inmates permits broader generalizability of the PAI to this population. A lengthy follow-up period averaging 2.2 years over an 8-year time span enhanced the time at risk, thereby creating more opportunity for infractions to occur.

The findings compare quite favorably with those of Edens and Ruiz (2006, 2009), showing that the PAI can make a substantial contribution to institutional risk assessments and security classification. The metaanalysis by Gardner et al. (2015) provides strong support for the application of PAI scores in correctional settings to identify inmates at higher relative risk for institutional misconduct. Findings from the current study also support the use of the PAI as a tool to aid in decision making about the relative probability of violence.

The Rorschach performance assessment system in risk assessment

At least seven metaanalyses support the validity of the Rorschach (Atkinson, Quarrington, Alp, & Cyr, 1986; Bornstein, 1996, 1999; Diener, Hilsenroth, Shaffer, & Sexton, 2011; Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neuleib, 1999; Mihura, Meyer, Dumitrascu, & Bombel, 2013; Parker, Hanson, & Hunsley, 1998). A key finding of these metaanalyses is that many Rorschach variables have been found valid in evidence-based studies of validity (Meyer & Kurtz, 2006; Weiner & Greene, 2008; Viglione & Rivera, 2013).

Mihura et al. (2013) in their recent metaanalysis combine 95 individual metaanalyses of peer-reviewed empirical validity on Comprehensive System (CS) variables (Exner, 2003). Specifically, these scholars found that the mean validity coefficient was $v = .27$ for externally assessed characteristics but only $r = .08$ for self-report scales and structured interview data. The variables with the strongest support were commonly those that assess cognitive abilities, or through perceptual problems and psychotic symptoms.

To apply the Rorschach in the evaluation of dangerousness, two approaches are commonly used. One involves the direct observation of aggressive references as indicative of aggressive preoccupation or risk. The second approach involves a more idiographic or individualized approach whereby one evaluates the recurrence of evidence of psychological processes or features associated with earlier violence to evaluate the possibilities of future violence occurrence (Stanfill et al., 2014).

Rorschach Aggression Indicators

Over the years, many overlapping schemes have appeared with regard to the scoring of aggression in Rorschach responses (e.g., Exner, 2003; Gacono & Meloy, 1994). Currently, there are available aggression scores in both the R-PAS and the CS, such as Aggressive Movement (AGM, AG in CS), Aggression Content (AGC, not in CS, from Gacono & Meloy, 1994) and Mutuality of Autonomy Pathology (MAP, not in CS, from Urist, 1977).

Endorsing the most severe scores in Urist's Mutuality of Autonomy (MAP) involves a reference to a controlling, malevolent, hostile, or destructive relationship or interaction (Stanfill et al., 2014). Some individuals express an enjoyment in destruction or violence that is assessed as a Morbid response (MOR). Both psychodynamic and cognitive-behavioral theories suggest that aggressive tendencies are associated with aggressive perceptions. Aggressive perceptions on the Rorschach are likely to be manifested as aggressive cognitions. The results of this metaanalytic study, however, indicate that Rorschach aggressive responses should be combined with findings from other measures in the assessment of dangerousness.

Idiographic Assessment of Dangerousness

In this approach, the clinician evaluates the recurrence of evidence of psychological process or feature associated with previous violence and estimates the possibilities of future violence. Accordingly, one would speculate about poor judgment and impulsivity, simplicity, limited processing ability, rigid black and white thinking, and immaturity among the engagement and cognitive processing variables predictive of violence risk. Such a limitation may be expressed as low Complexity (not in CS), the number of responses (R), Form Percentage (F%, Lambda in CS), multiple determinant responses (Blends), synthesized responses (Sy, DQ+ and Dv/+ in CS), human movement (M), total of human movement and weighted sum of color (MC, EA in CS), and difference between MC and potentially problematic determinants (MC-PPD, D-score in CS), as well as more color-dominant versus form-dominant color responses (i.e., CF + C greater than SumC, FC less than CF + C in CS).

To evaluate the current violent risk of an individual whose violence is defined by psychotic episodes, one would examine the perception and thinking problems domain for psychotic, thought disorder, or judgment disturbance indicators, expressed as high scores on the Ego Impairment Index (EII-3, not in CS); Thought and Perception-Composite (TP-Comp, Perception and Thought Index, CS); Weighted Sum of Cognitive Codes (WSumCog, WSum6 in CS); Severe Cognitive Codes (SevCog, Lvl 2 in CS); proportion of distorted responses (FQ%, X-% in CS); proportion of distorted whole and common detail responses (WD%, WDA% in CS); and low scores in FQo% and P. Distress and despair, or "emotional collapse," may provoke aggressive acts for some individuals. Thus, in those with such a history, elevated stress and distress variables [inanimate movement (m), diffuse shading (Y), morbid content (MOR), shading and achromatic color (YTVC', sh in CS), and crude and problematic contents (CritCont%, not in CS)] might stimulate aggression. Alternatively, an extreme elevation on the Suicide Concern Scale (SC-Comp, Suicide Constellation in CS), might suggest danger to the self.

Pathways to violence may also be associated with interpersonal relations and self-concept in the form of extreme dependency; conflicted, disturbed, or paranoid interpersonal relatedness; callous or narcissistic inclinations; skillful exploitation of others; or, conversely, misunderstanding of self and other (Gacono, Gacono, Meloy, & Baity, 2008; Meloy & Gacono, 1992). To some degree all these are accessible among Rorschach self- and other-representation variables [Space Reversal (SR, not in CS), Good to Poor Human Representations (PHR/GPHR, HRV in CS), distorted human movement responses (M-), Vigilance Composite (V-Comp, Hypervigilance Index in CS) whole realistic human content (H), and cooperative movement (COP)], as well as the aggression variables discussed earlier, particularly MAP and Mutuality of Autonomy Health (MAH, not in CS) interpreted in terms of relational themes (Bombel, Mihura, & Meyer, 2009; Graceffo, Mihura, & Meyer, 2014). In addition, self-concept and interpersonal imagery is expressed qualitatively in the verbatim test record and interaction with the examiner. Relevant to interpersonal problems and violence is research support (Wood et al., 2010) for elevations with elevated Personal Knowledge Justification responses (PER) and low Texture responses, as well as for reflections (*r*; Mihura et al., 2013) and narcissistic content in the form of idealization and devaluation (Hilsenroth, Fowler, Padawer, & Handler, 1997).

SUMMARY

With the expansion of aggression and violence, the salient role of violence prediction is indisputable. The present chapter examines the recent developments in the field by overviewing the various approaches to the study or risk assessment, and places special emphasis in presenting advances in the study of accuracy of violence in risk assessment. Following the theoretical framework of violence risk assessment, we present a list of measures that assess the prediction of violence. The measures are classified into specialized measures for dangerousness risk assessment and personality measures.

REFERENCES

- Abidin, Z., Davoren, M., Naughton, L., Gibbons, O., Nulty, A., & Kennedy, H. G. (2013). Susceptibility (risk and protective) factors for in-patient violence and self-harm: prospective study of structured professional judgement instruments START and SAPROF, DUNDRUM-3 and DUNDRUM-4 in forensic mental health services. *BMC Psychiatry*, 27(13), 197.
- Aharoni, E., Vincent, G. M., Harenski, C. L., Calhoun, V. D., Sinnott-Armstrong, W., Gazzaniga, M. S., & Kiehl, K. A. (2013). Neuroprediction of future rearrest. *Proceedings of the National Academy of Sciences of the United States of America*, 110(15), 6223–6228.
- Altman, D. G., & Bland, J. M. (1994a). Diagnostic tests 1: sensitivity and specificity. *British Medical Journal*, 308(6943), 1552.
- Altman, D. G., & Bland, J. M. (1994b). Diagnostic tests 2: predictive values. *British Medical Journal*, 309(6947), 102.
- Andrews, D. A., & Bonta, J. (1995). *Level of Service Inventory-Revised*. Toronto, Canada: Multi-Health Systems.
- Andrews, D. A., & Bonta, J. (1998). *The psychology of criminal conduct* (2nd ed.). Cincinnati, OH: Anderson Publishing.
- Andrews, D. A., & Bonta, J. (2006). *The psychology of criminal conduct* (4th ed.). Newark, NJ: Anderson Publishing.
- Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5th ed.). Newark, NJ: LexisNexis.
- Andrews, D., Bonta, J., & Wormith, J. S. (2004). *Level of Service/Case Management Inventory (LS/CMI): An offender assessment system*. Toronto, Canada: Multi-Health Systems.
- Andrews, D. A., Bonta, J., & Wormith, J. S. (2006). The recent past and near future of risk and/or need assessment. *Crime & Delinquency*, 52(1), 7–27.
- Andrews, D. A., Bonta, J., & Wormith, J. S. (2008). *The Level of Service/Risk, Need, Responsivity (LS/RNR): User's manual*. Toronto, Canada: Multi-Health Systems.
- Andrews, D. A., & Wormith, J. S. (1984). *The criminal sentiments scale*. Ottawa, Canada: Ministry of Correctional Services of Canada.
- Archer, R. P., Buffington-Vollum, J. K., Stredny, R. V., & Handel, R. W. (2006). A survey of psychological test use patterns among forensic psychologists. *Journal of Personality Assessment*, 87(1), 84–94.
- Atkinson, L., Quarrington, B., Alp, I. E., & Cyr, J. J. (1986). Rorschach validity: an empirical approach to the literature. *Journal of Clinical Psychology*, 42(2), 360–362.
- Babchishin, K. M., Hanson, R. K., & Helmus, L. (2011). *The RRASOR, Static-99R and Static-2002R all add incrementally to the prediction of recidivism among sex offenders (Corrections Research: User Report 2011-02)*. Ottawa, Canada: Public Safety Canada.
- Baird, S. C., Heinz, R. C., & Bemus, B. J. (1979). *Project report no. 4: A two year follow-up*. Madison, WI: Bureau of Community Corrections.
- Barbaree, H. E., Langton, C. M., Blanchard, R., & Boer, D. P. (2008). Predicting recidivism in sex offenders using the SVR-20: the contribution of age-at-release. *International Journal of Forensic Mental Health*, 7(1), 47–64.
- Barbaree, H. E., Seto, M. C., Langton, C. M., & Peacock, E. J. (2001). Evaluating the predictive accuracy of six risk assessment instruments for adult sex offenders. *Criminal Justice and Behaviour*, 28(4), 490–521.
- Bartosh, D. L., Garby, T., Lewis, D., & Gray, S. (2003). Differences in the predictive validity of actuarial risk assessments in relation to sex offender type. *International Journal of Offender Therapy and Comparative Criminology*, 47(4), 422–438.
- Blackburn, R. (2000). Risk assessment and prediction. In J. McGuire, T. Mason, & A. O'Kane (Eds.), *Behavior, crime and legal processes: A guide for legal practitioners* (pp. 178–204). Chichester, UK: Wiley.
- Blair, P. R., Marcus, D. K., & Boccaccini, M. T. (2008). Is there an allegiance effect for assessment instruments? Actuarial risk assessment as an exemplar. *Clinical Psychology: Science and Practice*, 15(4), 346–360.
- Boccaccini, M. T., Murrie, D. C., Hawes, S. W., Simpler, A., & Johnson, J. (2010). Predicting recidivism with the Personality Assessment Inventory in a sample of sex offenders screened for civil commitment as sexually violent predators. *Psychological Assessment*, 22(1), 142–148.
- Boer, D. P., Hart, S. D., Kropp, P. R., & Webster, C. D. (1997). *Manual for the Sexual Violence Risk-20: Professional guidelines for assessing risk of sexual violence*. Lutz, FL: Psychological Assessment Resources.
- Bombel, G., Mihura, J. L., & Meyer, G. J. (2009). An examination of the construct validity of the Rorschach Mutuality of Autonomy (MOA) Scale. *Journal of Personality Assessment*, 91(3), 227–237.
- Bonta, J. (2002). Offender risk assessment: Guidelines for selection and use. *Criminal Justice and Behavior*, 29(4), 355–379.
- Bonta, J., & Andrews, D. A. (2007). *Risk-Need-Responsivity model for offender assessment and rehabilitation*. Ottawa, Canada: Public Safety Canada.
- Bonta, J., Harman, W. G., Han, R. G., & Cormier, R. B. (1996). The prediction of recidivism among federally sentenced offenders: a re-validation of the SIR scale. *Canadian Journal of Criminology*, 38(1), 61–79.
- Bonta, J., & Motiuk, L. L. (1992). Inmate classification. *Journal of Criminal Justice*, 20(4), 343–353.
- Bonta, J., & Wormith, J. S. (2013). Applying the Risk–Need–Responsivity principles to offender assessment. In L. A. Craig, L. Dixon, & T. A. Gannon (Eds.), *What works in offender rehabilitation: An evidence-based approach to assessment and treatment* (pp. 69–93). Chichester, UK: Wiley.
- Bornstein, R. F. (1996). Construct validity of the Rorschach Oral Dependency Scale: 1967–1995. *Psychological Assessment*, 8(2), 200–205.

- Bornstein, R. F. (1999). Criterion validity of objective and projective dependency tests: a meta-analytic assessment of behavioural prediction. *Psychological Assessment, 11*(1), 48–57.
- Borowsky, I. W., Ireland, M., & Resnick, M. D. (2002). Violence risk and protective factors among youth held back in school. *Ambulatory Pediatrics, 2*(6), 475–484.
- Borum, R., Bartel, P., & Forth, A. (2002). *Manual for the Structured Assessment of Violence Risk in Youth (SAVRY), consultation edition, version 1*. Tampa, FL: University of South Florida.
- Braff, R., Sneddon, C. (2007). Family Law Act reform: the potential for screening and risk assessment for family violence. Australian Domestic and Family Violence Clearinghouse, Issues Paper 12, pp. 1–36
- Brundtland, G. H. (2002). Reducing risks to health, promoting healthy life. *JAMA, 288*(16), 1974–1974.
- Butcher, J. N., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *Manual for the restandardized Minnesota Multiphasic Personality Inventory: MMPI-2*. Minneapolis, MN: University of Minnesota Press.
- Caldwell, C. H., Kohn-Wood, L. P., Schmeelk-Cone, K. H., Chavous, T. M., & Zimmerman, M. A. (2004). Racial discrimination and racial identity as risk or protective factors for violent behaviors in African American young adults. *American Journal of Community Psychology, 33*(1–2), 91–105.
- Campbell, M. A., French, S., & Gendreau, P. (2009). The prediction of violence in adult offenders: a meta-analytic comparison of instruments and methods of assessment. *Criminal Justice and Behavior, 36*(6), 567–590.
- Canales, D. D., Olver, M. E., & Wong, S. C. (2009). Construct validity of the Violence Risk Scale-Sexual Offender Version for measuring sexual deviance. *Sexual Abuse: A Journal of Research and Treatment, 21*(4), 474–492.
- Caspi, A., Moffitt, T. E., Silva, P. A., Stouthamer-Loeber, M. S., Krueger, R. F., & Schmutte, P. S. (1994). Are some people crime-prone? Replications of the personality-crime relationship across countries, genders, races, and methods. *Criminology, 32*(2), 163–195.
- Coid, J. W., Ullrich, S., & Kallis, C. (2013). Predicting future violence among individuals with psychopathy. *British Journal of Psychiatry, 203*(5), 387–388.
- Coid, J., Yang, M., Ullrich, S., Zhang, T., Sizmur, S., Farrington, D., & Rogers, R. (2010). Most items in structured risk assessment do not predict violence. *Journal of Forensic Psychiatry and Psychology, 22*(1), 3–21.
- Constantinou, A. C., Freestone, M., Marsh, W., Fenton, N., & Coid, J. W. (2015). Risk assessment and risk management of violent reoffending among prisoners. *Expert Systems with Applications, 42*(21), 7511–7529.
- Cooke, D. J., & Michie, C. (2010). Limitations of diagnostic precision and predictive utility in the individual case: a challenge for forensic practice. *Law and Human Behavior, 34*(4), 259–274.
- Copas, J., & Marshall, P. (1998). The offender group reconviction scale: a statistical reconviction score for use by probation officers. *Journal of the Royal Statistical Society, Applied Statistics, Series C, 47*(1), 159–171.
- Craig, L. A., Browne, K. D., & Beech, A. R. (2008). *Assessing risk in sex offenders: A practitioner's guide*. Chichester, UK: Wiley.
- Cunningham, M. D., & Reidy, T. J. (1999). Don't confuse me with the facts: common errors in violence risk assessment at capital sentencing. *Criminal Justice and Behaviour, 26*(1), 20–43.
- Cunningham, M. D., Reidy, T. J., & Sorensen, J. R. (2008). Assertions of “future dangerousness” at federal capital sentencing: rates and correlates of subsequent prison misconduct and violence. *Law and Human Behaviour, 32*(1), 46–63.
- Davoren, M., Abidin, Z., Naughton, L., Gibbons, O., Nulty, A., Wright, B., & Kennedy, H. G. (2013). Prospective study of factors influencing conditional discharge from a forensic hospital: the DUNDRUM-3 programme completion and DUNDRUM-4 recovery structured professional judgement instruments and risk. *BMC Psychiatry, 13*, 185.
- De Vogel, V., de Ruiter, C., Bouman, Y., & de Vries Robbé, M. (2007). *Handleiding bij de SAPROF: Structured assessment of protective factors for violence risk*. Utrecht, The Netherlands: Forum Educatief, Versie 1.
- De Vogel, V., de Ruiter, C., van Beek, D., & Mead, G. (2004). Predictive validity of the SVR-20 and Static-99 in a Dutch sample of treated sex offenders. *Law and Human Behaviour, 28*(3), 235–251.
- De Vries Robbé, M., de Vogel, V., & de Spa, E. (2011). Protective factors for violence risk in forensic psychiatric patients. A retrospective validation study of the SAPROF. *International Journal of Forensic Mental Health, 10*(3), 178–186.
- De Vries Robbé, M., De Vogel, V., & Douglas, K. S. (2013). Risk factors and protective factors: a two-sided dynamic approach to violence risk assessment. *Journal of Forensic Psychiatry and Psychology, 24*(4), 440–457.
- De Vries Robbé, M., de Vogel, V., Douglas, K. S., & Nijman, H. L. I. (2015). Changes in dynamic risk and protective factors for violence during inpatient forensic psychiatric treatment: predicting reductions in post-discharge community recidivism. *Law and Human Behaviour, 39*(1), 53–61.
- De Vries Robbé, M., de Vogel, V., & Stam, J. (2012). Protective factors for violence risk: the value for clinical practice. *Scientific Research, 3*(12a), 1259–1263.
- Dempster, R. J., Hart, S. D., & Boer, D. P. (2002). Prediction of sexually violent recidivism: a comparison of risk assessment instruments. Unpublished manuscript.
- Desmarais, S. L., Johnson, K. L., & Singh, J. P. (2016). Performance of recidivism risk assessment instruments in U.S. correctional settings. *Psychological Services, 13*(3), 206–222.
- Diener, M. J., Hilsenroth, M. J., Shaffer, S. A., & Sexton, J. A. (2011). A meta-analysis of the relationship between the Rorschach Ego Impairment Index (EII) and psychiatric severity. *Clinical Psychology & Psychotherapy, 18*(6), 464–485.
- Digman, J. M. (1990). Personality structure: emergence of the five-factor model. *Annual Review of Psychology, 41*, 417–440.
- Douglas, K. S. (2009). Expert opinion. Assessing risk for violence using structured professional judgment. *American Psychology-Law Society News, 29*(1), 12–15.

- Douglas, K. S., Blanchard, A. J. E., Guy, L. S., Reeves, K. A., Weir, J. (2010). HCR-20 violence risk assessment scheme: overview and annotated bibliography. Available from: <http://kdouglas.files.wordpress.com/2007/10/hcr-20-annotated-biblio-sept-2010.pdf>
- Douglas, K. S., Hart, S. D., Webster, C. D., & Belfrage, H. (2013). *HCR-20V3: Assessing risk for violence—User guide*. Burnaby, Canada: Mental Health, Law and Policy Institute, Simon Fraser University.
- Douglas, K. S., Ogloff, J. R. P., & Hart, S. D. (2003). Evaluation of a model of violence risk assessment among forensic psychiatric patients. *Psychiatric Services, 54*(10), 1372–1379.
- Douglas, K. S., Ogloff, J. R. P., Nicholls, T. L., & Grant, I. (1999). Assessing risk for violence among psychiatric patients: the HCR-20 violence risk assessment scheme and the Psychopathy Checklist: Screening Version. *Journal of Consulting and Clinical Psychology, 67*(6), 917–930.
- Douglas, K. S., Strand, S., Belfrage, H. (2011). Dynamic risk: evaluation of the nature and predictive validity of change on the clinical and risk management scales of the HCR-20 Violence Risk Assessment Scheme. In *11th conference of the international association of forensic mental health services*, Barcelona, Spain
- Douglas, K. S., Yeomans, M., & Boer, D. P. (2005). Comparative validity analysis of multiple measures of violence risk in a sample of criminal offenders. *Criminal Justice and Behavior, 32*(5), 479–510.
- Dowden, C., & Andrews, D. A. (1999a). What works for female offenders: a meta-analytic review. *Crime & Delinquency, 45*(4), 438–452.
- Dowden, C., & Andrews, D. A. (1999b). What works in young offender treatment: a meta-analysis. *Forum on Corrections Research, 11*(2), 21–24.
- Doyle, M., Dolan, M., & McGovern, J. (2002). The validity of North American risk assessment tools in predicting in-patient violent behaviour in England. *Legal and Criminological Psychology, 7*(2), 141–154.
- Ducro, C., & Pham, T. (2006). Evaluation of the SORAG and the Static-99 on Belgian sex offenders committed to a forensic facility. *Sexual Abuse: A Journal of Research and Treatment, 18*(1), 15–26.
- Edens, J., Buffington-Vollum, J., Keilen, A., Roskamp, P., & Anthony, C. (2005). Predictions of future dangerousness in capital murder trials: is it time to “disinvent the wheel?”. *Law and Human Behaviour, 29*(1), 55–86.
- Edens, J. F., Poythress, N. G., & Lilienfeld, S. O. (1999). Identifying inmates at risk for disciplinary infractions: a comparison of two measures of psychopathy. *Behavioral Sciences and the Law, 17*(4), 435–443.
- Edens, J. F., & Ruiz, M. A. (2006). On the validity of validity scales: the importance of defensive responding in the prediction of institutional misconduct. *Psychological Assessment, 18*(2), 220–224.
- Edens, J. F., & Ruiz, M. A. (2009). Predicting institutional aggression by defensive prison inmates: an examination of the Personality Assessment Inventory treatment consideration scales. *International Journal of Forensic Mental Health, 8*(3), 178–185.
- Edens, J. F., Skeem, J. L., & Douglas, K. S. (2006). Incremental validity analyses of the violence risk appraisal guide and the psychopathy checklist: screening version in a civil psychiatric sample. *Assessment, 13*(3), 368–374.
- Elbogen, E. B., & Johnson, S. C. (2009). The intricate link between violence and mental disorder: results from the national epidemiologic survey on alcohol and related conditions. *Archives of General Psychiatry, 66*(2), 152–161.
- Exner, J. (2003). *The Rorschach: A comprehensive system: Vol. 1. Basic foundations* (4th ed.). Hoboken, NJ: Wiley.
- Farrar-Owens, M. (2013). The evolution of sentencing guidelines in Virginia: an example of the importance of standardized and automated felony sentencing data. *Federal Sentencing Reporter, 25*(3), 168–170.
- Farrington, D. P., & Loeber, R. (2013). Establishing causes of offending. In G. J. N. Bruinsma, & D. Weisburd (Eds.), *Encyclopedia of criminology and criminal justice*. New York, NY: Springer.
- Farrington, D. P., Loeber, R., & Ttofi, M. M. (2012). Risk and protective factors for offending. In B. C. Welsh, & D. P. Farrington (Eds.), *The Oxford handbook of crime prevention* (pp. 46–69). New York, NY: Oxford University Press.
- Fazel, S., Lichtenstein, P., Grann, M., Goodwin, G. M., & Långström, N. (2010). Bipolar disorder and violent crime: new evidence from population-based longitudinal studies and systematic review. *Archives of General Psychiatry, 67*(9), 931–938.
- Fazel, S., Singh, J. P., Doll, H., & Grann, M. (2012). The prediction of violence and antisocial behaviour: a systematic review and meta-analysis of the utility of risk assessment instruments in 73 samples involving 24,827 individuals. *British Medical Journal, 345*, e4692.
- Fenton, N. E., & Neil, M. (2012). *Risk assessment and decision analysis with Bayesian networks*. London, UK: CRC Press.
- Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: a framework for understanding healthy development in the face of risk. *Annual Review of Public Health, 26*, 399–419.
- Ferguson, C. J. (2009). An effect size primer: a guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*(5), 532–538.
- Gacono, C. B., Gacono, L. A., Meloy, J. R., & Baity, M. R. (2008). The Rorschach assessment of aggression: the Rorschach Extended Aggression Scores. In C. B. Gacono, & F. B. Evans (Eds.), *Forensic Rorschach assessment* (pp. 543–559). New York, NY: Routledge.
- Gacono, C. B., & Meloy, J. R. (1994). *The Rorschach assessment of aggressive and psychopathic personalities*. Hillsdale, NJ: Erlbaum.
- Gardner, B. O., Boccaccini, M. T., Bitting, B. S., & Edens, J. F. (2015). Personality assessment inventory scores as predictors of misconduct, recidivism, and violence: a meta-analytic review. *Psychological Assessment, 27*(2), 534–544.
- Gendreau, P., Goggin, C. E., & Law, M. A. (1997). Predicting prison misconducts. *Criminal Justice and Behavior, 24*(4), 414–431.
- Gendreau, P., Goggin, C., & Smith, P. (2002). Is the PCL-R really the “unparalleled” measure of offender risk? A lesson in knowledge cumulation. *Criminal Justice and Behavior, 29*(4), 397–426.
- Glas, A. S., Lijmer, J. G., Prins, M. H., Bonsel, G. J., & Bossuyt, P. M. M. (2003). The diagnostic odds ratio: a single indicator of test performance. *Journal of Clinical Epidemiology, 56*(11), 1129–1135.
- Glover, A. J. J., Nicholson, D. E., Bernfeld, G. A., & Quinsey, V. L. (2002). A comparison of predictors of general and violent recidivism among high-risk federal offenders. *Criminal Justice and Behaviour, 29*(3), 235–249.
- Gottfredson, S. D., & Moriarty, L. J. (2006). Statistical risk assessment: old problems and new applications. *Crime and Delinquency, 52*(1), 178–200.

- Graceffo, R. A., Mihura, J. L., & Meyer, G. J. (2014). A meta-analysis of an implicit measure of personality functioning: the Mutuality of Autonomy Scale. *Journal of Personality Assessment*, 96(6), 581–595.
- Gray, N. S., Fitzgerald, S., & Taylor, J. (2007). Predicting future reconviction in offenders with intellectual disabilities: the predictive efficacy of VRAG, PCL-SV, and the HCR-20. *Psychological Assessment*, 19(4), 474–479.
- Grubin, D. (1998). *Sex offending against children: Understanding the risk (Police Research Series, Paper 99)*. London: Home Office.
- Gu, Y., Singh, J. P., Yun, L. B., & Hu, Z. (2014). A review of violence risk assessment for mentally disordered patients in mainland of China. *Criminal Justice and Behavior*, 41(12), 1398–1405.
- Guy, L. S., Douglas, K. S., & Hart, S. D. (2015a). Risk assessment and communication. In B. L. Cutler, & P. A. Zapf (Eds.), *APA handbook of forensic psychology, Vol. 1: Individual and situational influences in criminal and civil contexts* (pp. 35–86). Washington, DC: American Psychological Association.
- Guy, L. S., Edens, J. F., Anthony, C., & Douglas, K. S. (2005). Does psychopathy predict institutional misconduct among adults? A meta-analytic investigation. *Journal of Consulting and Clinical Psychology*, 73(6), 1056–1064.
- Guy, L. S., Kusaj, C., Packer, I. K., & Douglas, K. S. (2015b). Influence of the HCR-20, LS/CMI, and PCL-R on decisions about parole suitability among lifers. *Law and Human Behaviour*, 39(3), 232–243.
- Guy, L. S., Packer, I. K., & Warnken, W. (2012). Assessing risk of violence using structured professional judgment guidelines. *Journal of Forensic Psychology Practice*, 12(3), 270–283.
- Hahn, J. (2007). Static and dynamic predictors of institutional misconduct and violence among incarcerated adult offenders. Unpublished doctoral dissertation, School of Professional Psychology, Pacific University, Forest Grove, OR
- Hannah-Moffat, K. (2013). Actuarial sentencing: an “unsettled” proposition. *Justice Quarterly*, 30(2), 270–296.
- Hannah-Moffat, K., & Maurutto, P. (2010). Re-contextualizing pre-sentence reports risk and race. *Punishment and Society*, 12(3), 262–286.
- Hanson, R. K. (1997). *The development of a brief actuarial risk scale for sexual offense recidivism (User Report No. 1997-04)*. Ottawa, Canada: Department of the Solicitor General of Canada.
- Hanson, R. K. (2005). Twenty years of progress in violence risk assessment. *Journal of Interpersonal Violence*, 20(2), 212–217.
- Hanson, R. K. (2009). The psychological assessment of risk for crime and violence. *Canadian Psychology*, 50(3), 172–182.
- Hanson, R. K., Harris, A. J., Scott, T. L., & Helmus, L. (2007). *Assessing the risk of sexual offenders on community supervision: The Dynamic Supervision Project (Research User Report No. 2007-05)*. Ottawa, Canada: Public Safety Canada.
- Hanson, R. K., Helmus, L., & Bourgon, G. (2008). The accuracy of risk prediction for intimate partner violence. *Public Safety Canada*, 13(1), Available from: <http://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/crcr-prdctn/index-en.aspx>.
- Hanson, R. K., Helmus, L., & Thornton, D. (2010). Predicting recidivism amongst sexual offenders: a multi-site study of Static-2002. *Law and Human Behaviour*, 34(3), 198–211.
- Hanson, R. K., & Howard, P. D. (2010). Individual confidence intervals do not inform decision-makers about the accuracy of risk assessment evaluations. *Law and Human Behavior*, 34(4), 275–281.
- Hanson, R. K., & Morton-Bourgon, K. E. (2009). The accuracy of recidivism risk assessments for sexual offenders: A meta-analysis of 118 prediction studies. *Psychological Assessment*, 21(1), 1–21.
- Hanson, R. K., & Thornton, D. (2000). Improving risk assessments for sex offenders: a comparison of three actuarial scales. *Law and Human Behavior*, 24(1), 119–136.
- Hanson, R. K., & Thornton, D. (2003). *Notes on the development of Static-2002 (Corrections Research User Report No. 2003-01)*. Ottawa, Canada: Department of the Solicitor General of Canada.
- Hare, R. D. (2003). *Manual for the Revised Psychopathy Checklist* (2nd ed.). Toronto, Canada: Multi-Health Systems.
- Hare, R. D., Harpur, T. J., Hakstian, A. R., Forth, A. E., Hart, S. D., & Newman, J. P. (1990). The Revised Psychopathy Checklist: reliability and factor structure. *Journal of Consulting and Clinical Psychology*, 2(3), 338–341.
- Harris, A., & Lurigio, A. J. (2007). Mental illness and violence: a brief review of research and assessment strategies. *Aggression and Violent Behaviour*, 12(5), 542–551.
- Harris, A. J. R., Phenix, A., Hanson, R. K., & Thornton, D. (2003a). *Static-99 coding rules: Revised 2003*. Ottawa, Canada: Solicitor General Canada.
- Harris, G. T., & Rice, M. E. (2003). Actuarial assessment of risk among sex offenders. In R. A. Prentky, E. S. Janus, & M. C. Seto (Eds.), *Understanding and managing sexually coercive behaviour* (pp. 198–210). New York, NY: Annals of the New York Academy of Sciences.
- Harris, G. T., Rice, M. E., & Camilleri, J. A. (2004). Applying a forensic actuarial assessment (the Violence Risk Appraisal Guide) to nonforensic patients. *Journal of Interpersonal Violence*, 19(9), 1063–1074.
- Harris, G. T., Rice, M. E., & Cormier, C. A. (2002). Prospective replication of the Violence Risk Appraisal Guide in predicting violent recidivism among forensic patients. *Law and Human Behaviour*, 26(4), 377–395.
- Harris, G. T., Rice, M. E., & Quinsey, V. L. (1993). Violent recidivism of mentally disordered offenders: the development of a statistical prediction instrument. *Criminal Justice and Behavior*, 20(4), 315–335.
- Harris, G. T., Rice, M. E., Quinsey, V. L., & Cormier, C. A. (2015). Violent offenders: appraising and managing risk *The law and public policy: Psychology and the social sciences*. (3rd ed.). Washington, DC: American Psychological Association.
- Harris, G. T., Rice, M. E., Quinsey, V. L., Lalumière, M. L., Boer, D., & Lang, C. (2003b). A Multisite comparison of actuarial risk instruments for sex offenders. *Psychological Assessment*, 15(3), 413–425.
- Harrison, K. (2010). Dangerous offenders, indeterminate sentencing, and the rehabilitation revolution. *Journal of Social Welfare & Family Law*, 32(4), 423–433.
- Hart, S. D. (2001). Assessing and managing violence risk. In K. S. Douglas, C. D. Webster, S. D. Hart, D. Eaves, & J. R. P. Ogloff (Eds.), *HCR-20 violence risk management companion guide* (pp. 13–25). Burnaby, Canada: Mental Health, Law, & Policy Institute.

- Hart, S. D. (2003). Actuarial risk assessment: commentary on Berlin et al. *Sexual Abuse: A Journal of Research and Treatment*, 15(4), 383–388.
- Hart, S. D., & Boer, D. P. (2009). Structured professional judgement guidelines for sexual violence risk assessment: the Sexual Violence Risk-20 (SVR-20) and Risk for Sexual Violence Protocol (RSVP). In R. K. Otto, & K. S. Douglas (Eds.), *Handbook of violence risk assessment*. Oxford, England: Routledge.
- Hart, S. D., & Cooke, D. J. (2013). Another look at the (im-)precision of individual risk estimates made using actuarial risk assessment instruments. *Behavioral Sciences and the Law*, 31(1), 81–102.
- Hart, S., Cox, D., & Hare, R. (1995). *The Hare Psychopathy Checklist: Screening Version (PCL:SV)*. Toronto, Canada: Multi-Health Systems.
- Hart, S. D., & Logan, C. (2011). Formulation of violence risk using evidence-based assessments: the structured professional judgment approach. In P. Sturmey, & M. McMurrin (Eds.), *Forensic case formulation*. Chichester, UK: Wiley-Blackwell.
- Heckerman, D., Mamdani, A., & Wellman, M. P. (1995). Real-world applications of Bayesian networks. *Communications of the ACM*, 38(3), 24–26.
- Heilbrun, K., & Heilbrun, A. B. (1995). Risk assessment with the MMPI-2 in forensic evaluations. In Y. S. Ben-Porath, J. R. Graham, G. C. N. Hall, R. D. Hirschman, & M. S. Zaragoza (Eds.), *Forensic applications of the MMPI-2* (pp. 160–178). Thousand Oaks, CA: Sage.
- Heilbrun, K., O’Neil, M. L., Stevens, T. N., Strohmman, M. A., Bowman, Q., & Lo, Y. W. (2004). Assessing normative approaches to communicating violence risk: a national survey of psychologists. *Behavioral Sciences and the Law*, 22(2), 187–196.
- Heilbrun, K., Yasuhara, K., & Shah, S. (2009). Violence risk assessment tools: overview and clinical analysis. In R. K. Otto, & K. S. Douglas (Eds.), *Handbook of violence risk assessment* (pp. 1–18). New York, NY: Routledge.
- Helmus, L., Thornton, D., Hanson, R. K., & Babchishin, K. M. (2012). Improving the predictive accuracy of Static-99 and Static-2002 with older sex offenders: revised age weights. *Sexual Abuse: Journal of Research and Treatment*, 24(1), 64–101.
- Hiller, J. B., Rosenthal, R., Bornstein, R. F., Berry, D. T. R., & Brunell-Neuleib, S. (1999). A comparative meta-analysis of Rorschach and MMPI validity. *Psychological Assessment*, 11(3), 278–296.
- Hilsenroth, M. J., Fowler, J. C., Padawer, J. R., & Handler, L. (1997). Narcissism in the Rorschach revisited: some reflections on empirical data. *Psychological Assessment*, 9(2), 113–121.
- Hilton, N. Z., Harris, G. T., & Rice, M. E. (2001). Predicting violence by serious wife assaulters. *Journal of Interpersonal Violence*, 16(5), 408–423. doi: 10.1177/088626001016005002.
- Hilton, N. Z., Harris, G. T., & Rice, M. (2010). *Risk assessment for domestically violent men: Tools for criminal justice, offender intervention, and victim services*. Washington, DC: American Psychological Association.
- Ho, R. M. Y., Lau, J. S. F., Cheung, H. H. K., Lai, T. T. S., Tam, V. F. L., Cahn, W. L., Yuen, K. K., & Yan, C. K. (2013). Evaluation of a model of violence risk assessment (HCR-20) among adult patients discharged from a gazetted psychiatric hospital in Hong Kong. *Journal of Forensic Psychiatry and Psychology*, 24(4), 479–495.
- Hoffman, P. B. (1994). Twenty years of operational use of a risk prediction instrument: the United States parole commission’s salient factor score. *Journal of Criminal Justice*, 22(6), 477–494.
- Hopwood, C. J., Baker, K. L., & Morey, L. C. (2008). Personality and drugs of choice. *Personality and Individual Differences*, 44(6), 1413–1421.
- Hunter, J. E., & Schmidt, F. L. (2000). Fixed effects vs. random effects meta-analysis models: implications for cumulative research knowledge. *International Journal of Selection and Assessment*, 8(4), 275–292.
- Jensen, F. V. (1996). *An introduction to Bayesian networks*. New York, NY: Springer.
- Karon, J. M., Fleming, P. L., Steketee, R. W., & De Cock, K. M. (2001). HIV in the United States at the turn of the century: an epidemic in transition. *American Journal of Public Health*, 91(7), 1060–1068.
- Khiroya, R., Weaver, T., & Maden, T. (2009). Use and perceived utility of structured violence risk assessments in English medium secure forensic units. *Psychiatrist*, 33(4), 129–132.
- Knock, M. K., Park, J. M., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (2010). Measuring the suicidal mind: Implicit cognition predicts suicidal behavior. *Psychological Science*, 21(4), 511–517.
- Kroner, D. G., & Mills, J. F. (2001). The accuracy of five risk appraisal instruments in predicting institutional misconduct and new convictions. *Criminal Justice and Behavior*, 28(4), 471–489.
- Kroner, C., Stadtland, C., & Eidt, M. (2007). The validity of the Violence Risk Appraisal Guide (VRAG) in predicting criminal recidivism. *Criminal Behaviour and Mental Health*, 17(2), 89–100.
- Kropp, P. R. (2004). Some questions regarding spousal assault risk assessment. *Violence Against Women*, 10(6), 676–697.
- Kropp, P. R. (2008). Intimate partner violence risk assessment and management. *Violence and Victims*, 23(2), 202–220.
- Kropp, P. R., Hart, S. D., Webster, C. D., & Eaves, D. (1995). *Manual for the spousal assault risk assessment guide* (2nd ed.). Vancouver, Canada: British Columbia Institute on Family Violence.
- Kropp, P. R., Hart, S. D., Webster, C. D., & Eaves, D. (1999). *Spousal Assault Risk Assessment Guide (SARA)*. Toronto, Canada: Multi-Health Systems.
- Krug, E. G., Mercy, J. A., Dahlberg, L. L., & Zwi, A. B. (2002). The world report on violence and health. *Lancet*, 360(9339), 1083–1088.
- Langton, C. M., Barbaree, H. E., Seto, M. C., Peacock, E. J., Harkins, L., & Hansen, K. T. (2007). Actuarial assessment of risk for re-offense among adult sex offenders: evaluating the predictive accuracy of the Static-2002 and five other instruments. *Criminal Justice and Behaviour*, 34(1), 37–59.
- Leistico, A. M. R., Salekin, R. T., DeCoster, J., & Rogers, R. (2008). A large-scale meta-analysis relating the hare measures of psychopathy to antisocial conduct. *Law and Human Behavior*, 32(1), 28–45.
- Loeber, R., Byrd, A. L., & Farrington, D. P. (2015). Why developmental criminology is still coming of age: the influence of biological factors on within-individual change. In J. Morizot, & L. Kazemian (Eds.), *The development of criminal and antisocial behavior: Theory, research and practical applications* (pp. 65–73). Cham, Switzerland: Springer International Publishing.

- Lowenkamp, C. T., Holsinger, A. M., & Latessa, E. J. (2001). Risk/need assessment, offender classification, and the role of child abuse. *Criminal Justice and Behaviour*, 28(5), 543–563.
- Lowenkamp, C. T., Lovins, B., & Latessa, E. J. (2009). Validating the level of service inventory-revised and the level of service inventory: screening version with a sample of probationers. *Prison Journal*, 89(2), 192–204.
- Loza, W. (2005). *The Self-Appraisal Questionnaire (SAQ): A tool for assessing violent and non-violent recidivism*. Toronto, Canada: Mental Health Systems.
- Loza, W., Dhaliwal, G. K., Kroner, D. G., & Loza-Fanous, A. (2000). Reliability and concurrent validity of the Self-Appraisal Questionnaire (SAQ): a tool for assessing violent and non-violent recidivism. *Criminal Justice and Behaviour*, 27(3), 356–374.
- Loza, W., & Green, K. (2003). The Self-Appraisal Questionnaire: a self-report measure for predicting recidivism versus clinician-administered measures: a 5-year follow-up study. *Journal of Interpersonal Violence*, 18(7), 781–797.
- Loza, W., Villeneuve, D. B., & Loza-Fanous, A. (2002). Predictive validity of the Violence Risk Appraisal Guide: a tool for assessing violent offender's recidivism. *International Journal of Law and Psychiatry*, 25, 85–92.
- Maden, T. (2007). *Treating violence: A guide to risk management in mental health*. Oxford, UK: Oxford University Press.
- Martel, J., Brassard, R., & Jaccoud, M. (2011). When two worlds collide: aboriginal risk management in Canadian corrections. *British Journal of Criminology*, 51(2), 235–255.
- Masten, A. S. (2014). *Ordinary magic: Resilience in development*. New York, NY: Guilford Press.
- McBride, M. (1999). Predicting violence among federal inmates. In *Paper presented at the corrections research forum*, Toronto, Canada
- McGrath, R. J., Cumming, G. F., Burchard, B. L., Zeoli, S., & Ellerby, L. (2010). *Current practices and emerging trends in sexual abuser management: The safer society 2009, North American survey*. Brandon, VT: Safer Society Press.
- McGraw, K. O., & Wong, S. P. (1992). A common language effect size statistic. *Psychological Bulletin*, 111(2), 361–365.
- McGuire, J. (2000). Explanations of criminal behavior. In J. McGuire, T. Mason, & A. O'Kane (Eds.), *Behavior, crime and legal processes: A guide for legal practitioners* (pp. 135–159). Chichester, UK: Wiley.
- McNeill, W. H. (1976). *Plagues and peoples*. New York, NY: Anchor Press.
- Meloy, J. R., & Gacono, C. B. (1992). The aggression response and the Rorschach. *Journal of Clinical Psychology*, 48(1), 104–114.
- Menzies, R. J., Webster, C. D., & Sepejak, D. S. (1985). Hitting the forensic sound barrier: predictions of dangerousness in a pre-trial psychiatric clinic. In C. D. Webster, M. Ben-Aron, & S. Hucker (Eds.), *Dangerousness: Probability and prediction, psychiatry and public policy* (pp. 115–143). New York, NY: Cambridge University Press.
- Meyer, G. J., & Kurtz, J. E. (2006). Advancing personality assessment terminology: time to retire “objective” and “projective” as personality test descriptors. *Journal of Personality Assessment*, 87(3), 223–225.
- Meyers, J. R., & Schmidt, F. (2008). Predictive validity of the Structured Assessment of Violence Risk in Youth (SAVRY) with juvenile offenders. *Criminal Justice and Behaviour*, 35(3), 344–355.
- Michel, S. F., Riaz, M., Webster, C., Hart, S. D., Levander, S., Müller-Isberner, R., & Hodgins, S. (2013). Using the HCR-20 to predict aggressive behavior among men with schizophrenia living in the community: accuracy of prediction, general and forensic settings, and dynamic risk factors. *International Journal of Forensic Mental Health*, 12(1), 1–13.
- Mihura, J. L., Meyer, G. J., Dumitrascu, N., & Bombel, G. (2013). The validity of individual Rorschach variables: systematic reviews and meta-analyses of the comprehensive system. *Psychological Bulletin*, 139(3), 548–605.
- Miller, J. D., & Lynam, D. R. (2001). Structural models of personality and their relation to antisocial behavior: a meta-analytic review. *Criminology*, 39(4), 765–798.
- Mills, J. F. (2005). Advances in the assessment and prediction of interpersonal violence. *Journal of Interpersonal Violence*, 20, 236–241.
- Mills, J. F., Jones, M. N., & Kroner, D. G. (2005). An examination of the generalizability of the LSI-R and VRAG probability bins. *Criminal Justice and Behavior*, 32(5), 565–585.
- Mills, J. F., & Kroner, D. G. (2006). The effect of base-rate information on the perception of risk for reoffense. *American Journal of Forensic Psychology*, 24, 45–56.
- Mills, J. F., Kroner, D. G., & Morgan, R. D. (2011). *Clinician's guide to violence risk assessment*. New York, NY: Guilford Press.
- Monahan, J. (1981). *The clinical prediction of violent behavior*. Rockville, MD: U.S. Department of Health and Human Services.
- Monahan, J. (1993). Mental disorder and violence: another look. In S. Hodgins (Ed.), *Mental disorder and crime* (pp. 287–302). Thousand Oaks, CA: Sage.
- Monahan, J., & Skeem, J. L. (2014). The evolution of violence risk assessment. *CNS Spectrums*, 19(5), 419–424.
- Monahan, J., & Skeem, J. L. (2015). Risk assessment in criminal sentencing. *Annual Review of Clinical Psychology*, 12, 489–513.
- Monahan, J., Steadman, H. J., Applebaum, P. S., Grisso, T., Mulvey, E. P., Roth, L. H., Robbins, P. C., Banks, S., & Silver, E. (2006). The classification of violence risk. *Behavioral Sciences and the Law*, 24(6), 721–730.
- Monahan, J., Steadman, H., Silver, E., Applebaum, P. S., Robbins, P. C., Mulvey, E. P., & Banks, S. (2001). *Rethinking risk assessment: The MacArthur study of mental disorder and violence*. Oxford, England: Oxford University Press.
- Morey, L. C. (1991). *Personality assessment inventory: Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Morey, L. (2007). *Personality assessment inventory—Adolescent professional manual*. Lutz, FL: Psychological Assessment Resources.
- Mossman, D. (1994). Assessing predictions of violence: being accurate about accuracy. *Journal of Consulting and Clinical Psychology*, 62(4), 783–792.
- Müller-Isberner, R., Webster, C. D., & Gretenkord, L. (2007). Measuring progress in hospital order treatment: relationships between levels of security and C and R scores of the HCR-20. *International Journal of Forensic Mental Health*, 6(2), 113–121.

- Murray, J., Farrington, D. P., & Eisner, M. P. J. (2009). Drawing conclusions about causes from systematic reviews of risk factors: the Cambridge Quality Checklists. *Journal of Experimental Criminology*, 5(1), 1–23.
- Nadeau, J., Nadeau, B., Smiley, W. C., McHattie, L. (1999). The PCL-R and VRAG as predictors of institutional behaviour. In *Paper presented at the conference on risk assessment and risk management: Implications for the prevention of violence*, Vancouver, Canada
- Newberry, M., & Shuker, R. (2012). Personality Assessment Inventory (PAI) profiles of offenders and their relationship to institutional misconduct and risk of reconviction. *Journal of Personality Assessment*, 94(6), 586–592.
- Nichols, T. L., Vincent, G. M., Whittemore, K. E., Ogloff, J. R. P. (1999). Assessing risk of inpatient violence in a sample of forensic psychiatric patients: comparing the PCL: SV, HCR-20, and VRAG. In *Paper presented at the conference on risk assessment and risk management: Implications for the prevention of violence*, Vancouver, Canada
- Nuffield, J. (1982). *Parole decision-making in Canada: Research towards decision guidelines*. Ottawa, Canada: Solicitor General of Canada.
- Nugent, P. M. (2001). The use of detention legislation: factors affecting detention decisions and recidivism among high-risk federal offenders in Ontario. Doctoral dissertation, Queen's University, Kingston, Canada.
- O'Laughlin, S., & Schill, T. (1994). The relationship between self-monitored aggression and the MMPI-2 F, 4, 9 composite and anger content scale scores. *Psychological Reports*, 74(3), 733–734.
- Olsson, H., Strand, S., Kristiansen, L., Sjöling, M., & Asplund, K. (2013). Decreased risk for violence in patients admitted to forensic care, measured with the HCR-20. *Archives of Psychiatric Nursing*, 27(4), 191–197.
- Olver, M. E., Klepfisz, G., Stockdale, K. C., Kingston, D. A., Nicholaichuk, T. P., & Wong, S. C. R. (2016). Some notes on the validation of VRS-SO static scores. *Journal of Sexual Aggression: An International, Interdisciplinary Forum for Research, Theory and Practice*, 22(2), .
- Olver, M. E., Wong, S. C. P., Nicholaichuk, T., & Gordon, A. (2007). The validity and reliability of the Violence Risk Scale-Sexual Offender version: assessing sex offender risk and evaluating therapeutic change. *Psychological Assessment*, 19(3), 318–329.
- O'Shea, L., Mitchell, A., Picchioni, M., & Dickens, G. (2013). Moderators of the predictive efficacy of the historical, clinical and risk management-20 for aggression in psychiatric facilities: systematic review and meta-analysis. *Aggression and Violent Behaviour*, 18(2), 255–270.
- Parker, K. C., Hanson, R. K., & Hunsley, J. (1998). MMPI, Rorschach, and WAIS: a meta-analytic comparison of reliability, stability, and validity. *Psychological Bulletin*, 103(3), 367–373.
- Patrick, C. J., Curtin, J. J., & Tellegen, A. (2002). Development and validation of a brief form of the Multidimensional Personality Questionnaire. *Psychological Assessment*, 14(2), 150–163.
- Pérez, R. M., Redondo, I. S., Martínez, G. M., García, F. C., & Andrés, P. A. (2008). Predicción de riesgo de reincidencia en agresores sexuales. *Psicothema*, 20(2), 205–210.
- Pescosolido, B. A., Martin, J. K., Long, J. S., Medina, T. R., Phelan, J. C., & Link, B. G. (2010). "A disease like any other"? A decade of change in public reactions to schizophrenia, depression, and alcohol dependence. *American Journal of Psychiatry*, 167(11), 1321–1330.
- Pham, T. H. (2002). Risk assessment and biological markers. In *Paper presented at Belgian Congress of Neuropsychology*, Leuven, Belgium.
- Prochaska, J., & DiClemente, C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390–395.
- Prochaska, J., DiClemente, C., & Norcross, J. (1992). In search of how people change: applications to addictive behaviours. *American Psychologist*, 47(9), 1002–1114.
- Quinsey, V. L., Book, A., & Skilling, T. A. (2004). A follow-up of deinstitutionalized developmentally handicapped men with histories of antisocial behaviour. *Journal of Developmental Disabilities*, 17, 243–254.
- Quinsey, V. L., Harris, G. T., Rice, M. E., & Cormier, C. A. (1998). *Violent offenders: Appraising and managing risk*. Washington, DC: American Psychological Association.
- Quinsey, V. L., Harris, G. T., Rice, M. E., & Cormier, C. A. (2006). *Violent offenders: Appraising and managing Risk* (2nd ed.). Washington, DC: American Psychological Association.
- Raynor, P. (2007). Risk and need assessment in British probation: the contribution of the LSI-R. *Psychology, Crime, and Law*, 13(2), 125–138.
- Reidy, T. J., Sorensen, J. R., & Davidson, M. (2016). Testing the predictive validity of the Personality Assessment Inventory (PAI) in relation to inmate misconduct and violence. *Psychological Assessment*, 28(8), 871–884.
- Rettenberger, M., Hucker, S. J., Boer, D. P., & Eher, R. (2009). The reliability and validity of the Sexual Violence Risk-20 (SVR-20): an international review. *Sexual Offender Treatment*, 4(2), 1–14.
- Rettenberger, M., Matthes, A., Boer, D. P., & Eher, R. (2010). Prospective actuarial risk assessment: a comparison of five risk assessment instruments in different sexual offender subtypes. *International Journal of Offender Therapy and Comparative Criminology*, 54(2), 169–186.
- Rice, M. E., & Harris, G. T. (1995). Violent recidivism: assessing predictive validity. *Journal of Consulting and Clinical Psychology*, 63(5), 737–748.
- Rice, M. E., & Harris, G. T. (2002). Men who molest their sexually immature daughters: Is a special explanation required? *Journal of Abnormal Psychology*, 111(2), 329–339.
- Rice, M. E., & Harris, G. T. (2005). Comparing effect sizes in follow-up studies: ROC Area, Cohen's *d*, and *r*. *Law and Human Behaviour*, 29(5), 615–620.
- Rice, M. E., Harris, G. T., & Lang, C. (2013). Validation of and revision to the VRAG and SORAG: the Violence Risk Appraisal Guide-Revised (VRAG-R). *Psychological Assessment*, 25(3), 951–965.
- Sadeh, N., Binder, R. L., & McNeil, D. E. (2013). Recent victimization increases risk for violence in justice-involved persons with mental illness. *Law and Human Behavior*, 38(2), 119–125.
- Sampson, R. J., Winship, C., & Knight, C. R. (2013). Translating causal claims: principles and strategies for policy-relevant criminology. *Criminology & Public Policy*, 12(4), 587–616.

- Schwalbe, C. S. (2007). Risk assessment for juvenile justice: a meta-analysis. *Law and Human Behavior, 31*(5), 449–462.
- Schwalbe, C. S., Fraser, M. W., Day, S. H., & Arnold, E. M. (2004). North Carolina Assessment of Risk (NCAR): reliability and predictive validity with juvenile offenders. *Journal of Offender Rehabilitation, 40*(1–2), 1–22.
- Serin, R. C., Lloyd, C. D., & Hanby, L. J. (2010). Enhancing offender re-entry: an integrated model for enhancing offender re-entry. *European Journal of Probation, 2*(2), 53–75.
- Simon, J. (2005). Reversal of fortune: The resurgence of individual risk assessment in criminal justice. *Annual Review of Law and Social Science, 1*, 397–421.
- Simourd, D. J. (1997). The Criminal Sentiments Scale-Modified and Pride in Delinquency scale: psychometric properties and construct validity of two measures of criminal attitude. *Criminal Justice and Behaviour, 24*(1), 52–70.
- Sinclair, J. S., Bello, I., Nyer, M., Mulford, J. S., Stein, M. B., Renna, M., & Blais, M. A. (2012). The Suicide (SPI) and Violence Potential Indices (VPI) from the personality assessment inventory: a preliminary exploration of validity in an outpatient psychiatric sample. *Journal of Psychopathology and Behavioural Assessment, 34*(3), 423–431.
- Singh, J. P. (2013). Predictive validity performance indicators in violence risk assessment: a methodological primer. *Behavioural Sciences and the Law, 31*(1), 8–22.
- Singh, J. P., Desmarais, S. L., & Van Dorn, R. A. (2013). Measurement of predictive validity in violence risk assessment studies: a second-order systematic review. *Behavioral Sciences and the Law, 31*(1), 55–73.
- Singh, J. P., & Fazel, S. (2010). Forensic risk assessment: a metareview. *Criminal Justice and Behavior, 37*(9), 965–988.
- Singh, J. P., Grann, M., & Fazel, S. (2011a). A comparative study of violence risk assessment tools: a systematic review and metaregression analysis of 68 studies involving 25,980 participants. *Clinical Psychology Review, 31*(3), 499–513.
- Singh, J. P., Grann, M., Lichtenstein, P., Långström, N., & Fazel, S. (2012). A novel approach to determining violence risk in schizophrenia: developing a stepped strategy in 13,806 discharged patients. *PLoS One, 7*(2), e31727.
- Singh, J. P., & Pettilä, J. (2013). Measuring and interpreting the predictive validity of violence risk assessments: an overview of the special issue. *Behavioral Sciences and the Law, 31*(1), 1–7.
- Singh, J. P., Serper, M., Reinharth, J., & Fazel, S. (2011b). Structured assessment of violence risk in schizophrenia and other psychiatric disorders: a systematic review of the validity, reliability, and item content of 10 available instruments. *Schizophrenia Bulletin, 37*(5), 899–912.
- Sjöstedt, G., & Långström, N. (2001). Actuarial assessment of sex offender recidivism risk: a cross-validation of the RRASOR and the Static-99 in Sweden. *Law and Human Behavior, 25*(6), 629–645.
- Skeem, J. L., Manchak, S. M., Lidz, C. W., & Mulvey, E. P. (2013). The utility of patients' self-perceptions of violence risk: consider asking the one who may know best. *Psychiatric Services, 64*(5), 410–415.
- Skeem, J. L., Manchak, S., & Peterson, J. K. (2011). Correctional policy for offenders with mental illness: creating a new paradigm for recidivism. *Law and Human Behavior, 35*(2), 110–126.
- Skeem, J., & Monahan, J. (2011). Current directions in violence risk assessment. *Current Directions in Psychological Science, 20*(1), 38–42.
- Smits, N. (2010). A note on Youden's J and its cost ratio. *BMC Medical Research Methodology, 10*(1), 89–93.
- Social Security Administration. (2003). *OASDI trustees report. V. Assumptions and methods underlying actuarial estimates*. Available from: http://www.ssa.gov/OACT/TR/TR03/V_demographic.html.
- Sorensen, J. R., & Cunningham, M. D. (2007). Operationalizing risk: the influence of measurement choice on the prevalence and correlates of prison violence among incarcerated murderers. *Journal of Criminal Justice, 35*(5), 546–555.
- Stadland, C., Hollweg, M., Kleindienst, N., Dietl, J., Reich, U., & Nedopil, N. (2005). Risk assessment and prediction of violent and sexual recidivism in sex offenders: long-term predictive validity of four risk assessment instruments. *Journal of Forensic Psychiatry and Psychology, 16*(1), 92–108.
- Stanfill, M. L., O'Brien, S., & Viglione, D. J. (2013). Multimethod violence risk assessment. In C. J. Hopwood, & R. F. Bornstein (Eds.), *Multimethod clinical assessment*. New York, NY: Guilford Press.
- Stanfill, M. L., O'Brien, S., & Viglione, J., Jr. (2014). Multimethod violence risk assessment. In C. J. Hopwood, & R. F. Bornstein (Eds.), *Multimethod clinical assessment* (pp. 379–402). New York, NY: Guilford Press.
- Steadman, H. J., Silver, E., Monahan, J., Appelbaum, P. S., Clark, R. P., Mulvey, E. P., & Banks, S. (2000). A classification tree approach to the development of actuarial violence risk assessment tools. *Law and Human Behaviour, 24*(1), 83–100.
- Storey, J. E., Gibas, A. L., Reeves, K. A., & Hart, S. D. (2011). Evaluation of violence risk (threat) assessment training for police and other criminal justice professionals. *Criminal Justice and Behavior, 38*(6), 554–564.
- Thornton, D. (2007). Scoring Guide for the Risk Matrix 2000.9/SVC. Available from: <http://www.birmingham.ac.uk/Documents/college-les/psych/RM-2000scoringinstructions.pdf>.
- Torrey, E. F., Stanley, J., Monahan, J., Steadman, H. J., Appelbaum, P. S. T., Mulvey, E. P., & Silver, E. (2008). The MacArthur Violence Risk Assessment Study revisited: two views ten years after its initial publication. *Psychiatric Services, 59*(2), 147–152.
- Ttofi, M. M., Farrington, D. P., Piquero, A. R., Lösel, F., DeLisi, M., & Murray, J. (2016). Intelligence as a protective factor against offending: a meta-analytic review of prospective longitudinal studies. *Journal of Criminal Justice, 45*, 4–18.
- Ulrich, S., & Coid, J. (2011). Protective factors for violence among released prisoners: effects over time and interactions with static risk. *Journal of Consulting and Clinical Psychology, 79*(3), 381–390.
- Urbaniok, F., Noll, T., Grunewald, S., Steinbach, J., & Endrass, J. (2006). Prediction of violent and sexual offences: a replication study of the VRAG in Switzerland. *Journal of Forensic Psychiatry and Psychology, 17*(1), 23–31.
- Urist, J. (1977). The Rorschach test and the assessment of object relations. *Journal of Personality Assessment, 41*(1), 3–9.

- Van Dorn, R., Volavka, J., & Johnson, N. (2012). Mental disorder and violence: is there a relationship beyond substance use? *Social Psychiatry and Psychiatric Epidemiology*, 47(3), 487–503.
- Verona, E., & Carbonell, J. L. (2000). Female violence and personality: evidence for a pattern of overcontrolled hostility among one-time violent female offenders. *Criminal Justice and Behaviour*, 27(2), 176–195.
- Viglione, D. J., & Rivera, B. (2013). Performance assessment of personality and psychopathology. In I. B. Weiner, J. R. Graham, & J. A. Naglieri (Eds.), *Handbook of psychology, assessment psychology* (pp. 600–621). (Vol. 10). Hoboken, NJ: Wiley.
- Vrana, G. C., Stoga, M., & Guzzo, L. (2008). *Predictive validity of the LSI-OR among a sample of adult male sexual assaulters*. North Bay, Ontario, Canada: Nipissing University.
- Walters, G. D. (1995). The Psychological Inventory of Criminal Thinking Styles (PICTS), Part I: reliability and preliminary validity. *Criminal Justice and Behavior*, 22(3), 307–325.
- Walters, G. D. (1996). The Psychological Inventory of Criminal Thinking Styles (PICTS), Part III: predictive validity. *International Journal of Offender Therapy and Comparative Criminology*, 40(2), 105–112.
- Walters, G. D. (2003). Predicting institutional adjustment and recidivism with the psychopathy checklist factor scores: a meta-analysis. *Law and Human Behavior*, 27(5), 541–558.
- Walters, G. D. (2006). Risk-appraisal versus self-report in the prediction of criminal justice outcomes: a meta-analysis. *Criminal Justice and Behavior*, 33(3), 279–304.
- Walters, G. D., White, T. W., & Denney, D. (1991). The lifestyle criminality screening form: preliminary data. *Criminal Justice and Behavior*, 18(4), 406–418.
- Ward, T., & Hudson, S. M. (1998). A model of the relapse process in sex offenders. *Journal of Interpersonal Violence*, 13(6), 700–725.
- Webster, C., Douglas, K. S., Eaves, D., & Hart, S. D. (1997). *HCR-20: Assessing risk for violence (Version 2)*. Burnaby, Canada: Mental Health, Law and Policy Institute, Simon Fraser University.
- Webster, C. D., Martin, M. L., Brink, J., Nicholls, T. L., & Desmarais, S. L. (2009). *Manual for the Short-Term Assessment of Risk and Treatability (START) (Version 1.1)*. Coquitlam, Canada: British Columbia Mental Health & Addiction Services.
- Webster, C. D., Nicholls, T. L., Martin, M. L., Desmarais, S. L., & Brink, J. (2006). Short-Term Assessment of Risk and Treatability (START): the case for a new structured professional judgment scheme. *Behavioral Sciences and the Law*, 24(6), 747–766.
- Weiner, I. B., & Greene, R. L. (2008). Psychometric foundations of assessment *Handbook of personality assessment*. (1st ed.). Hoboken, NJ: Wiley, pp. 49–75.
- World Health Organization. (1999). *The World Health Report 1999: Making a difference*. Geneva, Switzerland: Author.
- Wong, S. C. P., & Gordon, A. (2006). The validity and reliability of the Violence Risk Scale: a treatment-friendly violence risk assessment tool. *Psychology, Public Policy, and Law*, 12(3), 279–309.
- Wong, S., Olver, M. E., Nicholaichuk, T. P., & Gordon, A. (2003). *The Violence Risk Scale: Sexual Offender version (VRS-SO)*. Saskatoon, Saskatchewan, Canada: Regional Psychiatric Centre and University of Saskatchewan.
- Wood, J. M., Lilienfeld, S. O., Nezworski, M. T., Garb, H. N., Allen, K. H., & Wildermuth, J. L. (2010). Validity of Rorschach Inkblot scores for discriminating psychopaths from nonpsychopaths in forensic populations: a meta-analysis. *Psychological Assessment*, 22(2), 336–349.
- Wormith, J. S., Hogg, S., & Guzzo, L. (2012). The predictive validity of a general risk/needs assessment inventory on sexual offender recidivism and an exploration of the professional override. *Criminal Justice and Behavior*, 39, 1511–1538.
- Yang, M., Wong, S. C. P., & Coid, J. (2010). The efficacy of violence prediction: a meta-analytic comparison of nine risk assessment tools. *Psychological Bulletin*, 136(5), 740–767.
- Zhou, J., Witt, K., Xiang, Y., Zhu, X., Wang, X., & Fazel, S. (2016). Violence risk assessment in psychiatric patients in China: a systematic review. *Australian and New Zealand Journal of Psychiatry*, 50(1), 33–45.

Chapter 15

The Aggressive Implications of Suicide

Chapter Outline

| | | | |
|--|------------|--|------------|
| An overview of suicide | 439 | Integrated motivational-volitional model | |
| Aggressive suicide | 440 | of suicidal behavior | 451 |
| Risk factors of suicide | 441 | Three-step theory | 452 |
| Personality and suicidality | 443 | The cultural model of suicide and suicide risk assessment | 452 |
| Suicide, aggression, and impulsivity | 443 | The Cultural Assessment of Risk for Suicide measure | 453 |
| Studies on the relationship between aggression, self-harm, and suicide | 444 | Principles and theories of homicide-suicide | 453 |
| Theories of suicide and corresponding measures | 445 | Psychoanalytic theories of homicide-suicide | 454 |
| Psychological pain theories | 445 | Two-stage model of outward and inward directed aggression | 455 |
| Suicide as an escape from self | 446 | Strain theories | 455 |
| Arrested flight model (cry of pain) | 446 | Stream analogy for lethal violence | 456 |
| Cognitive theories | 446 | The assessment of suicide | 456 |
| Hopelessness theory and the comprehensive cognitive model | 446 | Challenges to suicide assessment | 457 |
| Fluid vulnerability theory | 448 | Review of measures of suicide | 457 |
| Schematic Appraisal Model of Suicide | 449 | Measures of suicide ideation and behaviors | 457 |
| Diathesis stress theories | 449 | Protective factors and resilience | 459 |
| Clinical biological models of suicidal behavior | 450 | Measures of resiliency against suicide ideation | 460 |
| Interpersonal theory | 450 | Summary | 463 |
| | | References | 463 |

AN OVERVIEW OF SUICIDE

Nearly 1 million individuals die by suicide worldwide each year [World Health Organization (WHO), 2014a, 2014b] and suicide remains a leading cause of death in the United States, particularly among adolescents and young adults (Sullivan, Annett, Simon, Luo, & Dahlberg, 2015). Suicide continues to be a complex phenomenon that is not as yet completely understood. Suicide research tends to be difficult to conduct because the actual base rate for completed suicides is relatively low, and as a result of the low base rate, the false positive error rate for short-term prediction is high (Wingate et al., 2006). At best, the prediction rate is said to be approximately 30% (Maris, 2002). Additionally, suicidal people are often excluded in clinical research and epidemiological studies, and inconsistent nomenclature for labeling suicide creates challenges in labeling suicide-related death (Goldsmith, Pellmar, Kleinman, & Bunny, 2002).

Suicide is defined as an act of intentionally terminating one's own life (Nock et al., 2008b). However, this definition does not do justice to the complexity of the concept and the numerous usages of terms across studies. Thus, the nomenclature for suicidal ideation and behavior has been the subject of considerable international attention and debate (Silverman, Berman, Sanddal, O'Carroll, & Joiner, 2007; Heilbron, Compton, Daniel, & Goldston, 2010). The nomenclature of suicide behaviors without fatal outcome varies as well. Sometimes they are referred to as "suicidality," whereas others term these as "suicide-related behaviors" or "suicidal behavior" (Heilbron et al., 2010; Van Orden et al., 2010). A suicide attempt is commonly characterized by: (1) self-initiated, potentially injurious behavior; (2) presence of intent to die; and (3) nonfatal outcome (Apter, 2010).

Other related behaviors and definitions relevant to this review include deliberate self-harm (DSH), nonsuicidal self-injury (NSSI), suicidal threats, and suicidal gestures (Apter, 2010). Other forms of classification include lethal or medically serious suicide attempt (MSSA) (Levi et al., 2008). Confusion over the boundary between terms, such as "suicide

attempt,” “gesture,” “deliberate self-harm,” and “parasuicide,” has led to inconsistency in how suicidal behavior is defined and assessed. Estimating the prevalence of suicidal behavior is characterized by complications and inaccuracies because of factors, such as inconsistency in reporting practices and difficulties in assessing suicidal intent postmortem (Claassen et al., 2010). More recently, researchers have questioned the accuracy of individuals’ self-report regarding their own attempt history. Findings from the National Comorbidity Survey (Nock & Kessler, 2006), for example, found the prevalence of suicide attempts to be 4.6% in a random sample of 5877 individuals; within this group, however, nearly half of the individuals acknowledged that they had not explicitly intended to die during their attempt, but rather hoped to communicate their pain and distress to others (accounting for 1.9% of the whole sample, as opposed to 2.7% who acknowledged at least some intention to die during their attempt).

Suicide occurs either as an individual act or in following a crime. As in Greek tragedies, it is often a solution to accumulating conflicts, often ending in self-destruction. Motives underlying these conflicts range from a need to escape and relieve others of burden, to retaliate and a wish to know that others care (Holden & Delisle, 2006). One of the most common types of homicide-suicide is filicide-suicide. Resnick (1969) was among the first to investigate the motives and the risk factors behind this type of crime. Specifically, he classified the motives for filicide as altruistic, accurately psychotic, accidental filicide, unwanted child and spouse revenge filicide.

Another less common type of homicide-suicide is *mass-murder-suicide*. “Mass murder involves the killing of several innocent people at an unknown, unexpected moment” (Resnick, 1969, p. 178). Dietz (1986) divides mass killers into three major types: family annihilators, pseudo commandos, and hit-and-run killers. The most common motives for their actions are anger and revenge. According to Declercq and Audenaert (2011b), revenge is one of the most recurrent motives for mass murder. Mass murderers see themselves as victims of an unjust world and are referred to as “collectors of injustice” (Knoll, 2010). They retreat into a fantasy life of violence and revenge. Declercq and Audenaert (2011a, 2011b) called these fantasies ego-syntonic; they focus on authority and omnipotence in which individuals identify with violent characters. Notes, when found, and statements, when given, reveal deep frustration with perceived wrong doings by authority figures and society at large. The mass-murderer often commits suicide.

Aggressive suicide

Even though suicide is often considered deviant, self-destruction may also be a technique of social control. From activists who burn themselves in protest to criminals who hang themselves in remorse, much suicidal behavior is a way of expressing grievances and securing redress. In other words, self-killing may be moralistic, belonging to the same sociological family as strikes, boycotts, imprisonment, execution, banishment, gossip, and vengeance (Baumgartner, 1984; Black, 1998; Manning, 2012).

The social logic of moralistic suicide varies from case to case. Usually, however, it combines the characteristics of two elementary forms of social control: avoidance and aggression. First, suicide involves an extreme curtailment of interaction, permanently severing relations between the self-killer and his or her adversaries. In this way it resembles other forms of moralistic avoidance, such as divorcing an abusive spouse, ceasing to speak with an obnoxious acquaintance, or resigning from a corrupt organization (Koch, 1974; Baumgartner, 1984; Black, 1998). Second, suicide may express hostility and inflict harm upon a wrongdoer. In this way it resembles other forms of moralistic aggression, such as berating an incompetent coworker, beating a disobedient child, or executing a convicted murderer.

Here, Manning (2015) explores the aggressive aspect of suicide, particularly how self-killers use their death to strike back at those they regard as wrongdoers. The discussion that follows first addresses patterns of aggressive suicide described in tribal and traditional settings, and then turns to aggressive suicide in the United States. Previous research has given scant attention to moralistic or aggressive aspects of suicide in contemporary settings.

Most published information on aggressive aspects of suicide comes from ethnographic studies of tribal and traditional settings—societies that are simple in the sense of having small local populations, a low division of labor, and little diversity of culture at the local level. One of the earliest discussions of this topic is that of Jeffreys (1952), who coined the term “Samsonic suicide” to refer to suicide for the purpose of revenge. Focusing on African societies, Jeffreys described two major mechanisms by which individuals might use self-destruction to avenge themselves upon an enemy: (1) supernatural sanctions and (2) sanctions imposed by third parties. These same mechanisms have been described by a number of other researchers and appear to have a wide geographical distribution.

Suicide is a source of supernatural pollution in many societies, and in some it is said to unleash forces that punish the self-killer’s adversaries. For example, in colonial Tanganyika “When a man has a grievance, and receives no redress, he will, as a final resort, go before the wrongdoer and say, ‘I shall commit suicide, and rise up as an evil spirit to torment you’” (Gouldsbury & Sheane, 1911, as cited in Jeffreys, 1952, p. 119). The same practice is found in traditional India, where

members of the Brahman caste might use suicide to avenge an injury—for “it was generally believed that the ghost of such deceased would harass and prosecute the offender” (Thakur, 1963, p. 63). Similarly, among Taiwanese farmers “the ghost of a suicide is believed to be particularly powerful and absolutely determined to bring tragedy to the people responsible” (Wolf, 1972, p. 163).

The second mechanism of vengeance occurs when suicide leads to “societal reprisals” against the victim’s adversary (Jeffreys, 1952). A common pattern is for a member of Clan A to commit suicide in response to an offense by a member of Clan B, prompting other members of Clan A to hold the offender liable for the death, for which they may demand compensation or swear vengeance.

Several scholars acknowledge that aggressive suicide occurs in industrial societies (e.g., Douglas, 1967; Maris, 1981), but thus far little research has focused on this type of behavior. In fact, most studies of suicide in the modern world are focused solely on suicide rates, comparing, for example, the rates of different cities or nations. Such studies tell us little about the nature of suicide acts and provide almost no information on moralistic and aggressive aspects of suicide.

Although suicide notes were recorded in only 15% of cases, their frequency in this setting is comparable to that reported for other US cities (Holmes & Holmes, 2005; Sanger & Veach, 2008). The content of the notes is also similar to that reported by previous studies (e.g., Shneidman, 1973; Sanger & Veach, 2008; Fincham, Langer, Scourfield, & Shiner, 2011). Many are simply goodbyes or instructions regarding burial requests and financial details, providing little or no information about the reason for the suicide. Of those that address interpersonal issues, most are not aggressive, but rather express love, gratitude, and requests for forgiveness. Suicide usually inflicts harm on others, even if there is no evidence that the harm was intended, and some self-killers attempt to minimize such harm by explicitly exonerating others from blame. One study, for example, found that 17% of suicide notes had statements to this effect (Sanger & Veach, 2008). But some self-killers do the opposite and leave notes that convey criticism, insults, and blame toward others.

Some aggrieved persons choose the location, manner, and timing of their death in such a way as to maximize the guilt, shame, or trauma that their death will inflict on another. One way of doing this is to ensure that the target of aggression will be the one to find the body. Some who kill themselves take steps to prevent such discoveries, such as leaving their homes and traveling elsewhere to commit the act or posting notes outside locked rooms warning loved ones not to enter. Others, however, engage in the opposite behavior, making it more likely that another will find their body, sometimes in the most disturbing fashion possible. This may involve killing oneself at another’s dwelling or place of work.

Social control may take the form of a blood feud, with two groups engaging in a reciprocal exchange of revenge killings.

Relational distance can be measured by “the scope, frequency, and length of interaction between people, the age of their relationship, and the nature and number of links between them in a social network” (Black, 1976/2010). Relational distance is least, and intimacy greatest, between those who spend a great deal of time with one another, share many attachments and involvements, and are in an exclusive relationship without competing ties to others.

Homicide, like suicide, is a severe and violent reaction to conflict, and it is often used to handle the same kinds of grievances, such as those arising from abandonment or infidelity. But whereas suicide increases with relational closeness, homicide decreases. Thus lovers and kin are opponents in over 90% of moralistic suicides, but these relationships are found in only about 25% of all homicides (Cooney & Phillips, 2002).

Note that closeness of the adversaries in the metropolitan cases is consistent with the morally ambiguous nature of many suicide notes, which reflect the morally ambiguous nature of intimate conflict. Black (1998) predicts that social control between strangers and cultural aliens is harsh and uncompromising, while between intimates right and wrong lose their clarity and social control becomes less punitive and one-sided.

Though moralistic behaviors are not necessarily aggressive, aggression is usually moralistic: a way of expressing grievances and punishing offensive conduct. It is social control, and as such it can be explained with the structural properties of the conflicts in which it occurs. One of these structural properties is the relational distance between the adversaries—whether they are spouses and close kin, mere acquaintances, or total strangers. Across various societies—including modern America—the targets of aggressive suicide are almost always relationally close, suggesting that intimate grievances are more likely to be handled with this behavior than with others.

Risk factors of suicide

Although gaining knowledge of risk factors for suicide within at-risk populations is important, the study of risk factors alone has not led to a comprehensive model of suicidality, or a greater ability for clinicians to predict suicide in specific individuals (Fowler, 2012). Many risk factors are too general (e.g., younger males or psychiatric disturbance), whereas others have been shown to have an inconsistent relationship to suicide. Suicide research began, and for the most part continues to focus on single, static risk factors, such as demographic factors, psychiatric diagnoses, past high-risk behaviors, and more

TABLE 15.1 Selected Static Risk Factors Associated With Individual Risk for Suicide and Suicide Attempts

| Variable | Relative Predictive Strength | False-Positive Risk |
|--|--|---------------------|
| Past suicide attempts | Strongest consistent predictor for both suicide attempts and completed suicide across many studies | Moderate-high |
| Comorbid psychiatric diagnoses | Risk increases with greater comorbidity, especially for substance, mood and personality disorders | High |
| Single diagnoses | Eating disorders, and substance abuse disorders carry the highest risk, mood, and personality disorders carry moderately high risk, anxiety disorders carry lower risk | High |
| Severity of mental illness | Limited studies suggest severity of impairment may be a risk factor beyond the specific diagnosis | High |
| Algorithms of multiple domains | Diagnoses, symptoms, demographic, and past history of hospitalization result in moderate true positive prediction but high false positive | High |
| Psychological vulnerabilities | Impulsivity/aggression, depressive symptoms, anxiety, hopelessness, and self-consciousness/social disengagement increase risk, yet some studies are inconclusive | High |
| Genetic markers | 5-HTT serotonin gene most studied with moderate association: other candidate genes vary by study | Unknown |
| Demographic (gender, age, race, economic status) | Males complete more suicides, females attempt more, nonmarried marital status, elderly, adolescent and young adult age groups, and Caucasian race are all associated with increased risk | Extremely high |

Source: Reprinted from Fowler, J. C. (2012). Suicide risk assessment in clinical practice: pragmatic guidelines for imperfect assessments. *Psychotherapy, 49*(1), 81–90, with permission. Copyright 2012 by the American Psychological Association.

recently, genetic markers. During the last 2 decades, the list of risk factors has grown rapidly. Table 15.1 includes a sample of static risk factors associated with increased risk.

By far, the factor receiving the widest empirical support for the prediction of suicide is a history of suicide attempts (Joiner et al., 2005; McLean, Maxwell, Platt, Harris, & Jepson, 2008; Miranda et al., 2008; Monnin et al., 2012). Studies across multiple diverse samples have demonstrated that once an initial suicide attempt is made, the risk for making a subsequent attempt is increased (Hawton, Comabella, Haw, & Saunders, 2013; Large, Sharma, Cannon, Ryan, & Nielsen, 2011). This relationship has been shown to retain statistical significance even when other well-established risk factors for suicide, such as hopelessness and depression, are controlled for (Joiner et al., 2005).

Psychiatric disorders has been identified as another important risk factor for suicidal behavior; it is estimated that up to 90% of individuals who attempt or complete suicide suffer from psychiatric conditions, although only 10% of individuals with mental health issues ever attempt suicide (McLean et al., 2008). Mood and anxiety disorders (especially depressive and bipolar disorders), eating disorders, impulse-control disorders, psychotic illnesses, substance use disorders, and personality disorders, provide the highest risk for suicide and suicidal behavior (Chesney, Goodwin, & Fazel, 2014; Nock et al., 2008a). Many decedents suffer from comorbidity of disorders simultaneously, a factor that enhances suicide risk (Nock et al., 2008a). Epidemiological studies have shown that comorbidity of psychiatric disturbance significantly increases an individual's risk for attempting suicide (Nock & Kessler, 2006; Pawlak et al., 2013). Other psychological variables, such as anger/hostility, perfectionism, and hopelessness have also received support as risk indicators for suicide (Hawton et al., 2013; Nock & Kessler, 2006; Stanford et al., 2009). Past experiences of trauma have also received empirical support as a risk factor for future suicidal behavior (Nock & Kessler, 2006), with one large-scale study finding that subjects who had experienced childhood rape or molestation were three to 11 times more likely to make a suicide attempt than those without (Molnar, Berkman, & Buka, 2001).

Other Significant Risk Factors

Although a significant number of individuals report suicidal ideation over their lifetime (9.2%), only 3.1% make suicide plans and only 2.7% make at least one attempt (Nock et al., 2008a). Many frequently cited risk factors increase risk for suicidal ideation, but they do not differentiate suicide ideators from attempters (Klonsky & May, 2014). The interpersonal theory (Joiner, 2005) identified three central constructs underlying for a suicide attempt—thwarted belongingness and perceived burdensomeness, which constitute suicidal desire, and the third is the capability for suicide (Klonsky & May, 2014; Van Orden et al., 2010).

Recent evidence suggests that nonsuicidal self-injury (NSSI) (i.e., the direct, purposeful damage of one's own body tissues without any intent to die) is associated with elevated risk for future suicidal behavior (Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; Victor & Klonsky, 2014a, 2014b). Research indicates that the majority of suicidal acts are precipitated by a stressful life event (SLE; Foster, 2011). Recent, acute stressors have been identified as critical risk factors for suicide, above and beyond the risk imposed by high levels of chronic stress (Phillips et al., 2002).

Psychological explanations for the onset of suicide risk have focused historically on the role of negative cognitive and emotional states in the etiology of suicide thoughts and behavior. These included such variables as “psychache”—referring to the emotional pain associated with suicide (Shneidman, 1996a, 1996b); Troister & Holden, 2010) and “hopelessness”—referring to negative or pessimistic expectancies regarding one's future (Beck, 1963; Beck, Weissman, Lester, & Trexler, 1974; Brown, Beck, Steer, & Grisham, 2000; McMillan, Gilbody, Beresford, & Neilly, 2007). More recent theory and research have expanded this etiologic focus to incorporate interpersonal difficulties, including perceived absence of social support or integration and of burdening others (Joiner, 2005; Van Orden et al., 2010) and personality traits and/or disorders (e.g., Clark, 1993; Duberstein & Conwell, 1997).

Personality and suicidality

Given the importance of personality as a context for understanding psychopathology (e.g., Krueger & Tackett, 2006), classifying patients based on their personality may be a useful strategy in the study of suicidality. In a recent exploratory study Ortigo, Western, & Bradley (2009) applied Q-factor analysis to identify subtypes of 311 adult suicide attempters using the Shedler-Western Assessment Procedure–II (SWAP-II). Personality profiles identified subtypes included internalizing, emotionality dysregulated, dependent, hostile-isolated, psychopathic and anxious-somatizing. Subtypes differed on applicable variables and provided more predictive pathways of adaptive functioning than *DSM*-based diagnoses. The internalizing and the emotionality dysregulated subtypes appeared especially related to suicide attempt history in clinical samples.

Important clinical features for the internalizing subtype included greater likelihood of being female, depressed, and avoidant, whereas the emotionality dysregulated subtype was associated more with existing behaviors, less overall adaptive functioning, traumatic childhood experiences, and bipolar personality disorder symptoms. Both subtypes were associated with a history of self-mutilation.

Suicide, aggression, and impulsivity

Notable evidence for the cooccurrence of aggression and self-harm which began to emerge in the 1970s and 1980s demonstrated in clinical studies that patients with a history of suicidal behavior often exhibited violent behaviors (e.g., Plutchik, Van Praag, Conte, & Picard, 1989). Additionally, prisoners incarcerated for violent offences revealed a history of self-harm (e.g., Bach-y-Rita, 1974). Since then, although sparse, evidence continues to indicate a link between aggressive behavior and self-harm (e.g., Flannery, Singer, & Wester, 2001) and vice versa (e.g., Hunt et al., 2006a, 2006b; Buri, Von Bonin, Strick, & Moggi, 2009). Similarly, epidemiological studies demonstrate elevated cooccurrence rates in a variety of populations, such as clinical (e.g., Fennig et al., 2005; Swogger, Van Orden, & Conner, 2014) forensic (e.g., Stalenheim, 2001) and community (e.g., Suokas et al., 2010).

Furthermore, cross-sectional studies lend additional support for cooccurrence by demonstrating that individuals who score highly on measures of aggression (or self-harm) score higher on measures of self-harm (or aggression) compared to controls (e.g., Dervic et al., 2006; Mann et al., 2005; Renaud, Berlim, McGirr, Tousignant, & Turecki, 2008). A recent study by Klonsky, May, and Glenn (2012) investigated the associations of NSSI and established suicide risk factors to attempted suicide in four samples: adolescent psychiatric patients, adolescent high school students, university undergraduates, and a random, digit-dialing sample of US adults. All samples were administered measures of NSSI, suicide ideation, and suicide attempts. In all four samples NSSI demonstrated a strong relationship to attempted suicide. The results interpreted in the context of Joiner's interpersonal theory of suicide revealed that NSSI may be a significant risk factor for suicide because its presence is linked to both increased desire and capacity for suicide.

Impulse is a predisposition toward rapid unplanned reactions to internal or external stimuli without any consideration of the consequences of these reactions (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Within psychoanalytic literature on suicidal behavior, Lindner (2006) stresses the individual's experience of “great helplessness and massive pressure to act” (Lindner, 2006, p. 200). He also highlights the negative impact of early relational disruptions and experiences of abandonment in effective affect regulation and impulse control. Joiner's (2005) interpersonal model of suicide proposes that impulsivity is a stable personality characteristic leading to a general lifelong pattern of engaging in impulsive behaviors across a variety of situations.

Although the majority of research on suicide and impulsivity has examined impulsivity through the accumulation of trait levels in individuals across situations (e.g., self-report measures asking about behaviors in daily life; [Stanford et al., 2009](#)), other researchers have approached the issue from a more context-specific perspective; for example, they investigated whether impulsivity predicts suicidal behavior in individuals who are only impulsive in certain situations or circumstances. Several studies have demonstrated that a specific type of impulsivity, in which impulsive behaviors arise only in the context of overwhelming negative affect, is related to suicidal behavior and attempts ([Bornovalova, Tull, Gratz, Levy, & Lejuez, 2011](#); [Klonsky & May, 2010](#)). This type of impulsivity, referred to as “negative urgency” ([Whiteside & Lynam, 2001](#)), refers to an impulsive reaction tendency that occurs only in situations that are particularly emotionally upsetting, in contrast to other conceptualizations of impulsivity that may describe a more generalized tendency to act in an impulsive manner.

Many studies reported a link between impulsivity and suicide ([Brodsky, Malone, Ellis, Dulit, & Mann, 1997](#); [Kingsbury, Hawton, Steinhardt, & James, 1999](#); [Mann, Waternaux, Haas, & Malone, 1999](#)). [Nock and Kessler \(2006\)](#), including evidence that impulsive-aggressive suicide is more common among young suicide attempters and suicide completers ([Brent & Mann, 2005, 2006](#)). And the genetic influence seems to be mediated by serotonergic mechanisms ([Mann, 2013](#)). However, several studies have failed to find a significant association between impulsivity and suicidal behavior ([Horesh, 2001](#); [Keilp et al., 2006](#); [Oquendo & Mann, 2000](#); [Oquendo et al., 2000](#)). Recent studies indicate that, although impulsivity is considered a risk factor for suicidal behavior, death by suicide is not necessarily an impulsive act. [Witte et al. \(2008\)](#) reported that less than one-fourth of suicide attempters did so without planning. It was also found that patients who made impulsive suicide attempts scored no higher on a self-report measure of impulsivity than patients who had planned their attempts ([Baca-García, Perez-Rodriguez, Diaz Sastre, Saiz-Ruiz, & De Leon, 2005](#); [Baca-García et al., 2005a](#)). [Klonsky and May \(2010\)](#) explained these mixed findings by suggesting that studies have utilized broad measures of impulsivity that insufficiently differentiate aspects of impulsivity, whereas only a specific trait of diminished ability to think through the consequences of one’s behavior before acting confers risk for suicidal behavior above and beyond suicidal ideation. Thus it is possible that impulsivity in and of itself is a peripheral construct in understanding suicidal behavior ([Gvion & Apter, 2011](#)).

A large and growing body of research has demonstrated complex connections between aggression, impulsivity, and suicidal behavior ([Gvion & Apter, 2011](#)). Over the past several years, there have been continuous efforts to comprehend the relationship between these variables. However, these efforts have been buffered by several methodological issues, perhaps most importantly by an ongoing inconsistency in the operationalization and measurement of each construct within research studies (e.g., state vs. trait definitions, self-report vs. behavioral measures). Although some researchers maintain a belief that impulsivity and aggression stem from a common genetic foundation (impulsive-aggressiveness; [Brent, 2010](#)), others hypothesize that they are genetically related yet distinct personality traits ([Houston & Stanford, 2005](#)); still others argue that they are entirely separate constructs despite their shared association to self-destructive behaviors ([Gvion & Apter, 2011](#)). A recent study using self-report methods identified important relationships between aggressive and impulsive behaviors and poor capacity for effortful control in a nonclinical young adult sample ([Meehan, De Panfilis, Cain, & Clarkin, 2013](#)) indicating that poor self-regulatory capacities can lead to increases in both impulsive and aggressive behaviors in the context of heightened distress. In a comprehensive review of empirical investigations of the relationship between aggression, impulsivity, and suicide, [Gvion and Apter \(2011\)](#) highlight the lack of clarity in findings over the past several decades. The authors describe the current state of the literature as “confusing and contradictory and not easy to organize in a coherent manner” (p. 104). They conclude their review by suggesting that the constructs of impulsivity and aggression are most likely to be useful in differentiating individuals who make near-lethal suicide attempts from those who make more frequent, nonmedically serious suicide attempts.

In fact, the inconsistency of findings connecting these character traits to suicidality may indicate that suicidal behaviors also depend on other factors, such as general personality style, capacity for effective self-regulation and effortful control, the cumulative effects of repeated distress, conflict or trauma and corresponding taxation on an individual’s capacity for self-control, and the context-specific situation-behavioral response patterns that are elicited in suicidal individuals by different features of their experiences and environments ([Lewis, Meehan, Cain, & Wong, 2016](#)).

Studies on the relationship between aggression, self-harm, and suicide

In a recent epidemiological study [O’Donnell, House, and Waterman \(2015\)](#) investigated the cooccurrence between NSSI or self-harm. From an original sample of 3036 papers, 123 studies were identified as appropriate for inclusion. The studies located for this review provides strong evidence to suggest that aggression and self-harm very often cooccur. First, the majority found aggression and self-harm to be positively associated. Second, individuals identified through one behavior

exhibited more of the other behavior at a group-level compared to controls. This suggests that engaging in one behavior may increase the chance of engaging in the other or, seen in another light, one does not protect against the other. Third, individuals with one behavior frequently exhibited the other, suggesting that the risk of cooccurrence also exists at an individual-level—the odds ratios indicating substantial effect. Thus, conclusions about cooccurrence from the basic generalizations about a particular group can be extended to individuals within that group. Moreover, the many different types of study examined suggest that cooccurrence is independent of a number of methodological factors (e.g., population, setting, measures, and data collection).

Studies in both high-risk individuals and school populations have found that trait aggression may serve as a predictor of future suicide and increase the risk of suicidal behavior. Keilp et al. (2006) found that aggressiveness was the most important factor in predicting suicidal behavior when stratifying by Bipolar Personality Disorder (BPD). They argued that aggressiveness should be considered a major target for further research on suicidal behavior and for the clinical assessment of suicidal risk.

School-based studies have revealed (1) that suicide-only adolescents have higher levels of overt and covert aggression than nonviolent and nonsuicide ones and higher levels of covert aggression than violent-only ones; (2) that those who scored higher on reactive aggression had a greater risk for suicide behaviors than those with higher scores on proactive aggression (e.g., Greening, Stoppelbein, Luebbe, & Fite, 2010); and (3) violent behavior as a behavioral marker of aggression, accounts for the majority of suicides in the United States, especially by use of firearms (Dumais et al., 2005).

Swogger, You, Cashman-Brown, and Conner (2011) suggested that aggression serves as an important mediator of the relationship between childhood physical abuse and suicide attempts among criminal offenders, highlighting the importance of aggressive treatment in suicide prevention programs. In a recent study, Swogger, Walsh, Maisto, and Conner (2013) examined the link between reactive aggression and life-time history of a suicide attempt in criminal offenders. Consistent with previous findings in nonoffenders' samples, reactive aggression was associated with a history of suicide attempt after controlling for gender and depression. Proactive aggression was unrelated to suicide attempts.

In a recent study, Greening et al. (2010) examined proactive and reactive aggression to examine how they relate to suicidal behaviors among young children. The sample consisted of 179 children (Mean = 1.5 years) admitted for acute psychiatric inpatient care. Self-report questionnaires/interviews were administered to children and their parents to assess the level of depression, proactive and reactive aggression, the risk of suicidal and the psychiatric evaluation for suicidal behaviors. The results demonstrated that reactive aggression did not emerge as a main effect but instead played a role as a moderator variable. That is, young depressed girls were found to be less likely to engage in suicidal behaviors if they had lower scores of reactive aggression. However, recent path analytic research suggests that aggression may be indirectly related to suicide attempts through suicidal ideation (Greening et al., 2008).

THEORIES OF SUICIDE AND CORRESPONDING MEASURES

Psychological pain theories

Shneidman's Theory of Psychache

One view of suicide, proposed by Edwin Shneidman (1996b), is that “In almost every case, suicide is caused by pain, a certain kind of pain—psychological pain, which I call *psychache*. Furthermore, this psychache stems from thwarted or distorted psychological needs” (p. 4).

The Psychache Scale

The Psychache Scale (PAS; Holden, Mehta, Cunningham, & McLeod, 2001) consists of 13 self-report items that are rated on 1–5 point scale that indicate Shneidman's (1993) concept of psychache. Coefficient α reliabilities for PAS scores are reported to be over .90 for university (Troister & Holden, 2010) and offender (Mills, Green, & Reddon, 2005) samples. Predictive validity has been examined through the PAS scores' ability to distinguish suicide attempters from nonattempters (Holden et al., 2001). A recent study by Troister, D'Agata, and Holden (2015) examined the effectiveness and advantages of three screening tools (the Beck Depression Inventory II, the Beck Hopelessness Scale, and the Psychache Scale) in evaluating preexisting suicide risk factors for a sample of 7522 undergraduate students. All measures demonstrated significant diagnostic accuracy for indicating suicide ideation, previous single and multiple suicide attempts, and recent suicide attempt, which are all serious risk factors for suicidal behaviors in university students. However, the PAS displayed superior performance in identifying suicide risk compared with the other two measures.

Suicide as an escape from self

Other personality-based theories of suicide have examined a set of different psychological needs in the emergence of suicidal behavior. [Shneidman \(1996, p. 157\)](#) identified “escape” as one of the primary goals of suicide; this idea has been elaborated upon in [Baumeister’s \(1990\)](#) “escape theory” of suicide. The escape theory of suicide asserts that suicide occurs when a person experiences failure in regards to a personally meaningful goal, and feelings of self-deprecation follow. Escape theory emphasizes the characteristic cooccurrence of high expectations of the self and an internal attribution of failure as a primary mechanism through which the motivation for suicide arises, implying that the frustration of psychological needs related to achievement, dominance, and shame avoidance may relate to later suicidal behavior.

A recent empirical evaluation of the escape theory of suicide provided support for the idea that failure to achieve subjectively important goals, and an internal attribution of this failure, increases the accessibility of suicide-related thoughts. Using a nonclinical university sample, [Chatard and Selimbegović \(2011\)](#) found that subjects who were primed with “failure” scenarios demonstrated increased accessibility of suicide-related thoughts compared to subjects who were primed with a neutral or “death” prompt. However, this effect was present only in subjects who reported a high baseline level of self-consciousness and a tendency to rely on “escapist” coping strategies (e.g., daydreaming or drinking alcohol). The authors interpreted these findings as evidence that “suicide-related thoughts arise as a result of a motivation to escape from negative self-awareness, when individuals realize that they fail to attain an important standard” ([Chatard & Selimbegović, 2011](#), p. 600).

These findings, in addition to the work of [Joiner, Van Orden, Witte, and Rudd \(2009\)](#) and [Joiner et al. \(2009b\)](#), support [Shneidman’s \(1996a, 1996b\)](#) proposal that enduring personality characteristics are important in the development of suicidality. Although the work of [Chatard and Selimbegović \(2011\)](#) suggests that the escape theory of suicide may be particularly applicable to individuals who are dispositionally vulnerable to experiences of shame and self-criticism in the face of failure, the interpersonal-psychological theory of suicide ([Joiner, 2005](#)) may be relevant to a separate group of suicidal individuals who are sensitive to interpersonal disruptions, loss, or abandonment.

Arrested flight model (cry of pain)

Extending Baumeister’s definition of suicide as a desire to escape from the self, [Williams \(1997\)](#) posited that suicide is a product of feelings of defeat in response to humiliation or rejection, which trigger perceptions of entrapment, combined with a failure to find alternative ways to solve the problem. This model draws upon the concept of *arrested flight* reported in the animal-behavior literature and which has been suggested to account for depression in humans ([Gilbert & Allan, 1998](#)). [Williams and Pollock \(2000, 2001\)](#) suggested that when individuals perceive their attempts at solving problems to be unsuccessful, they feel powerless to escape from the situation. The sense that the future holds little opportunity for reprieve leads to hopelessness. However, rescue factors can moderate the relationship between entrapment and suicide and thereby reduce suicide risk.

Overall, Williams’s model views suicidal behavior as a cry of pain rather than a cry for help in response to an intolerable emotional or situational state. The model integrates psychobiological and evolutionary factors, it emphasizes the potential interactions between emotions and cognitions in the road to suicide and highlights the role of entrapment and hopelessness in the development of suicidal ideation and behavior. The model has been supported by studies that demonstrated the importance of defeat and entrapment (e.g., [Rasmussen et al., 2010](#); [Taylor et al., 2010a, 2010b](#)). Many studies underscored poor problem solving to suicide. Williams and Pollock described it as overgeneral autobiographical memory, in which a person faced with a problem fails to access his past in order to generate possible solutions. The role of autobiographical memory in suicidal behavior was supported in several studies (e.g., [Arie, Apter, Orbach, Yefet, & Zalzman, 2008](#)). This model is limited by the difficulty in separating the constructs of hopelessness, depression, defeat, entrapment, and suicidal ideation.

COGNITIVE THEORIES

Hopelessness theory and the comprehensive cognitive model

One of the first modern theories of suicide was proposed by [Beck, Emery, and Greenberg \(1985\)](#) and [Beck, Brown, Berchick, Stewart, and Steer \(1990\)](#), who suggested that overwhelming thoughts and feelings of hopelessness was the major cause for suicidal ideation and eventually death by suicide. Suicidal ideation, they suggested, is a function of hopeless cognitions about the unchangeable negativity of one’s situation. The hopelessness theory of suicide is similar to Durkheim’s anomic suicide, in that when things in one’s life become difficult (e.g., economic troubles), suicidal individuals are likely to feel powerless, and thus, hopeless ([Beck et al., 1985, 1990](#)).

There are a number of studies indicating that hopelessness is a risk factor for suicide attempts and completion. For example, one longitudinal study found that psychiatric patients who score high on a measure of hopelessness were subsequently more than 4 times as likely to die by suicide as those who initially scored low on the hopelessness scale (Brown et al., 2000). Further, hopelessness also has been found to predict future suicidal behavior in both children and adolescents (e.g., Huth-Bocks, Kerr, Ivey, Kramer, & King, 2007). These findings indicate that hopelessness is an important predictor of future suicidal behavior.

Despite the impressive power of hopelessness in predicting future death by suicide, the hopelessness theory of suicide does not fully account for all aspects of suicide. The most important shortcoming of the theory is that many people feel hopeless but ultimately do not die by suicide. Take terminal illness, for example. Not all individuals in these hopeless situations die by suicide and many may even find a way to come to terms with their situation, even if it is a hopeless one.

Beck et al. (1990) emphasized the cognitive aspect of suicidality. They suggested that hopelessness plays a major role in suicide by disrupting all components of the classic cognitive triad of beliefs about self, others, and the future. In a more recent study, Wenzel, Brown, and Beck (2009) introduced the concept of *maladaptive schemas*, which consist of biases in attention, information processing, and memory.

Wenzel et al. (2009) described two schemas thought to contribute to suicidality: trait hopelessness and unbearability. When activated, such schemas are thought to precipitate state hopelessness, a key aspect of acute suicidality. Such activation of latent cognitive structures and processes is consistent with Beck's recent postulations, which address shortcomings of an earlier, more linear information-processing model by means of a more dynamic, multisystem model. In this iteration of the model (Beck, 1996), cognitions and related processes are thought to serve as key components of "modes," which consist of cognitive, behavioral, affective, and motivational components, which, when activated, "produce a synchronous response to external demands and provide a mechanism for implementing internal dictates and goals" (Beck, 1996, p. 4). *Primal mode* is presented as an example of an activated physiological, affective, cognitive, and motivational state that is stimulated when a phobic individual is confronted by the object or situation he or she most fears (Beck, 1996, p. 3).

Suicide-relevant attention biases result in selective processing of suicide-relevant stimuli. Memory biases impair the ability of the suicidal individual to recall reasons for living or being hopeful about his/her life. Wenzel and Beck (2008) formulated a comprehensive model of suicide whereby the interaction between three main constructs lead to suicidal act: *dispositional vulnerability factors*, *cognitive processes associated with psychiatric disturbance*, and *cognitive processes associated with suicidal acts*. In this cognitive model there are two types of suicide schemas. Nonimpulsive attempts are those characterized by chronic hopelessness, and impulsive attempts are those characterized by perceptions of unbearability (Fawcett, Busch, Jacobs, Kravitz, & Fogg, 1997).

The theories of Beck have had an impact on the current understanding of suicidal behavior. Studies that assessed suicide-specific attention bias among suicide attempters have used cross-sectional designs (e.g., Keilp, Gorlyn, Oquendo, Burke, & Mann, 2008; Malloy-Diniz, Neves, Abrantes, Fuentes, & Corrêa, 2009). There was only one recent prospective design that showed that attention bias precedes suicide attempt (Cha, Najmi, Park, Finn, & Nock, 2010).

Beck Hopelessness Scale

To measure a negative view of the future, Beck et al. (1974) devised the Hopelessness Scale, a 20-item true-false scale composed of 9 items keyed as false and 11 keyed as true. In the development of the Beck Hopelessness Scale (BHS), Beck followed the suggestions of Stotland (1969), and selected 9 items from an unpublished test of attitudes about the future and 11 items from a pool of pessimistic statements made by psychiatric patients who were adjudged by clinicians to appear hopeless (Beck et al., 1974). In the validation study, BHS scores were strongly correlated with clinical ratings of hopelessness (Beck et al., 1974). To date, the validity of the BHS has been investigated and confirmed in clinical and nonclinical samples (Beck & Steer, 1993). For example, several studies indicated that, in psychiatric samples, the BHS is a valid measure for predicting subsequent suicide behavior (e.g., Klonsky et al., 2012; McMillan et al., 2007), as well as worse general health and social functioning (Pompili et al., 2013).

Although several studies have been conducted to date to assess the factor validity of the BHS in psychiatric and non-clinical samples, the structure of the scale is still not clear (Aish, Wasserman, & Renberg, 2001).

Snyder's Hope Scales

Snyder's two-factor hope model is reflected in several direct and indirect measures of the construct. The availability of sound measures of this model of hope has contributed to the generation of basic and applied hope research.

Adult Dispositional Hope Scale. The Hope scale (Snyder et al., 1991) is a self-report, 12-item inventory designed to tap dispositional hope in adults, ages 15 and older. The 4-point continuum (from 1 = definitely false to 4 = definitely true)

was used in the original studies, although an 8-point scale has been used recently to encourage diverse responding. Four items reflect agency, four reflect pathway and four are distracters. Agency and pathways items are summed to yield total score.

Children's Hope Scale. The Children's Hope scale (CHS; Snyder et al., 1997) is a 6-item self-report measure that is based on the premise that children are goal-directed and that their goal-directed thoughts can be understood according to agency and pathways. The CHS has been validated for use with children ages 7–16. Three of the six items reflect agency and three reflect pathways thinking. Children respond to a 6-point Likert scale regarding the applicability of each item.

Reliabilities for the CHS have been acceptable, with Cronbach α s of the CHS total score ranging from .72 to .86, with a median α of .77 (Snyder et al., 1997).

Adult State Hope Scale. The State Hope scale (Snyder et al., 1996) is a six-item self-report scale that assesses goal-directed thinking at a given moment in time. This scale can be administered in 2–5 min, and hand-scored in a minute or less. The scale is written at approximately a sixth-grade reading level and includes the agency and pathways subscales, as well as a total score that is attained by summing responses to all six items. The agency and pathways subscale scores are derived by summing their respective three items.

Fluid vulnerability theory

Beck's concept of "suicidal mode" was expanded by Rudd (2000). The suicidal mode, when activated, manifests as suicidal cognitions, negative affect, physiological arousal, and motivation to engage in suicidal behavior. The cognitive component of the suicidal mode consists largely of a *suicidal belief system*, which, in turn, consists of three categories of core beliefs: unlovability, helplessness, and poor distress tolerance (Rudd, 2000). Contained within these core beliefs are the perception of helplessness, inadequacy (unlovability), and inability to cope (unbearability), all consistent with Beck's theory. This constellation of beliefs is thought to contribute to a *fluid vulnerability*, which fluctuates over time and helps explain the duration and recurrence of the suicidal mode across psychiatric conditions and situations (Rudd, 2006).

To explain the process of suicide risk, Rudd (2006) proposed the *fluid vulnerability* theory. The fluid vulnerability theory is based on the assumption that suicidal episodes are time limited and the factors that trigger the episode and contribute to its severity and duration are fluid in nature. Rudd believed that every individual has a baseline vulnerability to suicide, which is determined by a combination of cognitive susceptibility (e.g., attention bias, overgeneral memory), biological susceptibility (e.g., physiological and affective symptoms) and behavioral susceptibility (e.g., deficient skills in interpersonal or regulation domains).

Variations in vulnerability account for the emergence and chronicity of suicidality. The acute risk is heightened in the presence of aggravating risk factors. Core cognitive themes that activate the *suicide mode* are a belief of being unloved, a belief that one is a burden to others, feelings of helplessness, and inability to tolerate distress, among others. The constellation of themes that comprise a person's suicide mode may serve as predictors of that person's vulnerability to a suicidal crisis, the probable triggers and duration of the crisis, and the potential for future crises. Cognitive vulnerabilities, such as rumination (Surrence, Miranda, Marroquín, & Chan, 2009) and cognitive inflexibility (Miranda, Gallagher, Bauchner, Vaysman, & Marroquin, 2012) have been found to predict suicidal ideation.

Suicide Cognitions Scale

The Suicide Cognitions Scale (SCS; Rudd et al., 2010) is a self-report instrument consisting of 18 items that are rated on a 5-point scale according to strength of belief. The items contain statements consistent with the suicidal schemas of unbearability (e.g., I can't stand this pain anymore) and unlovability (e.g., I am completely unworthy of love). The instrument is scored by summing ratings across items.

Rudd et al. (2010) reported strong internal consistency and evidence of validity as a measure of a suicidal belief system in three different populations (psychiatric inpatients, emergency department patients, and college students). The SCS revealed significantly higher scores for groups with previous suicide attempts compared with those with no prior attempts, as well as significant differences when comparing individuals with and without a history of psychiatric treatment. The SCS also was able to discriminate between patients with a past history of suicidal ideation versus patients with one attempt and multiple attempts in an inpatient clinical sample. Furthermore, these authors reported that the SCS showed incremental validity above what is accounted for by the Beck Hopelessness Scale (BHS; Beck & Steer, 1993) and that the BHS adds "no explanatory power beyond that accounted for by the SCS total score" (Rudd et al., 2010). Bryan et al. (2014) also reported strong internal consistency and evidence of validity of the SCS as a measure of suicidal beliefs in a sample of military personnel. Furthermore, the SCS was able to discriminate between groups based on a history of suicide attempt, nonsuicidal self-injury, suicidal ideation, and controls (Bryan et al., 2014).

Rudd et al. (2010), using a sample of 160 inpatients, reported 2 factors accounting for the majority of the variance: Unlovability, consisting of 12 items, and Unbearability, comprising 6 items. They then performed a confirmatory factor analysis using a sample of 158 emergency department participants. Results reported by Gibbs (2011) revealed an additional six-item factor, named Unsolvability, thus producing three factors of six items each. This study utilized a clinical sample of 95 adolescents, from an inpatient facility and a partial hospitalization program. Bryan et al. (2014) performed confirmatory factor analyses on each of their two samples, which supported the two-factor solution proposed in the initial findings by Rudd et al. (2010).

Schematic Appraisal Model of Suicide

A recently proposed theoretical framework, the Schematic Appraisal Model of Suicide (SAMS; Johnson, Gooding, & Tarrier, 2008) has taken a somewhat divergent approach. Instead of describing the route into suicidality, it focuses on the individual's appraisal system and thought processes to affect this. One advantage of appraisals-based structure is that it allows the identification of potentially protective mechanisms that may confer resilience.

The SAMS suggests that two types of appraisal are relevant to suicidality. First, it suggests that situation appraisals are important and that, when stressful events are appraised as defeating and entrapping, for example, the likelihood of suicidality increases. In addition to the situation appraisal system, the model suggests a key role for a self-appraisal construct, which is thought to impact all other relevant cognitive processes. Although this suggests that negative self-appraisals may be particularly harmful, it also proposes that positive self-appraisals may be especially protective, providing a source of resilience. Of particular interest, the model suggests that positive self-appraisals may directly impact the situation appraisals system. However, the SAMS does not explain the mechanisms by which positive self-appraisals may interfere. As stressful situations are known to influence appraisals (Lazarus & Folkman, 1984), one possibility is that self-appraisals could reduce the likelihood that stressful events will be negatively appraised, leading to suicidality.

In a recent study Panagioti, Gooding, and Tarrier (2015) examined whether positive self-appraisals would moderate the association between stressful life events and suicidality. It examined positive self-appraisals, such as broad-minded coping, reappraising emotion regulation style, and survival and coping related reasons for living which would also demonstrate a moderating impact on the association between life events and suicidality. The results revealed that positive self-appraisals interacted with stressful life events in such a way that those with moderate or high levels of positive self-appraisals did not experience increased suicidality. The second finding was that broad-minded coping, reappraising emotional reasons for living did not moderate the impact of stressful life events.

Resilience Appraisals Scale

The Resilience Appraisals Scale (RAS; Johnson, Gooding, Wood, & Tarrier et al., 2010) consists of 12-item scale comprising three 4-item subscales assessing positive self-appraisals. These subscales focus on appraisals of perceived ability to cope with emotions, perceived ability to cope with difficult situations, and perceived ability to gain social support. Items for the emotion-coping scale include "I can handle my emotions," and "In difficult situations, I can manage my emotions." Items for the situation-coping subscale include "I can usually find a way of overcoming problems," and "If faced with a setback, I could probably find a way around the problem," and items for the social support subscale include "My family or friends are very supportive of me" and "If I were to have problems, I have people I could turn to." Responses are scored on a 5-point scale ranging from "Strongly Disagree" to "Strongly Agree." Johnson et al. (2010a) have found the scale to have a robust three-factor structure and report evidence of convergence with other measures of appraisals. Findings also suggest scores are distinct from measures of current life stress (Johnson et al., 2010a). Alpha reliabilities were .88 for the total scale, .92 for the emotion coping subscale, .92 for the situation coping subscale, and .93 for the social support subscale (Johnson et al., 2010a).

DIATHESIS STRESS THEORIES

There is growing consensus among researchers that suicide risk is best conceptualized as a complex diathesis-stress phenomenon. Most theories posit an underlying genetic vulnerability that is triggered by early adverse events, resulting in impaired development and function of neurobiological systems regulating behavior, affect, and cognitive function. Impairments in stress response systems may then be overwhelmed (during adolescence and adulthood) in response to episodic negative life events, increasing the likelihood of triggering a suicidal crisis. Thus, underlying genetic and psychological vulnerabilities are assumed to be triggered by environmental stressors, increasing likelihood of negative outcomes including suicidal behavior (Currier & Mann, 2008; Turecki, 2005; Rudd, 2006). Studies generally support diathesis-stress

models for predicting suicide risk interactions between early adverse events and current impulsivity (Brotsky et al., 2001), loneliness and recent stressful life events (Chang, Sanna, Hirsch, & Jeglic, 2010), and level of psychopathology and recent stressful life events in alcoholics (Conner, Beautrais, & Conwell, 2003), which confer increased risk of suicide-related behaviors. Diathesis-stress models appear to impart added risk for suicide above and beyond assessment of these factors in isolation. The one exception is individuals who have made multiple suicide attempts in which stressful life events did not correlate with intensity of suicide crisis (Joiner & Rudd, 2000). Multiple suicide attempts may lead to habituation by reducing normal barriers, such as pain, fear of death, and negative social consequences (Joiner, 2005).

Clinical biological models of suicidal behavior

Mann et al. (1999) propose a stress-diathesis model in which the risk for suicidal acts is determined not merely by a psychiatric illness (the stressor) but also by a diathesis. This diathesis may be reflected in tendencies to experience more suicidal ideation and to be more impulsive and, therefore, more likely to act on a suicidal urge. The stress model of suicidal behavior is based on the observation that stressful life events are commonly recognized as causes of suicidal behavior. A variety of explanatory models, including those applied by lay people, have indeed featured stress as a primary determinant of suicidal behavior. Such models indicate that negative life events may precipitate suicidal behavior even without the existence of individual predisposing psychological or biological characteristics (Van Heeringen, 2012).

Genetic effects, childhood abuse, and epigenetic mechanisms may be involved in the etiology of the diathesis to suicidal behavior (Mann & Haghghi, 2010). Clinical studies have demonstrated that reported childhood adversity, such as deprivation and physical or sexual abuse, is a risk factor for psychopathological phenomena in later childhood and adulthood, including depression and suicide. However, not all individuals will develop psychopathology following exposure to childhood adversity. Neuroanatomical, physiological, and genomic alterations may contribute to the long-lasting detrimental effects of exposure to childhood adversity on the risk of psychopathology (Miller, Kinnally, Ogden, Oquendo, & Mann, 2009). Postmortem findings include fewer cortical serotonin neurons in key brain regions, such as the dorsal and ventral prefrontal cortex, which also appear to correlate with components of the diathesis (Mann, 2003).

Aggression, impulsivity, and borderline personality disorder are key characteristics, which may be the result of genetic factors or early life experiences, including a history of physical or sexual abuse. A common underlying genetic or familial factor may, therefore, explain the association between suicidal behavior with the aggression/impulsivity factor and/or borderline personality disorder, independent of transmission of major depression or psychosis. Suicide risk was also associated with past head injury, and the authors hypothesize that aggressive-impulsive children and adults are more likely to sustain a head injury, which may lead to disinhibition and aggressive behavior. The serotonin neurotransmission system may also play a role (Mann et al., 1999).

Interpersonal theory

Joiner's (2005) interpersonal-psychological theory of suicide is one example of a comprehensive, personality-based model of suicidal behavior. The foundation of the Interpersonal Theory is the assumption that people die by suicide because they can and because they want to. Within the framework of this theory, three constructs are central to suicidal behavior, two primarily related to suicidal desire—*thwarted belongingness* and *perceived burdensomeness*—and one primarily related to capability—*acquired capability for suicide*. The theory also includes a specification of the relations between these constructs in the form of four hypotheses and thereby includes a specification of a causal pathway for the development of the desire for suicide and the capability to engage in serious suicidal behavior (i.e., lethal or near-lethal attempts).

Social isolation is one of the strongest and most reliable predictors of suicidal ideation, attempts, and lethal suicidal behavior across the lifespan. Social isolation can be conceptualized as measuring one facet of the higher order construct of social connectedness (or social integration), which can be measured at multiple levels (Berkman, Glass, Brissette, & Seeman, 2000). Review also indicated that other facets of social connectedness (e.g., loneliness and loss of a spouse) are also predictive of lethal suicidal behavior. Joiner (2005) proposed that these social connectedness variables are associated with suicide because they are observable indicators that a fundamental human psychological need is unmet; this need is described by Baumeister and Leary (1995) as the “need to belong” (p. 521). According to the theory, when this need is unmet—a state known as *thwarted belongingness*—a desire for death develops (also referred to in the suicidology and clinical literature as passive suicidal ideation). Other suicide theorists have also proposed a central role for social connectedness, though the proposed mechanisms for the relations between social connectedness and suicide differ across theoretical accounts. According to the theory, *perceived burdensomeness* comprises two dimensions of interpersonal functioning—beliefs that the self is so flawed as to be a liability on others, and affectively laden cognitions of self-hatred. As with thwarted belongingness, perceived burdensomeness

is presumed to be a dynamic cognitive affect state, as well as a dimensional phenomenon. Thus individuals' levels of perceived burdensomeness are likely to vary over time, over relationships, and along a continuum of severity. Therefore it is necessary to define the point at which perceptions of burdensomeness may lead to suicidal behaviors.

The Interpersonal Theory draws upon—and extends—evolutionary models of fear and anxiety by proposing that humans are biologically prepared to fear suicide because suicidal behavior involves exposure to stimuli and cues that have long been associated with threats to survival. And yet, some individuals die by suicide. According to the theory, it is possible to *acquire the capability* for suicide, which is composed of both increased physical pain tolerance and reduced fear of death, through familiarization and activation of opponent processes, in response to repeated exposure to physically painful and/or fear-inducing experiences. In other words, through repeated practice and exposure, an individual can adapt to the physically painful and fearful aspects of self-harm, making it possible for him or her to engage in increasingly painful, physically damaging, and lethal forms of self-harm. Moreover, acquired capability is presumed to be a multidimensional emergent latent variable that involves the dimensions of lowered fear of death and increased physical pain tolerance.

Integrated motivational-volitional model of suicidal behavior

O'Connor (2011) proposed the three-phase integrated motivational-volitional (IMV) model of suicidal behavior. The model emphasizes the interplay between factors associated with the development of suicidal ideation and the translation of these thoughts into suicidal behavior as an effort to integrate components of previous theoretical models. The *premotivational phase* consists of background factors (e.g., environmental deprivation, vulnerabilities) and triggering life events that provide the biosocial context for suicide, while the *motivational phase* consists of factors associated with the formation of suicidal thoughts and intention to end one's life. The theory posits, that suicidal ideation derives from feelings of entrapment that are triggered by experiences of defeat and humiliation. In the third *volitional phase*, the suicidal thoughts turn into actual suicidal behaviors. The transition is determined by behavioral enaction factors, as identified in the theory of planned behavior (Ajzen, 1991), cry of pain model (Williams, 1997), and the interpersonal theory of suicide (Joiner, 2005). Examples include access to means of suicide, capability to attempt suicide, imitation, and impulsivity (Fig. 15.1).

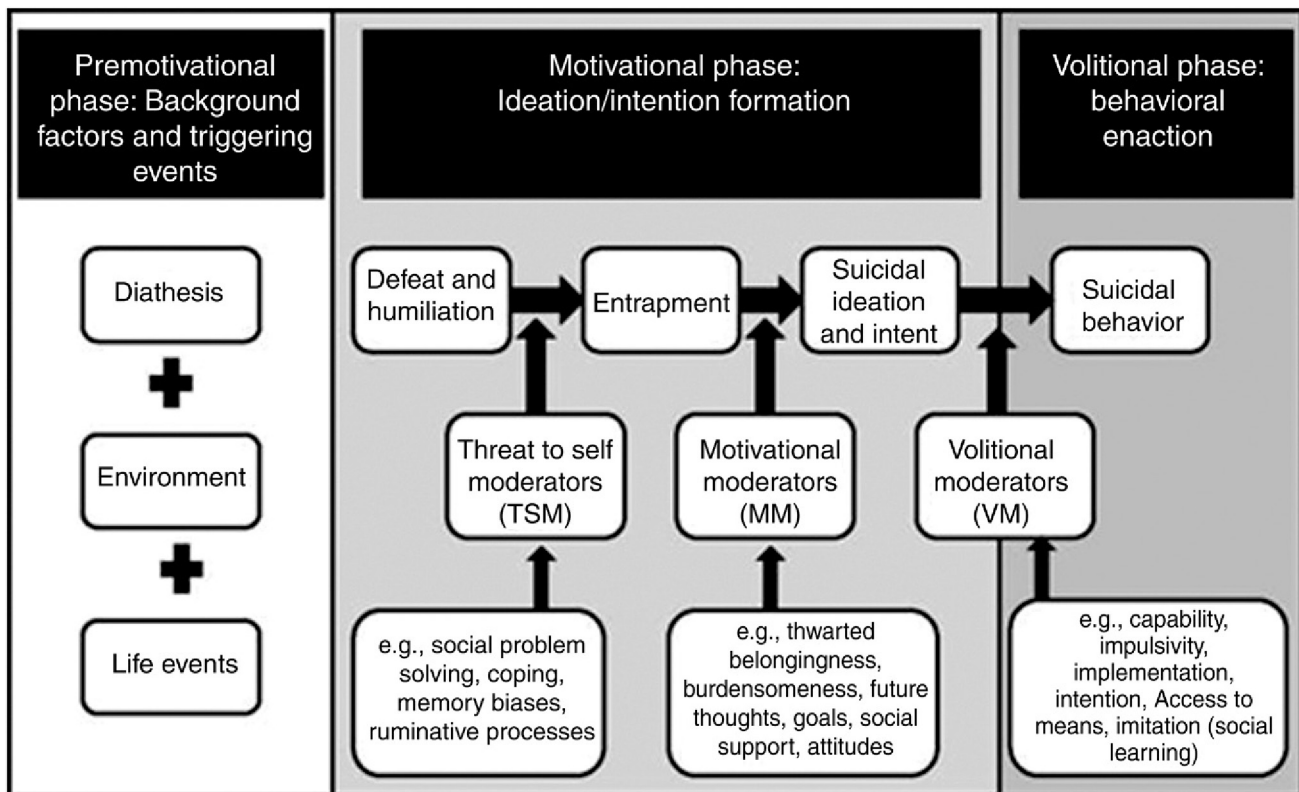


FIGURE 15.1 Integrated motivational-volitional model of suicidal behavior. (Reprinted from O'Connor, R. C. (2011). *Toward an integrated motivational-volitional model of suicidal behaviour*. In R. C. O'Connor, S. Platt, & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy & practice* (pp. 181–198). Chichester: Wiley-Blackwell, with permission. Copyright 2011 by Wiley-Blackwell.)

In a recent study [Dhingra, Boduszek, and O'Connor \(2015\)](#) based on the main principles of the IMV, examined the factors associated with the development of suicidal thoughts versus those associated with acting on such thoughts. Within a multivariate context, it was predicted that the factors associated with ideation formation (motivational factors) would be distinct from those that stimulate inaction (volitional moderators). The sample consisted of 1288 university students in the United Kingdom. The results revealed that suicide attempters differed from suicide ideators on all volitional factors (fearlessness about death, impulsivity, and exposure to suicidal behavior). Compared to ideators, attempters were more impulsive and fearless about death. Conversely, the two suicide groups did not differ on any of the variables (motivational factors) associated with the development of thoughts of death by suicide.

Three-step theory

The three-step theory (3ST; [Klonsky & May, 2015](#)) employs the ideation-to-action framework, takes into account findings from previous research and theories, and provides a comprehensive and testable model of suicide. The key constructs of the 3ST are pain and hopelessness, connectedness, and suicide capacity.

Step 1: Development of Suicidal Ideation

According to the 3ST, the first step toward ideation begins with pain. If someone's experience of living is characterized by pain, this individual is essentially being punished for living, which can decrease desire to live. This first tenet of the 3ST is consistent with some key recent research findings. First, as reviewed earlier studies on suicide motivations find that suicide attempts are prompted by overwhelming pain and hopelessness more than by other factors, including burdensomeness, thwarted belongingness, desire for help or to communicate, and impulsivity; moreover, this pattern has replicated in both clinical and nonclinical samples, and in both adults and adolescents ([May & Klonsky, 2013](#); [May, O'Brien, Liu, & Klonsky, 2016](#)). Importantly, the 3ST emphasizes that it is the combination of pain and hopelessness that brings about suicidal ideation.

Step 2: Strong Versus Moderate Ideation

According to the 3ST, the second step toward potentially lethal suicidal behavior occurs when pain exceeds connectedness. The 3ST postulates that someone who experiences pain and hopelessness and considers suicide will only have moderate ideation (e.g., Sometimes I think I might be better off dead) if connectedness remains greater than the pain. However, ideation becomes strong (e.g., I would kill myself if I had the chance) if pain overwhelms any sense of connectedness. Disrupted connectedness is similar to low belongingness and burdensomeness, as described in Joiner's interpersonal theory, but operates differently in the 3ST. In the interpersonal theory, belongingness and burdensomeness are thought to directly cause suicidal ideation. In the 3ST, the primary role of connectedness is to protect against escalating suicidal ideation in those at risk due to pain and hopelessness. Recent research supports the second step of the 3ST ([Klonsky & May, 2015](#)).

Step 3: Progression From Ideation to Attempts

Most individuals with ideation do not make a suicide attempt; therefore, the final step of the 3ST addresses the conditions under which strong ideation leads to a suicide attempt, agreeing with [Joiner \(2005\)](#) that the key determinant is whether the individual has the capacity to make a suicide attempt. Joiner suggests that fear of death is a powerful instinct that makes it extremely difficult to attempt suicide, even if experiencing strong suicidal ideation; thus, individuals can only attempt suicide if they have developed the capacity to overcome this barrier.

Joiner's theory emphasizes acquired capability. In short, this ability is developed and increased through experiences with painful and provocative events that increase one's tolerance for pain, injury, and death. The 3ST broadens the concept and proposes three categories of variables that contribute to suicide capacity: *dispositional*, *acquired*, and *practical*. This third step of the 3ST has also been supported by recent research ([Klonsky & May, 2015](#)). In a US-based online sample, which included large numbers of attempters and ideators, dispositional, acquired, and practical contributors to suicide capacity each related to suicide attempt history, and they continued to relate to attempt history in analyses controlling for current ideation and for past ideation.

THE CULTURAL MODEL OF SUICIDE AND SUICIDE RISK ASSESSMENT

Existing research approaches to suicide assessment and prevention have not incorporated cultural elements in a consistent way. In addition, the majority of suicide models have underestimated the role of cultural influence. [Chu, Goldblum, Floyd, and Bongar \(2011\)](#) produced a comprehensive analysis of literature describing the relationship between cultural factors and

suicide in three major ethnic groups (Asian Americans, Latinos, and African Americans) and LGBTQ (an abbreviation for lesbian, gay, bisexual, and transgender or transsexual individuals) sexual minority groups. The authors split all this body of research in four factors that account for over 93% of existing culturally specific risk data: cultural sanctions, idioms of distress, minority stress and social discord. Subsequently they integrated these four factors into a theoretical framework, the Cultural Model of Suicide (CMS). Three theoretical principles emerge: (1) culture affects the types of stressors that lead to suicide, (2) cultural meanings associated with stressors and suicide affect the emergence of suicidal tendencies, one's threshold of tolerance for pain and subsequent suicidal acts, and (3) culture affects the way suicidal thoughts, plans and attempts are expressed.

Continued clarification of the Cultural Model of Suicide involves the meaningfulness of an expanded theoretical component—that of *cultural meaning*. Cultural meaning mediates the development of suicidal behavior to stressors, such as health problems for the elderly (Stice & Canetto, 2008) or interpersonal problems for females (Canetto, 1993, 1997a, 1997b) as identified by the cultural scripts theory (CST) (Stice & Canetto, 2008). Although the CST is crucial in highlighting the importance of cultural scripts and culturally significant precipitating stressors, it does not fully operationalize the cultural meaning of suicide (Stice & Canetto, 2008).

The Cultural Assessment of Risk for Suicide measure

A new self-report instrument for the Cultural Assessment of Risk for Suicide (CARS) measure is based on the Cultural Model of Suicide (Chu, Goldblum, Floyd, & Bongar, 2010). The total sample consisted of 950 participants >18 years of age. The CARS consisted of an initial set of 52 items developed to assess for the 4 cultural risk categories of CMS (cultural sanctions, idioms of distress, minority stress, and social discord) which later were reduced to 39. EFA yielded eight theoretically meaningful and coherent factors each with good internal consistencies. Two of the eight factors (idioms of distress-emotional/somatic and idioms of distress-suicide actions) are consistent with the broader component of the cultural meaning of idioms of distress.

One CARS factor is consistent with the Cultural Model component of Cultural Sanctions. The Cultural Model's component of Minority Stress is represented within three CARS factors representing separate subtypes of minority stress: (1) nonspecific minority stress encompassing stressors of minority status, (2) sexual minority stress specific to LGBTQ individuals, and (3) acculturative stress. Finally, the social discord component of the Cultural Model is parsed into general social support and family conflict factors. The CARS also showed good psychometric properties as an overall measure of risk, with the entire 39-item total score showing good internal consistency.

We assessed convergent validity of the CARS factors and overall scale by analyzing their relationships with other established measures of suicidal ideation and behavior. Correlation coefficients showed that each of the eight CARS factors and the total CARS score demonstrated convergent associations with measures of suicidal behaviors and hopelessness as measured by the suicide item from the BDI, the SIS, and the BHS. Analyses also showed that the CARS subscale and total scores adequately discriminated among individuals with and without reported history of suicide attempts.

PRINCIPLES AND THEORIES OF HOMICIDE-SUICIDE

Berman (1979) was one of the first to propose a classification scheme of homicide-suicide. In his typology, he included subcategories of suicide pacts referred to as “exhibitionistic suicides.” Such types of suicide include assassination followed by suicide and terrorist suicide missions. Wallace (1986), on the other hand, generated four axiological models of homicide-suicide based on motive, conflict, altruism, and mental abnormality. Marzuk, Tardiff, and Hirsch (1992) proposed a classification system based on the relationship between perpetrator and victim: spousal homicide-suicide, child suicide, familicide-suicide, and extrafamilial homicide-suicide.

Hanzlick and Koponen (1994) adapted Marzuk et al.'s (1992) classification by delineating sociodemographic variables, event-related characteristics, as well as precipitating stressors. Felthous and Hempel (1995) proposed to link Marzuk et al.'s classification to one based on psychopathology. Palermo et al. (1997) distinguished three forms of homicide-suicide, the first type consisting of homicide combined with a self-destructive act as an outcome of anger or paranoia. The second type includes perpetrators who commit suicide motivated by fear of detection and exposure. In the third type, the authors distinguished between “kamikaze” type terrorist acts in which the perpetrator dies as a by-product of the homicidal act. Harper and Voigt (2007) proposed a classification system involving “intimate or domestic lethal violence-suicide,” “family annihilation suicide,” “public killing spree suicide,” and a category consisting of “mistaken or accidental homicide suicide.”

Palermo's (1994) review of homicide-suicide studies focused on cases involving jealous paranoid personality types. Based on psychoanalytical, sociological, and psychiatric theories, Palermo suggested that these cases should be referred

to as extended suicides. “It is obvious that at the time of crime his (the perpetrator’s) feelings are not those of killing an autonomous entity—but rather an extension of himself. The murder-suicide then becomes the expression of an extended suicide” (p. 214). This concept proposes that suicide is the primary motivation. Extended suicide is often reported in mothers who kill their children (Hanzlick & Koponen, 1994). Hatters-Friedman, Hrouda, Holden, Noffsinger, and Resnick (2005) reviewed 30 filicide-suicides during the 1958 and 2002 in the United States. The authors concluded that 90% of the mothers who killed the children and later committed suicide were motivated by “altruism” to alleviate their child from pain or suffering compared to 60% of fathers.

Van Wormer (2008) introduced the term *suicide-murder* to describe cases driven by suicide. These cases include elderly homicide-suicide characterized by imminent separation due to infirmity, mass shootings and spree killings, and intimate violence. Van Wormer proposed that the suicidal murderers are antisocial and they have dependent “symbiotic” relationships with their partners. Theoretical frameworks proposed to apply to homicide-suicide include attribution theories (Starzomski & Nussbaum, 2000), masculinity theories (Gregory, 2012), strain theories (Harper & Voigt, 2007), social-integration theories (stemming largely from Durkheim, 1897/1966), psycho-dynamic theories (Palermo, 1994), and stream analogy theories (Stack, 1997; Unnithan, Huff-Corzine, Corzine, & Whitt, 1994). These theories correspond with typology-based explanatory frameworks for homicide-suicide, which incorporate factors, such as mental illness, motivational state (e.g., jealousy, frustration), and the relationship status distance between offender and victim(s) (e.g., family or strangers; Harper & Voigt, 2007; Liem & Nieuwbeerta, 2010; Marzuk et al., 1992; Palermo, 1994).

Psychoanalytic theories of homicide-suicide

Among the first important psychological insight into suicide was Freud' (Masango, Rataemane, & Motojesi, 2008). Freud's first observations on self-destruction led to psychoanalytic theories and studies that have influenced the research on suicide. In his seminal work, *Beyond the Pleasure Principle*, Freud (1920) conceptualized the internal forces that promote self-destruction. He postulated that the life and death drives were opposing basic instincts. The life drive was directed at reducing the tension associated with survival needs; the death drive was directed at eliminating the tension of life itself. He believed that the energy to kill oneself derived from an earlier repressed desire to destroy another. Suicide represented an internalization of this object and a turning of the external death wish inward, against a fragment of one's own ego. Freud referred to suicide as aggression turned inward. Some research has supported these speculations by finding a high degree of “frustrated” relationships characterized by domestic violence especially among those killing their intimate partner before committing suicide (e.g., Koziol-Mclain et al., 2006).

Elaborating on Freud's death instinct, Menninger (1938) claimed that every suicide is an inverted homicide, or “murder in the 180th degree.” He conceptualized a suicidal triad consisting of the wish to kill (murder), the wish to be killed (guilt), and the wish to die (depression). The wish to kill is originally oriented to an external object and later introjected into the ego, leading to feelings of guilt for wishing loved ones dead. As one's ego is destroyed by self-hate and guilt, a depressed, hopeless wish to die evolves, and the wish to be killed as punishment for thoughts of destroying others. Menninger (1938) linked suicide and self-harm to castrating or mutilating fantasies directed toward one's parents and siblings.

Other Freudian element keys to the understanding of both homicide and suicide are the concepts of the ego, superego, and the id (Freud, 1949). In this psychodynamic model, the ego is battling with the id, the superego, and the outside world—concepts later incorporated by theorists, such as Henry and Short (1954). In addition to taking on a sociological point of view to explain both homicidal and suicidal behavior as described before, they also incorporated psychodynamic factors in their explanatory model. Henry and Short (1954) postulated that suicide is a function of an excessively strict superego or an internalized restraining mechanism of the personality, which prohibits the outward expression of aggression. From these theoretical underpinnings, it can be concluded that, when a person with a strong superego formation kills, that individual is more likely to commit suicide after the killing than one who does not have an internalized prohibition against the outward expression of aggression. Suicide can thus be considered as self-punishment by the superego for having resorted to violent behavior (thereby constituting an act motivated by guilt and self-blame).

In addition, Henry and Short held that the victim in a homicide-suicide not only represents a source of frustration but also a source of nurturance. When the source of frustration (i.e., the victim) is destroyed in a homicide, the source of nurturance is also lost. Hence, the killing of the victim can restore or even increase frustration over the loss of a loved object. The self then becomes a legitimate target of aggression in the form of suicide. Previous research supports this presumption, finding a high degree of “frustrated” relationships characterized by domestic violence especially among those killing their (estranged) intimate partner before committing suicide (Koziol-Mclain et al., 2006; Morton, Runyan, Moracco, & Butts, 1998; Rosenbaum, 1990). From this point of view, homicide-suicide is considered to be a variation of homicidal behavior, since suicide following the homicide is perceived of as reactive.

Klein (1935, 1946) further emphasized the role of the death instinct, asserting that primitive envy in early life represents a severe form of innate aggression. According to Klein's theory, suicide is caused by unbearable guilt over aggressive fantasies toward internalized objects. The guilt causes feelings of badness and destructiveness. Suicide is therefore an attempt to prevent one's own destructiveness. This psychodynamic theory was the first to emphasize the role of object-relations in the suicidal process.

Two-stage model of outward and inward directed aggression

The two-stage model of suicide and violence (Apter, Plutchik, & van Praag, 1993; Plutchik, 1995; Plutchik, Van Praag, & Conte, 1989) is based on the assumption that suicide and violence are expressions of the same underlying aggressive impulse, and it is the presence or absence of other variables that determine what direction the aggression will take. Plutchik et al. (1989a) listed possible triggers (stressors) that generate aggressive impulses, including threats, challenges, insults, loss of control, and perceived threat to one's social rank. In the first stage, the cutoff level of impulsive aggression that will be expressed in overt behavior or action is determined. Impulsive aggression may be amplified or attenuated by other factors, such as social support, attitudes toward violence, and access to a weapon. In the second stage, the object toward which the aggression is directed is identified. The risk of aggression toward the self (suicide) is increased in the presence of depression, total life problems, and recent psychopathology symptoms. Impulsive trait and problems with the law direct the aggressive impulse toward others (violence).

Multiple epidemiologic, clinical, retrospective, prospective, and family studies have identified a strong link between aggression and suicide (Gvion & Apter, 2011). Direct examinations of the two-stage model provided some support (Apter et al., 1993; Plutchik, 1995; Plutchik et al., 1989a). However, evidence for relationships between psychopathologies and outward and inward aggression is inconsistent (Spielberger, Reheiser, & Sydeman, 1995; Whiteside & Abramowitz, 2004). Recent studies on suicide emphasized the need to look at more specific aspects of aggression when studying suicide attempts (Giegling et al., 2009), such as gender differences between trait anger, anger expression, and suicide attempts among adolescents and young adults (Goldston, Reboussin, & Daniel, 2006). From the theoretical perspective, this model attempts to explain the impulsive-aggressive type of suicidal behavior that seems to occur more in younger people and has received the most attention. However, other personality constellations may underlie suicidal behavior, such as narcissist-perfectionist type and hopelessness-depressive type (Apter et al., 2008; Apter, 2010). These may well be associated with different biosocial diatheses.

Strain theories

Durkheim (1897/1951) insisted that no phenomenon was more affected by imitation or contagion than suicide. However, he did not agree that this contagious quality necessarily affected the suicide rate—a social fact—because its genesis was psychological and its consequences merely individual and random; nor did he hold that geographical clustering of suicide was caused by imitation. Rather, the key causes were social integration and regulation. Durkheim stated that where there is a lack of social ties in a community, social integration will be low, leading to individualism and egoistic suicide. On the other hand, where social integration is excessive and the interests of the group dominate those of the individual, high rates of altruistic suicide will result. Another important social cause of suicide he assumed is inadequate regulation, otherwise known as anomie. In a study of suicides in American countries using spatial analysis, Baller and Richardson (2002) found some support for Durkheim's theory in that suicides clustered geographically only because the structural predictors of suicide, such as social integration, also clustered in space. Nevertheless, they also found evidence that imitation shaped the geographic patterning of suicide.

Drawing on Durkheim's concept of anomie, Merton's strain theory contends that a state of anomie arises when certain groups are restricted in attaining a cultural value (e.g., wealth) through institutionalized means (e.g., work) (Merton, 1968). In Merton's theory, there are various ways in which an individual can respond to the problem of anomie: by *conformity*, *innovation*, *ritualism*, *retreatism*, or *rebellion*. The latter two coping mechanisms have been used to explain both suicide and homicide: the retreating individual withdraws, or seeks to isolate himself from the social structure—the most extreme and permanent form being suicide. In rebellion, on the other hand, the individual responds to frustrations by striking out against social structures and their participants—homicide being the most extreme form (cf., Unnithan et al., 1994). Merton's concept of strain has previously been used in explaining the disproportionate rate of homicides followed by suicides committed by working-class individuals in turn-of-the-century Chicago (Adler, 1999). Adler explained the high frequency of homicide-suicide during that time by the lack of resources and standing of the working class to achieve middle-class status, which gave rise to an anomic state, characterized by feelings of disgrace and helplessness. This strain perspective was

further supported by the fact that the homicide-suicide rate fell in the 1910s, when relatively few workers found themselves at the edge of both working class and middle class (and their related social and cultural worlds).

Later scholars, such as Robert Agnew (1992), have interpreted Merton's concept of strain as personal strain, rather than as societal strain. Agnew's theory focuses on relationships in which the person is presented with a "noxious" situation (Agnew, 1992). These situations range from preventing an individual from achieving positively valued goals, removing or threatening to remove positively valued stimuli, and presenting or threatening to present an individual with noxious or negatively valued stimuli. This condition generates a variety of negative emotions, such as disappointment, depression, fear, and anger. Violent behavior, then, becomes a means to cope with frustration and interpersonal problems. Agnew's theory of social stress and strain has been applied to Harper and Voigt (2007) homicide-suicide conceptualization. Based on the findings from previous literature and findings from their sample of 42 homicide-suicides in New Orleans, factors, such as loss of a job, financial problems, loss of or rejection by a sexual partner were found to be prevalent. From this perspective, inability to achieve positively valued goals includes the withdrawal from an intimate partner and/or children. The presentation of negatively valued stimuli corresponds to interpersonal rejection or abandonment (Harper & Voigt, 2007). From this point of view, homicide-suicide occurs when an individual is faced with the inability to achieve positively valued goals combined with the occurrence of negatively valued stimuli.

Stream analogy for lethal violence

Rather than considering the *origin* of aggression, the stream analogy for lethal violence addresses the *direction* of aggressive impulses. Underpinnings of this theory can be traced back to Henry and Short (1954), who held that both homicide and suicide are alternative aggressive responses to frustration. This understanding was revived with the introduction of the stream analogy for lethal violence by Whitt et al. (in Unnithan et al., 1994), describing lethal violence as a stream with two distinct currents flowing through time: the homicide current and the suicide current. The combined currents comprise the overall amount of lethal violence. In this model, suicide and homicide are alternate forms of death, constituting a function of two sets of causal mechanisms: *forces of production* and *forces of direction*. Forces of production are social and cultural factors that influence the total *amount* of lethal violence. Forces of direction are cultural and structural factors that prompt offenders to *direct* their violent drives inward to suicide or outward to homicide. In order to explain the choice between homicide and suicide, the stream analogy uses concepts from attribution theory, the choice between homicide and suicide depending on attributional concerns: a higher tendency of external blame in response to frustration will result in a higher homicide rate relative to the suicide rate (Batton, 1999; cf., Wu, 2003). Conversely, factors that increase the internal attribution of blame in response to frustration increase the risk of suicide relative to homicide. In this model, individuals in both groups share a hopeless perspective on their future prospects.

This theory does not, however, discuss conditions under which homicide and suicide occur simultaneously in a homicide-suicide. Homicide-suicide blurs the clear lines between homicidal and suicidal behavior—homicide being outwardly directed, whereas suicide is inwardly directed. Stack (1997) attempted to apply the stream analogy to homicide-suicide in a study of Chicago homicides. He concluded that the principal source of frustration in homicide-suicide stems from the perpetrator's inability to live neither *with* nor *without* the victim. He argued that the homicide act overcomes a sense of helplessness, but that the subsequent guilt causes suicide. Stack suggested viewing homicide-suicide as containing both inward and outward attribution: homicide resulting from external blame attribution, followed by an internal attribution resulting in a suicide. In a similar vein, Liem and Roberts (2009) found perpetrators of intimate-partner homicides who committed a serious suicide attempt to have a high prevalence of unemployment, depressive disorder, previous suicide threats and suicide plans, in line with suicide victims. These findings suggest that intimate partner homicide-suicide favors the suicide current over the homicide current.

THE ASSESSMENT OF SUICIDE

Most recently, approaches to the assessment of suicide risk have included the development of innovative methodologies for identifying implicit behavioral markers for suicidal behavior, effectively circumventing the problematic issues associated with reliance on self-report measures. Methodologies, such as the Implicit Association Test (IAT) that assess the associative patterns between implicit personality-based cognitive and affective processes, may be potentially useful in identifying the situation-behavior response patterns that are characteristic of individuals with different personality types (Mischel, 2004). Modified Stroop tasks are performance-based measures that record response latencies of how quickly participants identify the color of different words presented on a computer screen. Researchers have recently found that suicidal individuals demonstrate a marked attentional bias toward suicide-related stimuli, and a stronger association between suicide and their

own self-concept, compared to nonsuicidal individuals (Cha et al., 2010; Nock, Hwang, Sampson, & Kessler, 2010). These methods have been shown to have greater predictive accuracy for later suicidal behaviors than that of trained clinicians or of subjects' own assessment of their future risk for suicide (Nock et al., 2010). These results provide early evidence that suicidality may, for some individuals, become an integrated part of personality structure, guiding cognitive processing, affect, and behavioral reactivity to environmental and interpersonal stimuli.

Challenges to suicide assessment

Effectively assessing suicide risk is dependent on the availability of sensitive and specific measures of long-term risk factors, short-term warning signs, and an appreciation for the complexity and variability of suicide risk over time. Unlike many diagnostic procedures assessing relatively stable phenomena, we do not yet possess a single test, or panel of tests that accurately identifies the emergence of a suicide crisis (Fowler, 2012). Among the many reasons is that suicide risk is fluid, highly state-dependent, and variable over time (Rudd, 2006).

Thus despite decades of research, accurate prediction of suicide and suicide attempts remains elusive. The American Psychiatric Association (APA) Guidelines on Suicidal Behavior (APA, 2003) concluded that predicting suicide appears impossible in large part due to the rarity of suicide, even among high-risk individuals, such as psychiatric inpatients. Beyond statistical challenges posed by low base rates, longitudinal prediction using relatively distal variables, such as psychiatric diagnoses, demographics, and self-reported psychological states, consistently yield high false-positive prediction rates, limiting their predictive value (Goldsmith et al., 2002; Rudd et al., 2006). Another complicating factor in the assessment process is the fact that most studies assess single risk factors, leaving clinicians and expert panels to estimate how risk factors interact to influence outcomes. Although prediction appears unlikely at this stage, clinicians are nonetheless responsible for assessing suicide risk, and for providing treatment to decrease risk (APA, 2003). Modifiable risk factors include the short-term safety of patients, and treating psychiatric symptoms/disorders using evidence-based treatments.

Review of measures of suicide

The psychometric properties of suicide measures are difficult to assess and compare (Fowler, 2012). Validation of scores on suicide measures tends to be conducted with respect to other measures (convergent validity) or simply by assessing internal consistency, rather than by evidence-based validity. Dimensionality and factor structure may also be assessed. There has been very little population-based research on the predictive validity of measures currently in use (that is, whether they predict subsequent suicidal behaviors), due to the relatively low prevalence of deaths by suicide in the general population and the difficulty and cost of implementing prospective studies.

There are suicidal risk measures that assess prevalence only (using binary items) or also aim to assess the severity of suicidal thoughts and behaviors (using response scales). A recent review and evaluation for suicidal ideation and behaviors (Batterham et al., 2014) focused only on severity measures for use in population-based research where suicidal ideation or behaviors is the main outcome.

This study provides a systematic review of adult, self-report suicide measures for use in population-based research. The focus of the review is on measures that assess the level of severity of suicidal thoughts and behaviors as a dimension. Dimensional measures are capable of capturing a range of risk states and are appropriate in assessing suicide risk in population-based samples. Furthermore, prevalence measures that do not assess suicide risk on a dimension tend to have inadequate psychometric properties. The other criteria used to evaluate measures are length, appropriate definitions of suicidal thoughts and behaviors, quantitative outcome, level of scientific scrutiny, and restrictions on use. The evaluation distinguishes between brief measures, which may be more useful for studies in which suicide is a secondary focus, and more comprehensive measures, which might be appropriate for studies focusing primarily on suicide. The aim of the review is to identify adult, self-report suicide measures that have sound psychometric properties and are appropriate for use in population-based research, with a view to promote more consistent use of identified measures.

Measures of suicide ideation and behaviors

Beck Scale for Suicide Ideation

The Beck Scale for Suicide Ideation (BSSI) is one of the oldest and most widely used suicide scales. The original BSS was developed in 1988, and was modeled after a successful interviewer-rated version, the Scale for Suicide Ideation (Beck, Kovacs, & Weissman, 1979). The BSS contains 19 items that measure the severity of actual suicidal wishes and plans. Scores range from 0 to 38, a higher score indicating a higher level of suicide ideation. Two studies (Beck, Brown, Steer,

Dahlsgaard, & Grisham, 1999; Brown et al., 2000) indicated that the best cutoff to indicate high/low risk was BSS >2. Originally, if a patient scored 0 on items 4 and 5, he/she was directed to item 20. If the patient scored >0 on items 4 and 5, all items of the BSS were completed. However, in most studies, the first five items are used as the screener (Brown et al., 2000; Van Spijker, Van Straten, & Kerkhof, 2010).

The Columbia-Suicide Severity Rating Scale

Suicidal ideation and behavior have traditionally been conceived as a unidimensional construct, with passive ideation, active intent, and behavior existing along a continuum (McKeown et al., 1998; Paykel, Myers, Lindenthal, & Tanner, 1974). The Columbia-Suicide Severity Rating Scale (C-SSRS) was designed to (1) provide definitions of suicidal ideation and behavior and nonsuicidal self-injurious behavior and corresponding probes; (2) quantify the full spectrum of suicidal ideation and suicidal behavior and gauge their severity over specified periods; (3) distinguish suicidal behavior and nonsuicidal self-injurious behavior; and (4) employ a user-friendly format that allows integration of information from multiple sources (e.g., direct patient interview, family and other interviews, and medical records). As reviewed by Meyer et al. (2010), these criteria are considered essential for judging the utility of scales assessing suicide-related phenomena, and the scale is unique among rating instruments in meeting all of these criteria. The C-SSRS, however, was designed to distinguish the domains of suicidal ideation and suicidal behavior. Four constructs are measured. The first is the *severity of ideation* (severity subscale). The second is the *intensity of ideation* subscale (intensity subscale) frequency, duration, controllability, deterrents, and reason for ideation. The third is the *behavior subscale*, which is rated on a nominal scale that includes actual, aborted, and interrupted attempts; preparatory behavior; and nonsuicidal self-injurious behavior. And the fourth is the *lethality subscale*, which assesses actual attempts.

The items for assessing severity of ideation (e.g., a specific plan or method) and intensity (e.g., frequency, duration) of ideation were based on factors predicting attempts and suicide identified in previous studies (Nock & Kessler, 2006; Mann et al., 1999). The C-SSRS uses different assessment periods, depending on research or clinical need; the lifetime period assesses the worst-point ideation, which research has suggested may be a stronger predictor of subsequent suicide than current ideation (Beck et al., 1999; Joiner et al., 2003).

Suicidal Ideation Attributes Scale

Suicidal Ideation Attributes Scale (SIDAS; Van Spijker et al., 2014), is a five-item scale assessing (1) frequency, (2) controllability, (3) closeness to attempt, (4) distress and (5) interference with daily activities on 10-point scales over the past month. The items are:

1. "In the past month, how often have you had thoughts about suicide?" (0 *Never*, 1–9: unlabeled points, 10 *Always*);
2. "In the past month, how much control have you had over these thoughts?" (0 *No control/do not control*, 1–9: unlabeled points, 10 *Full control*);
3. "In the past month, how close have you come to making a suicide attempt?" (0 *Not at all close*, 1–9: unlabeled points, 10 *Have made an attempt*);
4. "In the past month, to what extent have you felt tormented by thoughts about suicide?" (0 *Not at all*, 1–9: unlabeled points, 10 *Extremely*); and
5. "In the past month, how much have thoughts about suicide interfered with your ability to carry out daily activities, such as work, household tasks or social activities?" (0 *Not at all*, 1–9: unlabeled points, 10 *Extremely*).

A 10-point scale was chosen to capture a larger degree of variability than might be expected from fewer categories, and to result in an approximately continuous scale. Respondents who endorse a frequency of zero (*Never*) on the first item of the scale skip the remaining items and are given scores of 10 for controllability (full control) and zero for closeness to attempt, distress, and interference. Higher scores are indicative of greater suicidal ideation severity. The SIDAS generally takes between 30 and 60 s to complete, although it is substantially shorter for individuals with no suicidal ideation.

The Minnesota Multiphasic Personality Inventory–2–Restructured Form–Suicidal/Death Ideation

For a more comprehensive and accurate suicide risk assessment Glassmire, Tarescavage, Burchett, Martinez, and Gomez (2016) proposed the inclusion of self-report questionnaires. A standard method in suicide risk assessment is often the application of standard personality questionnaires, such as the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway & McKinley, 1940) and its latest version, the MMPI-2–Restructured Form (MMPI-2–RF; Ben-Porath & Tellegen, 2008/2011). The MMPI-2 and MMPI-2–RF include several items that inquire about suicidal ideation and behavior and thus provide more relevant information on suicide risk than simply the use of clinical scales (Glassmire, Stolberg, Greene, & Bongar, 2001)

grouping the six items in a single scale, the Suicidal Potential Scale (SPS). Four of the six MMPI-2 items from the SPS were retained on the MMPI-2-RF. These four items plus one additional item were combined to form the MMPI-2-RF Suicidal Death Ideation Scale (SUI). To date only one study has examined the utility of the MMPI-2-RF SUI scale. [Gottfried, Bodell, Carbonell, and Joiner \(2014\)](#) found that SUI was associated with reported history of suicide attempts, clinician ratings of suicide risk and self-report measures. They also found that SUI was associated with self-reported past suicide attempts over and above age, gender and the MMPI-2-RF Demoralization (RCd) and Low Positive Emotions (RC2) scales, which measure general distress and depressive symptomatology, respectively.

In a current study, [Glassmire et al. \(2016\)](#) examined whether the MMPI-2-RF-SUI items would provide incremental suicide-risk assessment information after accounting for information collected from a clinical interview. It was found that patients who endorsed SUI items concurrently presumed conceptually related suicide-risk information during the clinical interview. The SUI scale, as well as the MMPI-2-RF Demoralization (RCd) and Low Positive Emotions (RC2) scales, correlated significantly and meaningfully with conceptually related suicide-risk information from the interview, including history of suicide attempts, history of suicidal ideation, current suicidal ideation, and months since last suicide attempt. We also found that the SUI scale added incremental variance (after accounting for information derived from the interview and after accounting for scores on RCd and RC2) to predictions of future suicidal behavior within 1 year of testing. Relative risk ratios indicated that both SUI-item endorsement and the presence of interview-reported risk information significantly and meaningfully increased the risk of suicidal behavior in the year following testing, particularly when endorsement of suicidal ideation occurred for both methods of self-report.

Protective factors and resilience

Over the last few decades, suicidology has focused on the relationship between various risk factors (in particular negative cognitive factors as hopelessness) and suicide (e.g., [Johnson, Wood, Gooding, Taylor, & Tarrier, 2010](#); [Wingate et al., 2006](#)). The positive or protective factors that enable individuals to deal with negative feelings and adopt coping strategies have been neglected. During the last decade there is a growing interest in the way protective or positive attitudes, feelings or cognitions can buffer suicidal risk factors and stressors (e.g., [Wingate et al., 2006](#)). More specifically, scholars concentrate in the study of the association between resilience and suicidality (e.g., [Johnson et al., 2010b](#)). [Johnson et al. \(2010b\)](#) conducted an extensive review of seventy-seven suicidality studies that examined the role of at least one positive psychological construct (resilience factor) in moderating the link between a risk factor and an outcome of suicidality. Moreover, the authors introduced a buffering framework to investigate the role of resilience factors (e.g., positive attributional styles and agency) in buffering the impact of risk factors (e.g., hopelessness, life stresses) on suicidality. Using this framework, the buffering effect of a wide range of positive psychological constructs on suicidal thoughts and behaviors can be explored.

Positive psychology concepts, such as hope, self-efficacy, meaning in life, reasons for living, and decision-making, have been systematically studied as buffers against suicide risks. To ensure that a factor is a buffer, it is necessary to demonstrate that it moderates the likelihood that the presence of a stressor or risk factor predicts suicidality. Individuals who attempt suicide are conceptualized as poor problem-solvers who are unable to generate or consider alternative available options. This inability may be related to cognitive rigidity defined as the inability to identify problems and corresponding solutions ([Schotte & Clum, 1982](#)). A strong association between *problem-solving* appraisal stress and hopelessness in individuals with suicide-related behaviors has been determined (e.g., [Rudd, Rajab, & Dahm, 1994](#)).

Reasons for living appears to play a positive role in suicidal individuals (e.g., [Malone et al., 2000](#)). In a 2-year prospective study, helping persons to find reasons for living contributed in decreasing future suicide attempts among depressed female inpatients ([Lizardi et al., 2007](#)). Numerous studies indicate that an individual's suicidal ideation is associated with hopelessness ([Brown et al., 2000](#)), a negative perception of one's future (e.g., [O'Connor and Cassidy, 2007](#)), and a lack of meaning in one's life ([Frankl, 1959, 1985](#); [Melton & Schulenberg, 2007](#)). [Frankl \(1959, 1985\)](#) postulates that when the will to meaning is restrained, existential frustration emerges. Meaning is commonly found through the pursuit of important goals ([Klinger, 1977](#)) or the development of a coherent life narrative (or life script) (e.g., [Kenyon, 2000](#)). [Baumeister \(1991\)](#) proposed that a feeling of meaning can be attained by first meeting needs for value, purpose, efficacy, and self-worth. Others have highlighted the importance of daily decision-making and action ([Maddi, 1970](#)) or of self-transcendence (e.g., [Allport, 1961](#); [Seligman, 2002](#)) in the creation of meaning. Meaning is considered important whether as a critical component ([Ryff & Singer, 1998](#)) or as a result of maximizing one's potential (e.g., [Deci & Ryan, 2000](#)).

In a recent prospective study, [Kleiman, Adams, and Kashdan \(2013\)](#) examined meaning in life (MIL) as a suicide resiliency factor. Specifically, the authors examined gratitude and grit as factors that synergistically confer resiliency to suicide by increasing meaning in life. Gratitude is an interpersonal characteristic that implies noticing the benefits and

gifts received from others (e.g., McCullough, Kilpatrick, Emmons, & Larson, 2001). Grit is an interpersonal psychological strength that implicates the pursuit of long-term goals with perseverance and passion (Duckworth, Peterson, Matthews, & Kelly, 2007). Using a sample of 209 college students, the authors found that individuals endorsing high gratitude and grit experience a near absence of suicidal ideations over time. These findings illustrate the importance of examining cooccurring personality factors and their combination that can provide resiliency to suicide.

Setting new goals and looking to the future can benefit an individual's psychological well-being and happiness (Lapierre, Dubé, Bouffard, & Alain, 2007; Sheldon & Houser-Marko, 2004; Brunstein, 1993). According to Snyder and Rand (2004) people who have hope believe that they can improve their situation, take responsibility for their own well-being and actively commit themselves to solve their problems. Additionally, past longitudinal studies have shown that personal commitment in the pursuit of goals predicts psychological well-being (Sheldon & Houser-Marko, 2004).

A recent framework, the Schematic Appraisals Model of Suicide (SAMS; Johnson et al., 2008), suggests that positive self-appraisals may be important for buffering individuals against suicidality, and may thus represent a key source of resilience. There is a wide literature showing that the way in which individuals appraise situations and events can affect levels of stress and depression (Birchwood, Iqbal, & Uptegrove, 2005). Other protective factors involve moral objections and strength of religious convictions. In general, individuals are less likely to act on suicidal thoughts when they hold strong religious convictions that suicide is morally incompatible and incorrect (APA, 2003; Neeleman, Wessely, & Lewis, 1998). Religious and spiritual beliefs and techniques may decrease suicide risk by providing coping strategies and a sense of hope and purpose (APA, 2003).

Measures of resiliency against suicide ideation

The Meaning in Life Questionnaire

The Meaning in Life Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006) assesses two dimensions of meaning in life using 10 items rated on a seven-point scale from “absolutely true” to “absolutely untrue.” The Presence of Meaning subscale measures how respondents evaluate their life meaning. The Search for Meaning subscale measures how engaged and motivated respondents are in efforts to find meaning or deepen their understanding of meaning in their lives. Evidence for the distinctiveness and validity has been shown in certain studies with various methodologies (e.g., Steger & Kashdan, 2007; Steger, Kashdan, Sullivan, & Lorentz, 2008). The MLQ does not have cut scores like measures of psychological disorders might have. It is intended to measure meaning in life across the complete range of human functioning. The MLQ takes about 3–5 min to complete.

The Satisfaction with Life Scale

The Satisfaction with Life Scale (SWLS) is a measure of life satisfaction developed by Diener, Emmons, Larsen, and Griffin (1985) (Pavot & Diener, 1993). *Life satisfaction* is one factor in the more general construct of *subjective well-being*, which has at least three components: positive affective appraisal, negative affective appraisal, and life satisfaction (Pavot & Diener, 2008). Life satisfaction is distinguished from affective appraisal in that it is more cognitively than emotionally driven.

Research on the SWLS has shown that current mood tends to have a small effect on life satisfaction (Eid & Diener, 2004) but personality traits (i.e., extraversion, neuroticism, agreeableness, and conscientiousness (Heller, Watson, & Ilies, 2004) have a modest “top-down” effect. A large twin study from the Netherlands found 38% of variance in the SWLS was attributable to heritability, broadly defined, including the shared personality characteristics of twins (Stubbe, Posthuma, Boomsma, & De Geus, 2005). The SWLS does not measure satisfaction with specific domains of life (e.g., family, employment, and income); however, one's overall satisfaction is significantly associated with those specific domains that a person considers important (Heller et al., 2004).

A metaanalysis of 60 studies that assessed the reliability of the SWLS found a mean Cronbach α of .78 with 95% confidence intervals ranging from .766 to .807 (Vassar, 2008). In the original validation study, Diener et al. (1985) found a 2-month test–retest correlation coefficient of .82. Studies since have reported .80 (Steger et al., 2006) and .84 (Pavot, Diener, Colvin, & Sandvik, 1991) for 1-month intervals; .54 for a 4-year interval (Magnus, Diener, Fujita, & Pavot, 1993); and .51 for 5-year averages with a 7-year interval in-between (Fujita & Diener, 2005). Lower test–retest reliability as time passes is consistent with expectations for variability in life circumstances and thus life satisfaction. The original validation studies correlated the SWLS with 10 other measures of subjective well-being. Most measures correlated at $r = .50$ or higher for each of the two samples from the original work. Numerous subsequent studies have found comparable or higher correlations with other populations when interviewer ratings, informant reports, or other objective measures are used.

Reasons for Living Scale

Linehan, Goodstein, Nielsen, and Chiles (1983) theorized that, just as pessimistic beliefs might contribute to the development of suicide thoughts and behavior, adaptive beliefs should decrease the likelihood of doing so. Terming these positive beliefs and expectancies reasons for living (or RFLs), these authors developed an RFL Inventory to assess RFLs in research and clinical practice (Linehan et al., 1983). Linehan initially conceptualized the RFL construct within the context of suicide prevention. This measure contains component subscales assessing Survival and Coping Beliefs, Responsibility to Family, Child-Related Concerns, Fear of Suicide, Fear of Social Disapproval, and Moral Objections to suicide; however, this factor structure has not been investigated among older adults. Her measure instructed respondents to rate each RFL with reference to deterring or preventing acting on thoughts of suicide. Nevertheless, RFLs can be conceptualized from a positive psychological standpoint as reflecting unique aspects of one's satisfaction with or enjoyment of life, or comprising specific sources of meaning or purpose in life, and thus may serve as critical indicators of psychological health and well-being. Research findings among community-residing older adults have generally supported associations between RFLs and indices of health and well-being, including self-rated global health (Segal, Levenson, & Coolidge, 2008), sense of belonging (Kissane & McLaren, 2006), social support, and religiosity (June, Segal, Coolidge, & Klebe, 2009). RFLs have also been shown to be positively associated with coping among community-residing older adults (Marty, Segal, & Coolidge, 2010; Range & Stringer, 1996). Marty et al. (2010) reported significant associations between problem-focused and emotion-focused coping with RFL and MIL; in contrast, dysfunctional coping was not associated with RFL or MIL, but it was associated with suicide ideation. Significant associations have also been reported between RFL and personality factors, including positive associations with extraversion and conscientiousness and traits of histrionic personality disorder, and negative associations with paranoid, schizoid, schizotypal, and depressive personality features (Segal, Marty, Meyer, & Coolidge, 2012; Segal, Williams, & Teasdale, 2002).

Edelstein et al. (2009) developed the Reasons for Living Scale–Older Adult version (RFL-OA) in keeping with guidelines for psychological assessment and treatment with older adults that recommend use of age-specific assessment tools (APA, 2004), and a trend to develop age-specific RFL scales (e.g., Gutierrez, Osman, Kopper, & Barrios, 2000; Gutierrez et al., 2002; Osman et al., 1996, 1998) given age differences in perceived RFLs (Koven, Edelstein, & Charlton, 2001; Miller, Segal, & Coolidge, 2001). They used a similar procedure to the one followed by Linehan et al. (1983) in developing their RFL Inventory. Specifically, they mailed open-ended surveys to 500 community-residing older adults to generate RFLs. There was also a second mail-out to a new sample of 500 community-residing older adults to assess response characteristics of a revised measure, and psychometric assessment among adults 50 years and older receiving treatment for depression. This approach yielded a set of 69 internally consistent RFLs ($\alpha = .96-.98$), of which 30 overlapped with items on Linehan's scale. Many of the nonoverlapping items shared thematic similarity with that of the original RFL; exceptions concerned items reflecting worry about the impact of suicide on one's children and an item asserting that life has purpose. Novel items included in the RFL-OA scale addressed themes of concern for one's spouse, grandchildren, pet, and a number of additional items with religious content. The RFL-OA demonstrated convergent, discriminant, and criterion validity; RFL-OA scores explained unique variance in suicide ideation scores over and above demographic factors and depression severity, and differentiated between participants with or without histories of suicide behavior (Edelstein et al., 2009). Limitations noted included a relative homogeneity across ethnic and religious backgrounds. The higher endorsement of religious items and moral objections to suicide in the RFL-OA scale development sample may suggest greater relevance of these constructs to older adults or regional cohort effects.

The Ways of Coping Questionnaire

The Ways of Coping Questionnaire (WCQ) is a self-report instrument that asks participants to recall a recent stressor and then rate how often they used any of 66 behaviors to cope with that particular stressor (Lazarus & Folkman, 1984). The authors of this scale reported internal consistency scores in the range of .61–.76. Construct validity was supported by correlations with theoretically related constructs, such as problem solving and locus of control. However, although this instrument has been established as a measure of coping in the general population, the factor structure of the scale, as with other scales, may not accurately reflect coping behaviors used by individuals with severe mental illness (Wineman, Durand, & McCulloch, 1994). In this study, the authors developed, using two different samples, a rational scoring system that would be sensitive to coping deficits particular to severe mental illness (Lysaker et al., 2004). This scoring scheme yields six modes of coping scores, of which two were used in these analyses (these specific modes were selected because they most closely resembled the construct of avoidant coping): ignoring, which refers to putting the stressor out of one's mind or choosing not to think about it, and resigning, which refers to a choice not to act because the person perceives that there is nothing to be done. In one study that compared results derived from the original scoring system with the revised scoring scheme across

two previous samples, the rationally devised scales had better internal consistency. Several of the original scale scores but none of the new scale scores failed to achieve acceptable internal consistency.

Social Problem-Solving Inventory–Revised and Short-Form

Social problem-solving ability was assessed in this study by means of the Social Problem-Solving Inventory–Revised (SPSI-R; Maydeu-Olivares & D’Zurilla, 1996; D’Zurilla, Chang, Nottingham, & Faccini, 1998; D’Zurilla, Maydeu-Olivares, & Kant, 1998). The SPSI-R is a 52-item, empirically derived revision of the original theory-driven social-problem-solving inventory (SPSI; D’Zurilla & Nezu, 1990). The latter instrument is linked to a social problem-solving model that assumes that problem-solving outcomes in the real world are largely determined by two major, partially independent processes: (1) problem orientation and (2) problem-solving proper (i.e., the application of problem-solving skills). The model identifies four major problem-solving skills: (1) problem definition and formulation, (2) generation of alternative solutions, (3) decision-making (judgment and evaluation of solutions), and (4) solution verification (evaluation of solution outcome). The SPSI consists of two major scales—the problem orientation scale and the problem-solving skills scale—which were designed to assess these two major components of the problem-solving process.

In a factor-analytic study of the SPSI, Maydeu-Olivares and D’Zurilla (1996) found that the theoretical concepts of problem orientation and problem-solving proper can be divided into five different yet related problem-solving dimensions: (1) positive problem orientation, (2) negative problem orientation, (3) rational problem solving, (4) impulsive/careless problem solving, and (5) avoidance behavior. Based on these findings, D’Zurilla et al. (1998a, 1998b) revised the SPSI to measure these five empirically derived problem-solving dimensions. Thus, the SPSI-R consists of five major scales. *Positive problem orientation* (PPO) taps a constructive cognitive set that includes the general tendencies to (1) appraise a problem as a challenge, (2) believe in one’s own problem-solving capabilities, (3) expect positive problem-solving outcomes, and (4) commit time and effort to solve problems with dispatch. *Negative problem orientation* (NPO) measures a dysfunctional cognitive-emotional set consisting of the general tendencies to (1) appraise a problem as a threat, (2) doubt one’s own problem-solving capabilities, (3) expect negative problem-solving outcomes, and (4) easily become upset, frustrated, and discouraged when attempting to solve problems in living. *Rational problem solving* (RPS) assesses a constructive cognitive-behavioral pattern involving the deliberate, systematic application of specific problem-solving skills (e.g., problem definition and formulation, generation of alternative solutions). *Impulsivity/carelessness style* (ICS) assesses a deficient cognitive-behavioral pattern characterized by impulsive, careless, hurried, and incomplete attempts to apply problem-solving strategies and techniques. *Avoidance style* (AS) measures a defective behavioral pattern involving the tendencies to (1) put off problem solving for as long as possible, (2) wait for problems to resolve themselves, and (3) shift the responsibility for problem solving to others. Greater problem-solving ability is indicated by higher scores on positive problem orientation and rational problem solving and lower scores on negative problem orientation, impulsivity/carelessness style, and avoidance style.

The SPSI-R scales have been found to have good psychometric properties. Coefficient α s are based on the three age samples. As reported in D’Zurilla et al. (1998a, 1998b) test–retest reliabilities (3-week period) range from .72 (PPO) to .88 (NPO) in a sample of 138 college students. In another sample of 221 nursing students, test–retest coefficients range from .68 (PPO) to .91 (NPO).

The SPSI-R-SF is a 25 item self-report measure of social problem-solving. The measure assesses two specific domains of problem solving: (1) orientation and (2) style. Those with a positive problem orientation perceive problems as solvable challenges that can be overcome with persistence and commitment (e.g., when I have a problem, I try to see it as a challenge or opportunity to benefit in some positive way from having a problem). Those with a negative problem orientation perceive problems as threats that appear frustrating and uncontrollable.

The Coping Orientation to Problems Experienced Inventory

The Brief COPE (Carver, 1997; Muller & Spitz, 2003) was derived from the Coping Orientation to Problems Experienced inventory (COPE; Carver, Scheier, & Weintraub, 1989). The COPE is a 60-item instrument with 4 items per scale. However, failure to complete the whole measure, observed participant frustration, and other questionnaire administration issues led to the development of a less extensive version, the Brief COPE (Carver, 1997), which is now increasingly used in research. The Brief COPE (Carver, 1997; Muller & Spitz, 2003) is a short, multidimensional inventory including 14 two-item scales that measure 14 conceptually differentiable coping reactions. These strategies, which include adaptive and potentially problematic responses, are acceptance, active coping, positive reframing, planning, using instrumental support, using emotional support, behavioral disengagement, self-distraction, self-blame, humor, denial, religion, venting, and substance use (Carver, 1997; Muller & Spitz, 2003; Skinner, Edge, Altman, & Sherwood, 2003). As outlined by Carver (1997), “The Brief

COPE thus provides researchers a way to assess potentially important coping response quickly” (p. 98). With the exception of two scales, the instrument possesses good reliability (e.g., Carver, 1997; Muller & Spitz, 2003). In Carver’s (1997) study, only Cronbach’s α of internal consistency was estimated and ranged from .50 to .90.

The Core Self-Evaluation Scale

The Core Self-Evaluation Scale (CSES; Judge, Erez, Bono, & Thoresen, 2003), despite being relatively new, has become a widely used instrument, and there is evidence of its utility in assessing several outcomes. The CSES was found to be a significant predictor of job and life satisfaction (e.g., Chang, Ferris, Johnson, Rosen, & Tan, 2012; Heilmann & Jonas, 2010; Hirschi & Herrmann, 2012), happiness and positive affectivity (Gardner & Pierce, 2010; Rey, Extremera, & Duran, 2012; Stumpp, Muck, Hülshager, Judge, & Maier, 2010), positive aspects of career decision-making (Di Fabio, Palazzeschi, & Bar-On, 2012; Koumoundourou, Kounenou, & Siavara, 2012), and lower perceived stress levels (Brunborg, 2008; Luria & Torjman, 2009), better health functioning (Hilbert, Braehler, Haeuser, & Zenger, 2014; Tsaousis, Nikolaou, Serdaris, & Judge, 2007; Yagil, Luria, & Gal, 2008), and higher levels of life balance (Grisslich, Proske, & Korndle, 2012). These results document that the CSES is not only relevant in the field of organizational psychology, but also in health psychology, clinical psychology, and quality-of-life research. However, validity aspects of the CSES with regard to specific psychopathological symptoms (e.g., anxiety, depression), quality of life, the experience of physical symptoms (e.g., pain), and work-related outcomes (e.g., duration of unemployment) have not been tested within a representative sample of the general population, and thus need further consideration.

The CSES is a short and validated 12-item instrument that covers four central aspects of self-evaluations: self-esteem, locus of control, neuroticism, and self-efficacy. Example items that cover these domains but do not exclusively represent them are “Overall, I’m satisfied with myself” (self-esteem); “Sometimes, I do not feel in control of my work” (locus of control); “There are times when things look pretty bleak and hopeless to me” (neuroticism); and “When I try, I generally succeed” (self-efficacy). Participants indicate their agreement with the statements on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Six items of the CSES are negatively worded and are reverse-coded before calculating the mean score of the total scale.

SUMMARY

The chapter began with the presentation of risk factors that may lead to suicidal thoughts or behaviors. We then elaborated on the concepts of aggression and impulsivity and their complex connections to suicidal behavior followed by empirical studies on the relationship between aggression, self-harm, and suicide. The next section presented various theories of suicide that fall under three major categories: psychological pain theories, cognitive theories, and stress theories. The section that followed delineated the Cultural Model of Suicide and the Cultural Assessment of Risk for Suicide (CARS) measure. The next part reviewed several theoretical models that attempt to explain the link between homicide and suicide. The risk assessment of suicide was examined through various measures of suicide ideation and behaviors. The last part of this chapter explored protective factors and resilience followed by a list of corresponding instruments.

REFERENCES

- Adler, J. S. (1999). “If we can’t live in peace, we might as well die”: homicide-suicide in Chicago, 1875–1910. *Journal of Urban History*, 26(1), 3–21.
- Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, 30(1), 47–88.
- Aish, A. M., Wasserman, D., & Renberg, E. S. (2001). Does Beck’s Hopelessness Scale really measure several components? *Psychological Medicine*, 31(2), 367–372.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision Processes*, 50(2), 179–211.
- Allport, G. W. (1961). *Pattern and growth in personality*. New York, NY: Holt, Rinehart & Winston.
- American Psychiatric Association (APA). (2003). *American Psychiatric Association Practice Guideline for the assessment and treatment of suicidal behaviours*. Arlington, VA: American Psychiatric Publishing.
- American Psychological Association (APA). (2004). Guidelines for psychological practice with older adults. *American Psychologist*, 59(4), 236–260.
- Apter, A. (2010). Clinical aspects of suicidal behaviour relevant to genetics. *European Psychiatry*, 25(5), 257–259.
- Apter, A., King, R. A., Bleich, A., Fluck, A., Kotler, M., & Kron, S. (2008). Fatal and non-fatal suicidal behaviour in Israeli adolescent males. *Archives of Suicide Research*, 12(1), 20–29.
- Apter, A., Plutchik, R., & van Praag, H. M. (1993). Anxiety, impulsivity and depressed mood in relation to suicidal and violent behaviour. *Acta Psychiatrica Scandinavica*, 87(1), 1–5.
- Arie, M., Apter, A., Orbach, I., Yefet, Y., & Zalzman, G. (2008). Autobiographical memory, interpersonal problem solving, and suicidal behavior in adolescent inpatients. *Comprehensive Psychiatry*, 49(1), 22–29.

- Baca-García, E., Diaz-Sastre, C., Resa, E. G., Blasco, H., Conesa, D. B., Oquendo, M. A., & De Leon, J. (2005a). Suicide attempts and impulsivity. *European Archives of Psychiatry and Clinical Neuroscience*, 255(2), 152–156.
- Baca-García, E., Perez-Rodriguez, M. M., Diaz Sastre, C., Saiz-Ruiz, J., & De Leon, J. (2005b). Suicidal behaviour in schizophrenia and depression: a comparison. *Schizophrenia Research*, 75(1), 77–81.
- Bach-y-Rita, G. (1974). Habitual violence and self-mutilation. *American Journal of Psychiatry*, 131(9), 1018–1020.
- Baller, R., & Richardson, K. (2002). Social integration, imitation and the geographic patterning of suicide. *American Sociological Review*, 67(6), 873–888.
- Batterham, P. J., Fairweather-Schmidt, A. K., Butterworth, P., Calear, A. L., Mackinnon, A. J., & Christensen, H. (2014). Temporal effects of separation on suicidal thoughts and behaviours. *Social Science & Medicine*, 111, 58–63.
- Batton, C. (1999). *The stream analogy: A historical study of lethal violence rates from the perspective of the integrated homicide-suicide model*. Nashville, TN: Vanderbilt University, Dissertation.
- Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review*, 97(1), 90–113.
- Baumeister, R. F. (1991). *Meanings of life*. New York, NY: Guilford Press.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529.
- Baumgartner, M. P. (1984). Social control from below. In D. Black (Ed.), *Toward a general theory of social control* (pp. 303–345). (Vol. 1). Orlando, FL: Academic Press.
- Beck, A. T. (1963). Thinking and depression: I. Idiosyncratic content and cognitive distortions. *Archives of General Psychiatry*, 9(4), 324–333.
- Beck, A. T. (1996). Beyond belief: a theory of modes, personality, and psychopathology. In P. M. Salkovskis (Ed.), *Frontiers of cognitive therapy* (pp. 1–25). New York, NY: Guilford Press.
- Beck, A. T., Brown, G., Berchick, R. J., Stewart, B. L., & Steer, R. A. (1990). Relationship between hopelessness and ultimate suicide: a replication with psychiatric outpatients. *American Journal of Psychiatry*, 147, 190–195.
- Beck, A. T., Brown, G. K., Steer, R. A., Dahlsgaard, K. K., & Grisham, J. R. (1999). Suicide ideation at its worst point: a predictor of eventual suicide in psychiatric outpatients. *Suicide and Life-Threatening Behaviour*, 29(1), 1–9.
- Beck, A., Emery, G., & Greenberg, R. L. (1985). *Anxiety disorders and phobias: A cognitive approach*. New York, NY: Basic Books.
- Beck, A. T., & Steer, R. A. (1993). *Beck anxiety inventory manual*. San Antonio, TX: The Psychological Corporation.
- Beck, A. T., Kovacs, M., & Weissman, A. (1979). Assessment of suicidal intention: the Scale for Suicide Ideation. *Journal of Consulting and Clinical Psychology*, 47(2), 343–352.
- Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: the hopelessness scale. *Journal of consulting and clinical psychology*, 42(6), 861–865.
- Ben-Porath, Y. S., & Tellegen, A. (2008/2011). *MMPI-2RF: Manual for administration, scoring, and interpretation*. Minneapolis, MN: University of Minnesota Press.
- Berkman, L. F., Glass, T., Brissette, I., & Seeman, T. E. (2000). From social integration to health: Durkheim in the new millennium. *Social Science and Medicine*, 51(6), 843–857.
- Berman, A. L. (1979). Dyadic death: homicide–suicide. *Suicide and Life-Threatening Behaviour*, 9(1), 15–23.
- Birchwood, M., Iqbal, Z., & Upthegrove, R. (2005). Psychological pathways to depression in schizophrenia: studies in acute psychosis, post psychotic depression and auditory hallucinations. *European Archives of Psychiatry and Clinical Neuroscience*, 255(3), 202–212.
- Black, D. (1998). *The social structure of right and wrong* (rev. ed.). San Diego, CA: Academic Press (Originally published 1993).
- Black, D. (2010). *The behavior of law* (special ed.). San Diego, CA: Academic Press (Originally published 1976).
- Bornoalova, M. A., Tull, M. T., Gratz, K. L., Levy, R., & Lejuez, C. W. (2011). Extending models of deliberate self-harm and suicide attempts to substance users: exploring the roles of childhood abuse, posttraumatic stress, and difficulties controlling impulsive behaviour when distressed. *Psychological Trauma: Theory, Research, Practice, and Policy*, 3(4), 349–359.
- Brent, D. (2010). What family studies teach us about suicidal behaviour: implications for research, treatment, and prevention. *European Psychiatry*, 25(5), 260–263.
- Brent, D. A., & Mann, J. J. (2005). Family genetic studies, suicide, and suicidal behaviour. *American Journal of Medical Genetics Part C: Seminars in Medical Genetics*, 133c(1), 13–24.
- Brent, D. A., & Mann, J. J. (2006). Familial pathways to suicidal behaviour—understanding and preventing suicide among adolescents. *New England Journal of Medicine*, 355(26), 2719–2721.
- Brodsky, B. S., Malone, K. M., Ellis, S. P., Dulit, R. A., & Mann, J. J. (1997). Characteristics of borderline personality disorder associated with suicidal behaviour. *American Journal of Psychiatry*, 154(12), 1715–1719.
- Brodsky, B. S., Oquendo, M., Ellis, S. P., Haas, G. L., Malone, K. M., & Mann, J. J. (2001). The relationship of childhood abuse to impulsivity and suicidal behavior in adults with major depression. *American Journal of Psychiatry*, 158(11), 1871–1877.
- Brown, G. K., Beck, A. T., Steer, R. A., & Grisham, J. R. (2000). Risk factors for suicide in psychiatric outpatients: a 20-year prospective study. *Journal of Consulting and Clinical Psychology*, 68(3), 371–377.
- Brunborg, G. (2008). Core self-evaluations: a predictor variable for job stress. *European Psychologist*, 13(2), 96–102.
- Brunstein, J. C. (1993). Personal goals and subjective well-being: a longitudinal study. *Journal of Personality and Social Psychology*, 65(5), 1061–1070.
- Bryan, C. J., Rudd, M. D., Wertenberger, E., Etienne, N., Ray-Sannerud, B. N., Morrow, C. E., & Young-McCaughon, S. (2014). Improving the detection and prediction of suicidal behaviour among military personnel by measuring suicidal beliefs: an evaluation of the Suicide Cognitions Scale. *Journal of Affective Disorders*, 159, 15–22.

- Buri, C., Von Bonin, B., Strick, W., & Moggi, F. (2009). Predictors of attempted suicide among Swiss patients with alcohol use disorders. *Journal of Studies of Alcohol and Drugs*, 70(5), 668–674.
- Canetto, S. S. (1993). She died for love and he for glory: gender myths of suicidal behavior. *OMEGA—Journal of Death and Dying*, 26(1), 1–17.
- Canetto, S. S. (1997a). Gender and suicidal behaviour: theories and evidence. In R. W. Maris, M. M. Silverman, & S. S. Canetto (Eds.), *Review of suicidology* (pp. 138–167). New York, NY: Guilford Press.
- Canetto, S. S. (1997b). Meanings of gender and suicidal behavior during adolescence. *Suicide and Life-Threatening Behaviour*, 27(4), 339–351.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: consider the brief COPE. *International Journal of Behavioural Medicine*, 4(1), 92–100.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of Personality and Social Psychology*, 56(2), 267–283.
- Cha, C. B., Najmi, S., Park, J. M., Finn, C. T., & Nock, M. K. (2010). Attentional bias toward suicide-related stimuli predicts suicidal behaviour. *Journal of Abnormal Psychology*, 119(3), 616–622.
- Chang, C. H., Ferris, D. L., Johnson, R. E., Rosen, C. C., & Tan, J. A. (2012). Core self-evaluations: a review and evaluation of the literature. *Journal of Management*, 38(1), 81–128.
- Chang, E. C., Sanna, L. J., Hirsch, J. K., & Jeglic, E. L. (2010). Loneliness and negative life events as predictors of hopelessness and suicidal behaviours in Hispanics: evidence for a diathesis-stress model. *Journal of Clinical Psychology*, 66(12), 1242–1253.
- Chatard, A., & Selimbegović, L. (2011). When self-destructive thoughts flash through the mind: failure to meet standards affects the accessibility of suicide-related thoughts. *Journal of Personality and Social Psychology*, 100(4), 587–605.
- Chesney, E., Goodwin, G. M., & Fazel, S. (2014). Risks of all-cause and suicide mortality in mental disorders: a meta-review. *World Psychiatry*, 13(2), 153–160.
- Chu, J. P., Goldblum, P., Floyd, R., & Bongar, B. (2010). A cultural theory and model of suicide. *Applied and Preventive Psychology*, 14(1–4), 25–40.
- Chu, J. P., Goldblum, P., Floyd, R., & Bongar, B. (2011). The cultural theory and model of suicide. *Applied and Preventive Psychology*, 14(1–4), 25–40.
- Claassen, C. A., Yip, P. S., Corcoran, P., Bossarte, R. M., Lawrence, B. A., & Currier, G. W. (2010). National suicide rates a century after Durkheim: do we know enough to estimate error? *Suicide and Life-Threatening Behaviour*, 40(3), 192–223.
- Clark, L. A. (1993). *Manual for the schedule of non-adaptive and adaptive personality*. Minneapolis, MN: University of Minnesota Press.
- Conner, K. R., Beautrais, A. L., & Conwell, Y. (2003). Risk factors for suicide and medically serious suicide attempts among alcoholics: analyses of Canterbury suicide project data. *Journal of Studies on Alcohol*, 64(4), 551–554.
- Cooney, M., & Phillips, S. (2002). Typologizing violence: a Blackian perspective. *International Journal of Sociology and Social Policy*, 22(7–8), 75–108.
- Currier, D., & Mann, J. J. (2008). Stress, genes and the biology of suicidal behaviour. *Psychiatric Clinics of North America*, 31(2), 247–269.
- D'Zurilla, T. J., Chang, E. C., Nottingham, E. J., IV, & Faccini, L. (1998a). Social problem solving deficits and hopelessness, depression, and suicidal risks in college students and psychiatric inpatients. *Journal of Clinical Psychology*, 54(8), 1091–1107.
- D'Zurilla, T. J., Maydeu-Olivares, A., & Kant, G. L. (1998b). Age and gender differences in social problem-solving ability. *Personality and Individual Differences*, 25(2), 241–252.
- D'Zurilla, T. J., & Nezu, A. M. (1990). Development and preliminary evaluation of the Social Problem-Solving Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 2(2), 156–163.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuit: human needs and the self-determination of behaviour. *Psychological Inquiry: An International Journal for the Advancement of Psychological Theory*, 11(4), 227–268.
- Declercq, F., & Audenaert, K. (2011a). A case of mass murder: personality disorder, psychopathology and violence mode. *Aggression and Violent Behaviour*, 16(2), 135–143.
- Declercq, F., & Audenaert, K. (2011b). Predatory violence aiming at relief in a case of mass murder: Meloy's criteria for applied forensic practice. *Behavioural Sciences & the Law*, 29(4), 578–591.
- Dervic, K., Gould, M. S., Lenz, G., Kleinman, M., Kalayci, T. A., Velting, D., & Friedrich, M. H. (2006). Youth suicide risk factors and attitudes in New York and Vienna: a cross-cultural comparison. *Suicide Life Threat Behaviour*, 36(5), 539–552.
- Dhingra, K., Boduszek, D., & O'Connor, R. C. (2015). Differentiating suicide attempters from suicide ideators using the Integrated Motivational-Volitional model of suicidal behaviour. *Journal of Affective Disorders*, 186, 211–218.
- Di Fabio, A., Palazzeschi, L., & Bar-On, R. (2012). The role of personality traits, core self-evaluation and emotional intelligence in career decision-making difficulties. *Journal of Employment Counselling*, 49(3), 118–129.
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75.
- Dietz, P. E. (1986). Mass, serial and sensational homicides. *Bulletin of the New York Academy of Medicine*, 62(5), 477–491.
- Douglas, J. D. (1967). *The social meanings of suicide*. Princeton, NJ: Princeton University Press.
- Duberstein, P. R., & Conwell, Y. (1997). Personality disorders and completed suicide: a methodological and conceptual review. *Clinical Psychology: Science and Practice*, 4(4), 359–376.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087–1101.
- Dumais, A., Lesage, A. D., Alda, M., Rouleau, G., Dumont, M., Chawky, N., & Turecki, G. (2005). Risk factors for suicide completion in major depression: a case-control study of impulsive and aggressive behaviors in men. *American Journal of Psychiatry*, 162(11), 2116–2124.
- Durkheim, E. (1897/1966). *Suicide*. New York, NY: Free Press.
- Edelstein, B. A., Heisel, M. J., McKee, D. R., Martin, R. R., Koven, L. P., Duberstein, P. R., & Britton, P. C. (2009). Development and psychometric evaluation of the reasons for living—older adults scale: a suicide risk assessment inventory. *Gerontologist*, 49(6), 736–745.

- Eid, M., & Diener, E. (2004). Global judgments of subjective well-being: situational variability and long-term stability. *Social Indicators Research*, *65*(3), 245–277.
- Fawcett, J., Busch, K. A., Jacobs, D., Kravitz, H. M., & Fogg, L. (1997). Suicide: a four-pathway clinical-biochemical model. *Annals of the New York Academy of Sciences*, *836*, 288–301.
- Felthous, A. R., & Hempel, A. G. (1995). Combined homicide–suicides: a review. *Journal of Forensic Sciences*, *40*(5), 846–857.
- Fennig, S., Geva, K., Zalsman, G., Weitzman, A., Fennig, S., & Apter, A. (2005). Effect of gender on suicide attempters versus nonattempters in an adolescent inpatient unit. *Comprehensive Psychiatry*, *46*(2), 90–97.
- Fincham, B., Langer, S., Scourfield, J., & Shiner, M. (2011). *Understanding suicide: A sociological autopsy*. Basingstoke, NY: Palgrave Macmillan.
- Flannery, D. J., Singer, M. I., & Wester, K. (2001). Violence exposure, psychological trauma and suicide risk in a community sample of dangerously violent adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *40*(4), 435–442.
- Foster, T. (2011). Adverse life events proximal to adult suicide: a synthesis of findings from psychological autopsy studies. *Archives of Suicide Research: Official Journal of the International Academy for Suicide Research*, *15*(1), 1–15.
- Fowler, J. C. (2012). Suicide risk assessment in clinical practice: pragmatic guidelines for imperfect assessments. *Psychotherapy*, *49*(1), 81–90.
- Frankl, V. E. (1959). *Man's search for meaning*. New York, NY: Random House.
- Frankl, V. E. (1985). *Man's search for meaning* (revised and updated ed.). New York, NY: Washington Square Press.
- Freud, S. (1920). *Beyond the Pleasure Principle. The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume XVIII (1920–1922)*. London: Penguin.
- Freud, S. (1949). *The ego and the id*. London: Hogarth Press.
- Fujita, F., & Diener, E. (2005). Life satisfaction set point: stability and change. *Journal of Personality and Social Psychology*, *88*(1), 158–164.
- Gardner, D. G., & Pierce, J. L. (2010). The Core Self-Evaluation Scale: further construct validation evidence. *Educational and Psychological Measurement*, *70*(2), 291–304.
- Gibbs, D. (2011). Assessing suicidal cognitions in adolescents: establishing the reliability and validity of the Suicide Cognitions Scale. *Dissertation Abstracts International, Section B: The Sciences and Engineering*, *71*(10-B), 6438.
- Giegling, I., Olgiati, P., Hartmann, A. M., Calati, R., Moller, H. J., Rujescu, D., & Serretti, A. (2009). Personality and attempted suicide. Analysis of anger, aggression and impulsivity. *Journal of Psychiatric Research*, *43*(16), 1262–1271.
- Gilbert, P., & Allan, S. (1998). The role of defeat and entrapment (arrested flight) in depression: an exploration of an evolutionary view. *Psychological Medicine*, *28*(3), 585–598.
- Glassmire, D., Stolberg, R., Greene, R., & Bongar, B. (2001). The utility of MMPI-2 suicide items for assessing suicidal potential: development of a suicidal potential scale. *Assessment*, *8*(3), 281–290.
- Glassmire, D. M., Tarescavage, A. M., Burchett, D., Martinez, J., & Gomez, A. (2016). Clinical utility of the MMPI-2-RF SUI items and scale in a forensic inpatient setting: association with interview self-report and future suicidal behaviours. *Psychological Assessment*, *28*(11), 1502–1509.
- Goldsmith, S. K., Pellmar, T. C., Kleinman, A. M., & Bunny, W. E. (2002). *Reducing suicide: A national imperative*. Washington, DC: National Academies Press.
- Goldston, D. B., Reboussin, B. A., & Daniel, S. S. (2006). Predictors of suicide attempts: state and trait components. *Journal of Abnormal Psychology*, *115*(4), 842–849.
- Gottfried, E., Bodell, L., Carbonell, J., & Joiner, T. (2014). The clinical utility of the MMPI-2-RF Suicidal/Death Ideation Scale. *Psychological Assessment*, *26*(4), 1205–1211.
- Greening, L., Stoppelbein, L., Fite, P., Dhossche, D., Erath, S., Brown, J., & Young, L. (2008). Pathways to suicidal behaviours in childhood. *Suicide and Life-Threatening Behaviour*, *38*(1), 35–45.
- Greening, L., Stoppelbein, L., Luebke, A., & Fite, P. J. (2010). Aggression and the risk for suicidal behaviours among children. *Suicide and Life-Threatening Behaviour*, *40*(4), 337–345.
- Gregory, M. (2012). Masculinity and homicide-suicide. *International Journal of Law, Crime and Justice*, *40*(3), 133–151.
- Grisslich, P., Proske, A., & Korndle, A. (2012). Beyond work and life: what role does time for oneself play in work-life balance. *Zeitschrift für Gesundheitspsychologie*, *20*(4), 166–177.
- Gutierrez, P. M., Osman, A., Barrios, F. X., Kopper, B. A., Baker, M. T., & Haraburda, C. M. (2002). Development of the reasons for living inventory for young adults. *Journal of Clinical Psychology*, *58*(4), 339–357.
- Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. (2000). Why young people do not kill themselves: the reasons for living inventory for adolescents. *Journal of Clinical Child Psychology*, *29*(2), 177–187.
- Gvion, Y., & Apter, A. (2011). Aggression, impulsivity, and suicide behaviour: a review of the literature. *Archives of Suicide Research*, *15*(2), 93–112.
- Hanzlick, R., & Koponen, M. (1994). Murder-suicide in Fulton County, Georgia: comparison with a recent report and proposed typology. *American Journal of Forensic Medicine and Pathology*, *15*(2), 168–175.
- Harper, D. W., & Voigt, L. (2007). Homicide followed by suicide: an integrated theoretical perspective. *Homicide Studies*, *11*(4), 295–318.
- Hathaway, S. R., & McKinley, J. C. (1940). A multiphasic personality schedule (Minnesota): I. Construction of the schedule. *Journal of Psychology: Interdisciplinary and Applied*, *10*(2), 249–254.
- Hatters-Friedman, S., Hrouda, D. R., Holden, C. E., Noffsinger, S. G., & Resnick, P. J. (2005). Filicide-suicide: common factors in parents who kill their children and themselves. *Journal of the American Academy of Psychiatry and the Law*, *33*(4), 497–504.
- Hawton, K., Comabella, C. C., Haw, C., & Saunders, K. (2013). Risk factors for suicide in individuals with depression: a systematic review. *Journal of Affective Disorders*, *147*(1–3), 17–28.

- Heilbron, N., Compton, J. S., Daniel, S. S., & Goldston, D. B. (2010). The problematic label of suicide gesture: alternatives for clinical research and practice. *Professional Psychology: Research and Practice, 41*(3), 221–227.
- Heilmann, T., & Jonas, K. (2010). Validation of a German-language core self-evaluations scale. *Social Behavior and Personality: An International Journal, 38*(2), 209–225.
- Heller, D., Watson, D., & Iles, R. (2004). The role of person versus situation in life satisfaction: a critical examination. *Psychological Bulletin, 130*(4), 574–600.
- Henry, A., & Short, J. (1954). *Suicide and homicide*. New York, NY: McGraw-Hill.
- Hilbert, A., Braehler, E., Haeuser, W., & Zenger, M. (2014). Weight bias internalization, core self-evaluation, and health in overweight and obese persons. *Obesity: A Research Journal, 22*(1), 79–85.
- Hirschi, A., & Herrmann, A. (2012). Vocational identity achievement as a mediator of presence of calling and life satisfaction. *Journal of Career Assessment, 20*(3), 309–321.
- Holden, R. R., & Delisle, M. M. (2006). Factor Structure of the Reasons for Attempting Suicide Questionnaire (RASQ) with suicide attempters. *Journal of Psychopathology and Behavioural Assessment, 28*(1), 1–8.
- Holden, R. R., Mehta, K., Cunningham, E. J., & McLeod, L. D. (2001). Development and preliminary validation of a scale of psychache. *Canadian Journal of Behavioural Science, 33*(4), 224–232.
- Holmes, R. M., & Holmes, S. T. (2005). *Suicide: Theory, practice, and investigation*. Thousand Oaks, CA: Sage.
- Horesh, N. (2001). Self-report vs. computerized measures of impulsivity as a correlate of suicidal behaviour. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 22*(1), 27–31.
- Houston, R. J., & Stanford, M. S. (2005). Characterization of aggressive behaviour and phenytoin response. *Aggressive Behaviour, 32*(1), 38–43.
- Hunt, I. M., Kapur, N., Robinson, J., Shaw, J., Flynn, S., Bailey, H., & Appleby, L. (2006a). Suicide within 12 months of mental health service contact in different age and diagnostic groups: national clinical survey. *British Journal of Psychiatry, 188*(2), 135–142.
- Hunt, I. M., Kapur, N., Windfuhr, K., Robinson, J., Bickley, H., Flynn, S., & Appleby, L. (2006b). Suicide in schizophrenia: findings from a national clinical survey. *Journal of Psychiatric Practice, 12*(3), 139–147.
- Huth-Bocks, A. C., Kerr, D. C. R., Ivey, A. Z., Kramer, A. C., & King, C. A. (2007). Assessment of psychiatrically hospitalized suicidal adolescents: self-report instruments as predictors of suicidal thoughts and behavior. *Journal of the American Academy of Child & Adolescent Psychiatry, 46*(3), 387–395.
- Jeffreys, M. D. W. (1952). Samsonic suicide or suicide of revenge among Africans. *African Studies, 11*(3), 118–122.
- Johnson, J., Gooding, P., & Tarrrier, N. (2008). Suicide risk in schizophrenia: explanatory models and clinical implications, the Schematic Appraisal Model of Suicide (SAMS). *Psychology and Psychotherapy: Theory, Research and Practice, 81*(1), 55–77.
- Johnson, J., Gooding, P. A., Wood, A. M., & Tarrrier, N. (2010a). Resilience as positive coping appraisals: testing the schematic appraisals model of suicide (SAMS). *Behaviour Research and Therapy, 48*(3), 179–186.
- Johnson, J., Wood, A. M., Gooding, P., Taylor, P. J., & Tarrrier, N. (2010b). Resilience to suicidality: The buffering hypothesis. *Clinical Psychology Review, 31*(4), 563–591.
- Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.
- Joiner, T. E., Conwell, Y., Fitzpatrick, K. K., Witte, T. K., Schmidt, N. B., Berlim, M. T., & Rudd, M. D. (2005). Four studies on how past and current suicidality relate even when “everything but the kitchen sink” is covaried. *Journal of Abnormal Psychology, 114*(2), 291–303.
- Joiner, T. E., & Rudd, M. D. (2000). Intensity and duration of suicidal crisis vary as a function of previous suicide attempts and negative life events. *Journal of Consulting and Clinical Psychology, 68*(5), 909–916.
- Joiner, T. E., Steer, R. A., Brown, G., Beck, A. T., Pettit, J. W., & Rudd, M. D. (2003). Worst-point suicidal plans: a dimension of suicidality predictive of past suicide attempts and eventual death by suicide. *Behaviour Research and Therapy, 41*(12), 1469–1480.
- Joiner, T. E., Van Orden, K. A., Witte, T. K., & Rudd, M. D. (2009a). *The interpersonal theory of suicide: Guidance for working with suicidal clients*. Washington, DC: American Psychological Association.
- Joiner, T. E., Van Orden, K. A., Witte, T. K., Selby, E. A., Ribeiro, J. D., Lewis, R., & Rudd, M. D. (2009b). Main predictions of the interpersonal–psychological theory of suicidal behaviour: empirical tests in two samples of young adults. *Journal of Abnormal Psychology, 118*(3), 634–646.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2003). The Core Self-Evaluations Scale (CSES): development of a measure. *Personnel Psychology, 56*(2), 303–331.
- June, A., Segal, D. L., Coolidge, F. L., & Klebe, K. (2009). Religiousness, social support and reasons for living in African American and European American older adults: an exploratory study. *Aging and Mental Health, 13*(5), 753–760.
- Keilp, J. G., Gorlyn, M., Oquendo, M. A., Brodsky, B., Ellis, S. P., Stanley, B., & Mann, J. J. (2006). Aggressiveness, not impulsiveness or hostility, distinguishes suicide attempters with depression. *Psychological Medicine, 36*(12), 1779–1788.
- Keilp, J. G., Gorlyn, M., Oquendo, M. A., Burke, A. K., & Mann, J. (2008). Attention deficit in depressed suicide attempters. *Psychiatry Research, 159*(1–2), 7–17.
- Kenyon, G. M. (2000). Philosophical foundations of existential meaning. In G. T. Reker, & K. Chamberlain (Eds.), *Exploring existential meaning: Optimizing human development across the life span* (pp. 7–22). Thousand Oaks, CA: Sage.
- Kingsbury, S., Hawton, K., Steinhardt, K., & James, A. (1999). The psychological characteristics of adolescents who take overdoses: comparison with community and psychiatric controls. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*(9), 1125–1131.
- Kissane, M., & McLaren, S. (2006). Sense of belonging as a predictor of reasons for living in older adults. *Death Studies, 30*(3), 243–258.
- Kleiman, E. M., Adams, L. M., & Kashdan, T. B. (2013). Gratitude and grit indirectly reduce risk of suicidal ideations by enhancing meaning in life: evidence for a mediated moderation model. *Journal of Research in Personality, 47*(5), 539–546.

- Klein, M. (1935). A contribution to the psychogenesis of manic-depressive states. *International Journal of Psychoanalysis*, 16(1), 145–174.
- Klein, M. (1946). Notes on some schizoid mechanisms. *International Journal of Psychoanalysis*, 27(3–4), 99–110.
- Klinger, E. (1977). *Meaning and void*. Minneapolis, MN: University of Minnesota Press.
- Klonsky, E. D., & May, A. (2010). Rethinking impulsivity in suicide. *Journal of Suicide and Life-Threatening Behaviour*, 40(6), 612–619.
- Klonsky, E. D., & May, A. M. (2014). Differentiating suicide attempters from suicide ideators: a critical frontier for suicidology research. *Suicide and Life-Threatening Behaviour*, 44(1), 1–5.
- Klonsky, E. D., & May, A. M. (2015). The three-step theory (3ST): a new theory of suicide rooted in the “ideation-to-action” framework. *International Journal of Cognitive Therapy*, 8(2), 114–129.
- Klonsky, E. D., May, A., & Glenn, C. R. (2012). The relationship between non-suicidal self-injury and attempted suicide: converging evidence from four samples. *Journal of Abnormal Psychology*, 122(1), 231–237.
- Knoll, J. L. (2010). The “pseudocommando” mass murderer: part I, the psychology of revenge and obliteration. *Journal of the American Academy of Psychiatry and the Law Online*, 38(1), 87–94.
- Koch, K. F. (1974). *War and peace in Jalemo: The management of conflict in Highland New Guinea*. Cambridge, MA: Harvard University Press.
- Koumoundourou, G. A., Kounenou, K., & Siavara, E. (2012). Core self-evaluations, career decision self-efficacy, and vocational identity among Greek adolescents. *Journal of Career Development*, 39(3), 269–286.
- Koven, L. P., Edelstein, B., & Charlton, A. S. (2001). Reasons for living across the lifespan. In *Poster presented at meeting of the Gerontological Society of America*, Chicago, IL.
- Koziol-Mclain, J., Webster, D., McFarlane, J., Block, C. R., Ulrich, Y., Glass, N., & Campbell, J. C. (2006). Risk factors for femicide-suicide in abusive relationships: results from a multisite case control study. *Violence and Victims*, 21(1), 3–21.
- Krueger, R. F., & Tackett, J. L. (2006). *Personality and psychopathology*. New York, NY: Guilford Press.
- Lapierre, S., Dubé, M., Bouffard, L., & Alain, M. (2007). Addressing suicidal ideations through the realization of meaningful personal goals. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, 28(1), 16–25.
- Large, M., Sharma, S., Cannon, E., Ryan, C., & Nielsens, O. (2011). Risk factors for suicide within a year of discharge from psychiatric hospital: a systematic meta-analysis. *Australian and New Zealand Journal of Psychiatry*, 45(8), 619–628.
- Lazarus, S. L., & Folkman, S. (1984). *Stress, appraisal and coping*. Springer.
- Levi, Y., Horesh, N., Fischel, T., Treves, I., Or, E., & Apter, A. (2008). Mental pain and its communication in medically serious suicide attempts: an “impossible situation”. *Journal of Affective Disorders*, 111(2–3), 244–250.
- Lewis, K. C., Meehan, K. B., Cain, N. M., & Wong, P. S. (2016). Within the confines of character: a review of suicidal behaviour and personality style. *Psychoanalytic Psychology*, 33(1), 179–202.
- Liem, M., & Nieuwebeerta, P. (2010). Homicide followed by suicide: a comparison with homicide and suicide. *Suicide and Life-Threatening Behaviour*, 40(2), 133–145.
- Liem, M., & Roberts, D. W. (2009). Intimate partner homicide by presence or absence of a self-destructive act. *Homicide Studies*, 13(4), 339–354.
- Lindner, R. (2006). Suicidality in men in psychodynamic psychotherapy. *Psychoanalytic Psychotherapy*, 20(3), 197–239.
- Linehan, M. M., Goodstein, J. L., Nielsen, S. L., & Chiles, J. A. (1983). Reasons for staying alive when you are thinking of killing yourself: the reasons for living inventory. *Journal of Consulting and Clinical Psychology*, 51(2), 276–286.
- Lizardi, D., Currier, D., Galfalvy, H., Sher, L., Burke, A., Mann, J., & Oquendo, M. (2007). Perceived reasons for living at index hospitalization and future suicide attempt. *Journal of Nervous and Mental Disease*, 195(5), 451–455.
- Luria, G., & Torjman, A. (2009). Resources and coping with stressful events. *Journal of Organizational Behaviour*, 30(6), 685–707.
- Lysaker, P. H., Johnnesen, J. K., Lancaster, R. S., Davis, L. W., Zito, W. Q., & Bell, M. D. (2004). A rationally devised scoring scheme to assess coping in schizophrenia: internal consistency and associations with work performance. *International Journal of Psychosocial Rehabilitation*, 8, 41–51.
- Maddi, S. R. (1970). The search for meaning. In M. Page (Ed.), *Nebraska symposium on motivation* (pp. 137–186). Lincoln, NE: University of Nebraska Press.
- Magnus, K., Diener, E., Fujita, F., & Pavot, W. (1993). Extraversion and neuroticism as predictors of objective life events: a longitudinal analysis. *Journal of Personality and Social Psychology*, 65(5), 1046–1053.
- Malloy-Diniz, L. F., Neves, F. S., Abrantes, S. S. C., Fuentes, D., & Corrêa, H. (2009). Suicidal behaviour and neuropsychological assessment of type I bipolar patients. *Journal of Affective Disorders*, 112(1–3), 231–236.
- Malone, K. M., Oquendo, M. A., Haas, G. L., Ellis, S. P., Li, S., & Mann, J. J. (2000). Protective factors against suicidal acts in major depression: reasons for living. *American Journal of Psychiatry*, 157(7), 1084–1088.
- Mann, J. J. (2003). Neurobiology of suicidal behaviour. *Nature Reviews Neuroscience*, 4(10), 819–828.
- Mann, J. J. (2013). The serotonergic system in mood disorders and suicidal behaviour. *Philosophical Transactions of the Royal Society B*, 368(1615), 20120537.
- Mann, J. J., Apter, A., Bertolote, J., Beautrais, A., Currier, D., Haas, A., & Hendin, H. (2005). Suicide prevention strategies: a systematic review. *JAMA*, 294(16), 2064–2074.
- Mann, J. J., & Haghghi, F. (2010). Genes and environment: multiple pathways to psychopathology. *Biological Psychiatry*, 68(5), 403–404.
- Mann, J. J., Waternaux, C., Haas, G. L., & Malone, K. M. (1999). Toward a clinical model of suicidal behaviour in psychiatric patients. *American Journal of Psychiatry*, 156(2), 181–189.
- Manning, J. (2015). Suicide and social time. *Dilemas: Revista de Estudos de Conflito e Controle Social*, 8(1), 97–126.
- Manning, J. (2012). Suicide as social control. *Sociological Forum*, 27(1), 207–227.
- Maris, R. W. (2002). Suicide. *Lancet*, 360(9329), 319–326.

- Maris, R. W. (1981). *Pathways to suicide: A survey of self-destructive behaviors*. Baltimore, MD: Johns Hopkins University Press.
- Marty, M. A., Segal, D. L., & Coolidge, F. L. (2010). Relationships among dispositional coping strategies, suicidal ideation, and protective factors against suicide in older adults. *Aging and Mental Health, 14*(8), 1015–1023.
- Marzuk, P. M., Tardiff, K., & Hirsch, C. S. (1992). The epidemiology of murder–suicide. *Journal of the American Medical Association, 267*(23), 3179–3183.
- Masango, S. M., Rataemane, S. T., & Motojesi, A. A. (2008). Suicide and suicide risk factors: a literature review. *South African Family Practice, 50*(6), 25–28.
- May, A. M., & Klonsky, E. D. (2013). Assessing motivations for suicide attempts: development and psychometric properties of the inventory of motivations for suicide attempts. *Suicide and Life-Threatening Behaviour, 43*(5), 532–546.
- May, A. M., O'Brien, K. M., Liu, R. T., & Klonsky, E. D. (2016). Descriptive and psychometric properties of the Inventory of Motivations for Suicide Attempts (IMSA) in an inpatient adolescent sample. *Archives of Suicide Research, 20*(3), 476–482.
- Maydeu-Olivares, A., & D'Zurilla, T. J. (1996). A factor-analytic study of the social problem-solving inventory: an integration of theory and data. *Cognitive Therapy and Research, 20*(2), 115–133.
- McCullough, M. E., Kilpatrick, S. D., Emmons, R. A., & Larson, D. B. (2001). Is gratitude a moral affect? *Psychological Bulletin, 127*(2), 249–266.
- McKeown, R. E., Garrison, C. Z., Cuffe, S. P., Waller, J. L., Jackson, K. L., & Addy, C. L. (1998). Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 37*(6), 612–619.
- McLean, J., Maxwell, M., Platt, S., Harris, F., & Jepson, R. (2008). *Risk and protective factors for suicide and suicidal behaviour: A literature review* (Health and Community Care, Scottish Government Social Research). Scottish Government.
- McMillan, D., Gilbody, S., Beresford, E., & Neilly, L. (2007). Can we predict suicide and non-fatal self-harm with the Beck Hopelessness Scale? A meta-analysis. *Psychological Medicine, 37*(6), 769–778.
- Meehan, K. B., De Panfilis, C., Cain, N. M., & Clarkin, J. F. (2013). Effortful control and externalizing problems in young adults. *Personality and Individual Differences, 55*(5), 553–558.
- Melton, A. M. A., & Schulenberg, S. E. (2007). On the relationship between meaning in life and boredom proneness: examining a logotherapy postulate. *Psychological Reports, 101*(3), 1016–1022.
- Menninger, K. (1938). *Man against himself*. New York, NY: Harcourt Brace and World.
- Merton, R. K. (1968). *Social theory and social structure*. New York, NY: The Free Press.
- Meyer, R. E., Salzman, C., Youngstrom, E. A., Clayton, P. J., Goodwin, F. K., Mann, J. J., & Sheehan, D. V. (2010). Suicidality and risk of suicide—definition, drug safety concerns, and a necessary target for drug development: a consensus statement. *Journal of Clinical Psychiatry, 71*(8), e1–e21.
- Miller, J. M., Kinnally, E. L., Ogden, R. T., Oquendo, M. A., & Mann, J. J. (2009). Reported childhood abuse is associated with low serotonin binding in vivo in major depressive disorder. *Synapse, 63*(7), 565–573.
- Miller, J. S., Segal, D. L., & Coolidge, F. L. (2001). A comparison of suicidal thinking and reasons for living among younger and older adults. *Death Studies, 25*(4), 357–365.
- Mills, J. F., Green, K., & Reddon, J. R. (2005). An evaluation of the Psychache Scale on an offender population. *Suicide and Life-Threatening Behaviour, 35*(5), 570–580.
- Miranda, R., Gallagher, M., Bauchner, B., Vaysman, R., & Marroquin, B. (2012). Cognitive inflexibility as a prospective predictor of suicidal ideation among young adults with a suicide attempt history. *Depression and Anxiety, 29*(3), 180–186.
- Miranda, R., Scott, M., Hicks, R., Wilcox, H. C., Harris, M. J. L., & Shaffer, D. (2008). Suicide attempt characteristics, diagnoses, and future attempts: comparing multiple attempters to single attempters and ideators. *Journal of the American Academy of Child & Adolescent Psychiatry, 47*(1), 32–40.
- Mischel, W. (2004). Toward an integrative science of the person. *Annual Review of Psychology, 55*, 1–22.
- Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158*(11), 1783–1793.
- Molnar, B. E., Berkman, L. F., & Buka, S. L. (2001). Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. *Psychological Medicine, 31*(6), 965–977.
- Monnin, J., Thiemard, E., Vandel, P., Nicolier, M., Tio, G., Courtet, P., & Haffen, E. (2012). Sociodemographic and psychopathological risk factors in repeated suicide attempts: gender differences in a prospective study. *Journal of Affective Disorders, 136*(1–2), 35–43.
- Morton, E., Runyan, W., Moracco, K., & Butts, J. D. (1998). Partner homicide-suicide involving female homicide victims: a population based study in North Carolina, 1988–1992. *Violence and Victims, 13*(2), 91–106.
- Muller, L., & Spitz, E. (2003). Évaluation multidimensionnelle du coping: Validation du Brief COPE sur une population française [Multidimensional assessment of coping: validation of the Brief COPE among a French population]. *L'Encéphale, 29*(6), 507–518.
- Neeleman, J., Wessely, S., & Lewis, G. (1998). Suicide acceptability in African- and white Americans: the role of religion. *Journal of Nervous and Mental Disease, 186*(1), 12–16.
- Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., & Williams, D. (2008a). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *British Journal of Psychiatry, 192*(2), 98–105.
- Nock, M. K., Borges, G., Bromet, E. J., Cha, C. B., Kessler, R. C., & Sing, L. (2008b). Suicide and suicidal behaviour. *Epidemiological Reviews, 30*(1), 133–154.
- Nock, M. K., Hwang, I., Sampson, N. A., & Kessler, R. C. (2010). Mental disorders, comorbidity and suicidal behavior: results from the National Comorbidity Survey Replication. *Molecular Psychiatry, 15*(8), 868–876.
- Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. J. (2006). Non-suicidal self-injury among adolescents: diagnostic correlates and relation to suicide attempts. *Psychiatry Research, 144*(1), 65–72.

- Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide gestures: analysis of the National Comorbidity Survey. *Journal of Abnormal Psychology, 115*(3), 616–623.
- O'Connor, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. *Crisis, 32*(6), 295–298.
- O'Connor, R. C., & Cassidy, C. (2007). Predicting hopelessness: the interaction between optimism/pessimism and specific future expectancies. *Cognition and Emotion, 21*(3), 596–613.
- O'Donnell, O., House, A., & Waterman, M. (2015). The co-occurrence of aggression and self-harm: systematic literature review. *Journal of Affective Disorders, 175C*, 325–350.
- Oquendo, M. A., & Mann, J. J. (2000). The biology of impulsivity and suicidality. *Psychiatric Clinics of North America, 23*(1), 11–25.
- Oquendo, M. A., Waternaux, C., Brodsky, B., Parsons, B., Haas, G. L., Malone, K. M., & Mann, J. J. (2000). Suicidal behaviour in bipolar mood disorder: clinical characteristics of attempters and non-attempters. *Journal of Affective Disorders, 59*(2), 107–117.
- Ortigo, K. M., Western, D., & Bradley, R. (2009). Personality subtypes of suicidal adults. *Journal of Nervous and Mental Disease, 197*(9), 687–694.
- Osman, A., Downs, W. R., Kopper, B. A., Barrios, F. X., Baker, M. T., Osman, J. R., Besett, T. M., & Linehan, M. M. (1998). The reasons for living inventory for adolescents (RFL-A): development and psychometric properties. *Journal of Clinical Psychology, 54*(8), 1063–1078.
- Osman, A., Kopper, B. A., Barrios, F. X., Osman, J. R., Besett, T. M., & Linehan, M. M. (1996). The brief reasons for living inventory for adolescents (BRFL-A). *Journal of Abnormal Child Psychology, 24*(4), 433–443.
- Palermo, G. B. (1994). Murder-suicide. An extended suicide. *International Journal of Offender Therapy and Comparative Criminology, 38*(3), 205–216.
- Palermo, G. B., Smith, M. B., Jenzten, J. M., Henry, T. E., Konicek, P. J., Peterson, G. F., & Witeck, M. J. (1997). Murder-suicide of the jealous paranoia type: a multicenter statistical pilot study. *American Journal of Forensic Medicine and Pathology, 18*(4), 374–383.
- Panagioti, M., Gooding, P. A., & Tarrier, N. (2015). A prospective study of suicidal ideation in posttraumatic stress disorder: the role of perceptions of defeat and entrapment. *Journal of Clinical Psychology, 71*(1), 50–61.
- Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment, 5*(2), 164–172.
- Pavot, W., & Diener, E. (2008). The Satisfaction with life scale and the emerging construct of life satisfaction. *Journal of Positive Psychology: Dedicated to Furthering Research and Promoting Good Practice, 3*(2), 137–152.
- Pavot, W., Diener, E., Colvin, C. R., & Sandvik, E. (1991). Further validation of the satisfaction with life scale: evidence for the cross-method convergence of well-being measures. *Journal of Personality Assessment, 57*(1), 149–161.
- Pawlak, J., Dmitrzak, W. M., Skibi ska, M., Szczepankiewicz, A., Leszczy ska, R. A., Rajewska, R. A., & Hauser, J. (2013). Suicide attempts and clinical risk factors in patients with bipolar and unipolar affective disorders. *General Hospital Psychiatry, 35*(4), 427–432.
- Paykel, E. S., Myers, J. K., Lindenthal, J. J., & Tanner, J. (1974). Suicidal feelings in the general population: a prevalence study. *British Journal of Psychiatry, 124*(582), 460–469.
- Phillips, M. R., Yang, G., Zhang, Y., Wang, L., Ji, H., & Zhou, M. (2002). Risk factors for suicide in China: a national case-control psychological autopsy study. *Lancet, 360*(9347), 1728–1736.
- Plutchik, R. (1995). Outward and inward directed aggressiveness: the interaction between violence and suicidality. *Pharmacopsychiatry, 28*(2), 47–57.
- Plutchik, R., Van Praag, H. M., & Conte, H. R. (1989a). Correlates of suicide and violence risk: III. A two-stage model of countervailing forces. *Psychiatry Research, 28*(2), 215–225.
- Plutchik, R., Van Praag, H. M., Conte, H. R., & Picard, S. (1989b). Correlates of suicide and violence risk, I: the suicide risk measure. *Comprehensive Psychiatry, 30*(4), 296–302.
- Pompili, M., Pennica, A., Serafini, G., Battuello, M., Innamorati, M., Teti, E., & Girardi, P. (2013). Depression and affective temperaments are associated with poor health-related quality of life in patients with HIV infection. *Journal of Psychiatric Practice, 19*(2), 109–117.
- Range, L. M., & Stringer, T. A. (1996). Reasons for living and coping abilities among older adults. *International Journal of Aging & Human Development, 43*(1), 1–6.
- Rasmussen, S. A., Fraser, L., Gotz, M., MacHale, S., Mackie, R., Masterton, G., & O'Connor, R. C. (2010). Elaborating the cry of pain model of suicidality: testing a psychological model in a sample of first-time and repeat self-harm patients. *British Journal of Clinical Psychology, 49*(1), 15–30.
- Renaud, J., Berlim, M. T., McGirr, A., Tousignant, M., & Turecki, G. (2008). Current psychiatric morbidity, aggression/impulsivity, and personality dimensions in child and adolescent suicide: a case-control study. *Journal of Affective Disorders, 105*(1–3), 221–228.
- Resnick, P. J. (1969). Child murder by parents: a psychiatric review of filicide. *American Journal of Psychiatry, 126*(3), 325–334.
- Rey, L., Extremera, N., & Duran, M. A. (2012). Core self-evaluations, meta-mood experience, and happiness: tests of direct and moderating effects. *Personality and Individual Differences, 53*(3), 207–212.
- Rosenbaum, M. (1990). The role of learned resourcefulness in self-control of health behaviour. In M. Rosenbaum (Ed.), *Learned resourcefulness: On coping skills, self control and adaptive behaviour* (pp. 3–30). New York, NY: Springer.
- Rudd, M. D. (2000). The suicidal mode: a cognitive-behavioural model of suicidality. *Suicide and Life-Threatening Behaviour, 30*(1), 18–33.
- Rudd, M. D. (2006). *Assessment and management of suicidality*. Sarasota, FL: Professional Resource Press.
- Rudd, M. D., Berman, A. L., Joiner, T. E., Nock, M. K., Silverman, M. M., Mandrusiak, M., & Witte, T. (2006). Warning signs for suicide: theory, research, and clinical applications. *Suicide and Life-Threatening Behaviour, 36*(3), 255–262.
- Rudd, M. D., Rajab, M. H., & Dahm, P. F. (1994). Problem-solving appraisal in suicide ideators and attempters. *American Journal of Orthopsychiatry, 64*(1), 136–149.
- Rudd, M. D., Schmitz, B., McClenen, R., Joiner, T., Elkins, G., & Claassen, C. (2010). The Suicide Cognitions Scale: a suicide-specific measure of hopelessness. *Journal of Abnormal Psychology.*
- Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry: An International Journal for the Advancement of Psychological Theory, 9*(1), 1–28.

- Sanger, S., & Veach, P. M. (2008). The interpersonal nature of suicide: a qualitative investigation of suicide notes. *Archives of Suicide Research, 12*(4), 352–365.
- Schotte, D. E., & Clum, G. A. (1982). Suicide ideation in a college population: a test of a model. *Journal of Consulting and Clinical Psychology, 50*(5), 690–696.
- Segal, D. L., Levenson, S., & Coolidge, F. L. (2008). Global self-rated health status predicts reasons for living among older adults. *Clinical Gerontologist, 31*(4), 122–132.
- Segal, D. L., Marty, M. A., Meyer, W. J., & Coolidge, F. L. (2012). Personality, suicidal ideation, and reasons for living among older adults. *Journal of Gerontology: Psychological Sciences and Social Sciences, 67b*(2), 159–166.
- Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Preventing depression: Mindfulness-based cognitive therapy*. New York, NY: Guilford Press.
- Seligman, M. E. P. (2002). *Authentic happiness*. New York, NY: Free Press.
- Sheldon, K. M., & Houser-Marko, L. (2004). Self-concordance, goal attainment, and the pursuit of happiness: can there be an upward spiral? *Journal of Personality and Social Psychology, 80*(1), 152–165.
- Shneidman, E. S. (1993). Commentary: suicide as psychache. *Journal of Nervous and Mental Disease, 181*(3), 145–147.
- Shneidman, E. S. (1996a). Suicide as psychache. In J. T. Maltzberger, & M. J. Goldblatt (Eds.), *Essential papers on suicide. Essential papers in psychoanalysis* (pp. 633–638). Northvale, NJ: Aronson.
- Shneidman, E. S. (1996b). *The suicidal mind*. New York, NY: Oxford University Press.
- Shneidman, E. S. (1973). Suicide notes reconsidered. *Psychiatry: Journal for the Study of Interpersonal Processes, 36*(4), 379–394.
- Silverman, M. M., Berman, A. L., Sanddal, N. D., O’Carroll, P. W., & Joiner, T. E. (2007). Rebuilding the tower of Babel: a revised nomenclature for the study of suicide and suicidal behaviours. Part 2: suicide-related ideations, communications, and behaviours. *Suicide and Life-Threatening Behaviour, 37*(3), 248–263.
- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychological Bulletin, 129*(2), 216–269.
- Snyder, C. R., & Rand, R. L. (2004). Hopelessness and health. *Encyclopedia of health and behavior, 2*, 521–523.
- Snyder, C. R., Harris, C., Anderson, J. R., Holleran, S. A., Irving, L. M., Sigmon, S. T., & Harney, P. (1991). The will and the ways: development and validation of an individual-differences measure of hope. *Journal of Personality and Social Psychology, 60*(4), 570–585.
- Snyder, C. R., Hoza, B., Pelham, W. E., Rapoff, M., Ware, L., Danovsky, M., & Stahl, K. (1997). The development and validation of the Children’s Hope Scale. *Journal of Pediatric Psychology, 22*(3), 399–421.
- Snyder, C. R., Simpson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and validation of the State Hope Scale. *Journal of Personality and Social Psychology, 70*(2), 321–335.
- Spielberger, C. D., Reheiser, E. C., & Sydeman, S. J. (1995). Measuring the experience, expression, and control of anger. In H. Kassirer (Ed.), *Anger disorders: Definition, diagnosis, and treatment. Series in clinical and community psychology* (pp. 49–67). Philadelphia, PA: Taylor & Francis.
- Stack, S. (1997). Homicide followed by suicide: an analysis of Chicago data. *Criminology, 35*(3), 435–453.
- Stalenheim, E. G. (2001). Relationships between attempted suicide, temperamental vulnerability, and violent criminality in a Swedish forensic psychiatric population. *European Psychiatry, 16*(7), 386–394.
- Stanford, M. S., Mathias, C. W., Dougherty, D. M., Lake, S. L., Anderson, N. E., & Patton, J. H. (2009). Fifty years of the Barratt Impulsiveness Scale: an update and review. *Personality and Individual Differences, 47*(5), 385–395.
- Starzomski, A., & Nussbaum, D. (2000). The self and the psychology of domestic homicide-suicide. *International Journal of Offender Therapy and Comparative Criminology, 44*(4), 468–479.
- Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: assessing the presence of and search for meaning in life. *Journal of Counselling Psychology, 53*(1), 80–93.
- Steger, M. F., & Kashdan, T. B. (2007). Stability and specificity of meaning in life and life satisfaction over one year. *Journal of Happiness Studies, 8*(2), 161–179.
- Steger, M. F., Kashdan, T. B., Sullivan, B. A., & Lorentz, D. (2008). Understanding the search for meaning in life: personality, cognitive style, and the dynamic between seeking and experiencing meaning. *Journal of Personality, 76*(2), 199–228.
- Stice, B. D., & Canetto, S. S. (2008). Older adult suicide: perceived precipitants and protective factors. *Clinical Gerontologist: The Journal of Aging and Mental Health, 31*(4), 1–25.
- Stotland, E. (1969). *The psychology of hope*. San Francisco, CA: Jossey-Bass.
- Stubbe, J. H., Posthuma, D., Boomsma, D. I., & De Geus, E. J. (2005). Heritability of life satisfaction in adults: a twin-family study. *Psychological Medicine, 35*(11), 1581–1588.
- Stump, T., Muck, P. M., Hülsheger, U. R., Judge, T. A., & Maier, G. W. (2010). Core self-evaluations in Germany: validation of a German measure and its relationships with career success. *Applied Psychology, 59*(4), 674–700.
- Sullivan, M. E., Annett, J. L., Simon, T. R., Luo, F., & Dahlberg, L. L. (2015). Suicide trends among persons aged 10–24 years—United States, 1994–2012. *Morbidity and Mortality Weekly Report, 64*(8), 201–205.
- Suokas, J. T., Perälä, J., Suominen, K., Saarni, S., Lönnqvist, J., & Suvisaari, J. M. (2010). Epidemiology of suicide attempts among persons with psychotic disorder in the general population. *Schizophrenia Research, 124*(1–3), 22–28.
- Surrence, K., Miranda, R., Marroquín, B. M., & Chan, S. (2009). Brooding and reflective rumination among suicide attempters: cognitive vulnerability to suicidal ideation. *Behaviour Research and Therapy, 47*(9), 803–808.
- Swogger, M. T., Van Orden, K. A., & Conner, K. R. (2014). The relationship of outwardly-directed aggression to suicidal ideation and suicide attempts across two high-risk samples. *Psychology of Violence, 4*(2), 184–195.

- Swogger, M. T., Walsh, Z., Maisto, S. A., & Conner, K. R. (2013). Reactive and proactive aggression and suicide attempts among criminal offenders. *Criminal Justice and Behaviour*, 41(3), 337–344.
- Swogger, M. T., You, S., Cashman-Brown, S., & Conner, K. R. (2011). Childhood physical abuse, aggression, and suicide attempts among criminal offenders. *Psychiatry Research*, 185(3), 363–367.
- Taylor, P. J., Awenat, Y., Gooding, P. A., Johnson, J., Pratt, D., Wood, A. M., & Tarrier, N. (2010a). The subjective experience of participation in schizophrenia research: a practical and ethical issue. *Journal of Nervous and Mental Disease*, 198(5), 343–348.
- Taylor, P. J., Gooding, P. A., Wood, A. M., Johnson, J., Pratt, D., & Tarrier, N. (2010b). Defeat and entrapment in schizophrenia: the relationship with suicidal ideation and positive psychotic symptoms. *Psychiatry Research*, 178(2), 244–248.
- Thakur, U. (1963). *The history of suicide in India: An introduction*. Nai Sarak, Delhi: Munshiram Manoharlal.
- Troister, T., D'Agata, M. T., & Holden, R. R. (2015). Suicide risk screening: comparing the Beck Depression Inventory-II, Beck Hopelessness Scale, and Psychache Scale in undergraduates. *Psychological Assessment*, 27(4), 1500–1506.
- Troister, T., & Holden, R. R. (2010). Comparing psychache, depression, and hopelessness in their associations with suicidality: a test of Shneidman's theory of suicide. *Personality and Individual Differences*, 49(7), 689–693.
- Tsaousis, I., Nikolaou, I., Serdaris, N., & Judge, T. A. (2007). Do the core self-evaluations moderate the relationship between subjective well-being and physical and psychological health? *Personality and Individual Differences*, 42(8), 1441–1452.
- Turecki, G. (2005). Dissecting the suicide phenotype: the role of impulsive-aggressive behaviours. *Journal of Psychiatry and Neuroscience*, 30(6), 398–408.
- Unnithan, N. P., Huff-Corzine, L., Corzine, J., & Whitt, H. P. (1994). *The currents of lethal violence: An integrated model of suicide and homicide*. Albany, NY: State University of New York Press.
- Van Heeringen, K. (2012). Stress-diathesis model of suicidal behaviour. In Y. Dwivedi (Ed.), *The neurobiological basis of suicide*. Boca Raton, FL: CRC Press.
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E. (2010). The interpersonal theory of suicide. *Psychological Review*, 117(2), 575–600.
- Van Spijker, B. A. J., Batterham, P. J., Cleave, A. L., Farrer, L., Christensen, H., Reynolds, J., & Kerkhof, A. J. F. M. (2014). The Suicidal Ideation Attributes Scale (SIDAS): community-based validation study of a new scale for the measurement of suicidal ideation. *Suicide and Life-Threatening Behaviour*, 44(4), 408–419.
- Van Spijker, B., Van Straten, A., & Kerkhof, A. (2010). The effectiveness of a web-based self-help intervention to reduce suicidal thoughts: a randomized controlled trial. *Trials*, 11, 25.
- Van Wormer, K. (2008). The dynamics of murder–suicide in domestic situations. *Brief Treatment and Crisis Intervention*, 8(3), 274–282.
- Vassar, M. (2008). A note on the score reliability for the satisfaction with life scale: an RG study. *Social Indicators Research*, 86(1), 47–57.
- Victor, S. E., & Klonsky, E. D. (2014a). Daily emotion in non-suicidal self-injury. *Journal of Clinical Psychology*, 70(4), 364–375.
- Victor, S. E., & Klonsky, E. D. (2014b). Correlates of suicide attempts among self-injurers: a meta-analysis. *Clinical Psychology Review*, 34(4), 282–297.
- Wallace, A. (1986). *Homicide: The social reality*. Sydney, NSW: Bureau of Crime Statistics and Research.
- Wenzel, A., & Beck, A. T. (2008). A cognitive model of suicidal behaviour: theory and treatment. *Applied and Preventive Psychology*, 12(4), 189–201.
- Wenzel, A., Brown, G. K., & Beck, A. T. (2009). *Cognitive therapy for suicidal patients: Scientific and clinical applications*. Washington, DC: American Psychological Association.
- Whiteside, S. P., & Abramowitz, J. S. (2004). Obsessive-compulsive symptoms and the expression of anger. *Cognitive Therapy and Research*, 28(2), 259–268.
- Whiteside, S. P., & Lynam, D. R. (2001). The five factor model and impulsivity: using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, 30(4), 669–689.
- Williams, J. M. G. (1997). *Cry of pain: Understanding suicide and self-harm*. London: Penguin Books.
- Williams, J. M. G., & Pollock, L. R. (2000). The psychology of suicidal behaviour. In K. Hawton, & K. van Heeringen (Eds.), *The international handbook of suicide and attempted suicide* (pp. 79–93). Chichester: Wiley.
- Williams, J. M. G., & Pollock, L. R. (2001). Psychological aspects of the suicidal process. In K. van Heeringen (Ed.), *Understanding suicidal behaviour* (pp. 76–93). Chichester: Wiley.
- Wineman, N. M., Durand, E. J., & McCulloch, B. J. (1994). Examination of the factor structure of the Ways of Coping Questionnaire with clinical populations. *Nursing Research*, 43(5), 268–273.
- Wingate, L. R., Burns, A. B., Gordon, K. H., Perez, M., Walker, R. L., Williams, F. M., & Joiner, T. E. (2006). Suicide and positive cognitions: Positive psychology applied to the understanding and treatment of suicidal behaviour. In T. E. Ellis (Ed.), *Cognition and suicide: Theory, research, and practice* (pp. 261–283). Washington, DC: American Psychological Association.
- Witte, T. K., Merrill, K. A., Stellrecht, N. E., Bernert, R. A., Hollar, D. L., Schatschneider, C., & Joiner, T. E. (2008). “Impulsive” youth suicide attempters are not necessarily all that impulsive. *Journal of Affective Disorders*, 107(1–3), 107–116.
- Wolf, M. (1972). *Women and the family in rural Taiwan*. Stanford: Stanford University Press.
- World Health Organization (WHO). (2014a). *Mental health–suicide prevention*. Geneva, Switzerland. Available from: http://www.who.int/mental_health/prevention/suicide/prevention/en/
- World Health Organization (WHO). (2014b). *WHO mortality database*. Geneva, Switzerland. Available from: <http://apps.who.int/healthinfo/statistics/mortality/whodpms/>
- Wu, B. (2003). Testing the stream analogy for lethal violence: a macro study of suicide and homicide. *Western Criminology Review*, 4(3), 215–225.
- Yagil, D., Luria, G., & Gal, I. (2008). Stressors and resources in customer service roles: exploring the relationship between core self-evaluations and burnout. *International Journal of Service Industry Management*, 19(5), 575–595.

Index

A

- Aberrant personality traits, 244
- Activation (ACT) Specific Problem scale, 365
- Actuarial risk assessment instruments (ARAI), 407
- Actuarial risk estimate (ARE), 407, 424
- Adaptive behavior
 - executive function and ASD, relation with, 113
 - historical background, 111–113
 - intelligence, role of, 112–113
 - measurement, 114–116
 - Adaptive Behavioral Assessment System 2nd ed. (ABAS-II), 114
 - Behavior Assessment System for Children (BASC-2), 115–116
 - Diagnostic Adaptive Behavior Scale (DABS), 115
 - performance measures, 116
 - Scales of Independent Behavior-Revised (SIB-R), 114–115
 - Vineland Adaptive Behavior Scales 2nd ed. (VABS-II), 115
 - Woodcock-Johnson battery, 114
- Adaptive personality, 366, 368
- Adult Temperament Questionnaire (ATQ), 165
 - factor scales, 166
- Advances in mental illness, 320
- Affective empathy, 109
- Age, 309, 310, 344, 385, 387, 388, 392
 - batteries, 97
 - early childhood behavior questionnaire, 6
 - graded theory, 390
- Agentive framework, 187
- Ages and Stages Questionnaires-Social Emotional version (ASQ-SE), 311
- Aggression, 224, 237, 278, 279, 309, 370, 383, 387, 398, 417, 427, 429
 - in industrial societies, 441
 - suicide, 440–441
- Agoraphobia, 315
- Agreeableness, 53, 235, 239, 244, 302, 386
- AIHQ. *See* Ambiguous Intentions and Hostility Questionnaire (AIHQ)
- Alabama Parenting Question (APQ), 173
- Alogia, 317
- Alternative five-factorial model (AFFM), 236–237
- Ambiguous Intentions and Hostility Questionnaire (AIHQ), 140
- American Association on Intellectual and Developmental Disabilities (AAIDD), 112
- Analyses of variance (ANOVA), 32
- Anhedonia, 321
- Anhedonic introversion, 345
- Antisocial
 - attitudes, 387
 - behaviors, 309, 389–391, 427
 - personality disorders, 135
 - syndrome, 385
 - thinking, 384
- Antisocial Beliefs and Attitudes Scales (ABAS), 397
- Antisocial Feature (ANT) scale, 427
- Anxiety, 30, 62, 77, 102, 118, 134, 143, 166, 171, 193, 208, 242, 281, 308, 314, 321, 347, 357, 359, 394, 408, 409
- Aphasia, 308, 318
- Arbitrarily applicable relational responding (AARR), 226
- AS. *See* Asperger syndrome (AS)
- ASD. *See* Autism spectrum disorder (ASD)
- Asperger syndrome (AS), 135
- Assessment methods
 - infants and preschoolers, 309–310
 - observational methods, 310
 - structured instruments, 311
 - theory, 306
- Attention, 319, 345, 353, 387, 392, 418, 423
- Attentional bias modification (ABM)
 - treatment, 295
- Attention deficit disorder (ADD), 96
- Attention-deficit/hyperactivity disorder (ADHD), 95, 296, 309, 312, 346
 - executive function, effect on, 99
 - temperament and parenting practices, 173–174
 - temperament/character traits, 173
- Attitudes, 384
 - definition, 384
 - influence, on violent behavior, 384
 - synonym for, 384
- Authority conflict, 385
- Autism, 94, 100, 102, 109, 115, 136, 174, 300, 308
- Autism spectrum disorder (ASD), 71, 300, 308, 312
 - adaptive ability, 116–117
 - adaptive behavior, longitudinal studies of, 118
 - attention-deficit/hyperactivity disorder (ADHD), association between, 117
 - conceptual reasoning, 116–117
 - executive functions
 - effect on, 99
 - longitudinal studies of, 118
 - problem solving, 116–117
 - temperament, relation with, 174
 - theory of mind (ToM)
 - assessment, 110
 - relation with, 109
 - as severity index, 109–110
- Autistic Spectrum Disorder, 301
- Autoregressive state model (ASM), 228
- Avolition, 317
- Axis II diagnoses, 347
- Axis I-related pathology, and personality disorder, 302

B

- BADE. *See* Bias against disconfirmatory evidence (BADE)
- Balanced Inventory of Desirable Responding (BIDR), 274
- Baumrind's parenting styles, 193
- Bayesian credible intervals, 77
- Bayesian networks (BNs), 82, 413
 - model, 10
- Bayley Scales of Infant Development, 303
- Beavers Interactional Competence Scale (BICS), 190
- Beavers Interactional Style Scale (BISS), 190
- Beavers system model of family functioning (BSMFF), 190
- Beck Cognition Insight Scale (BCIS), 133
- Beck Hopelessness Scale (BHS), 447
- Beck Scale for Suicide Ideation (BSSI), 457
- Behavioral and Emotional Screening System (BESS), 7, 209
- Behavioral Assessment of the Dysexecutive Syndrome (BADs), 117
- Behavioral control, 192
- Behavioral sensitization, 314
- Behavioral Style Questionnaire (BSQ), 161
- Behavior Assessment System for Children (BASC), 115–116
 - Parent Rating Scale (PRS), 115
 - Self-Report of Personality Scale (SRP), 115
 - Teacher Rating Scale (TRS), 115
- Behavior Rating Inventory of Executive Function (BRIEF), 98
 - behavioral regulation index, 98
 - metacognition index, 98
- Behavior scales, 4
- Belief and desire reasoning, 101
- Belief networks/causal probabilistic networks, 413

- Beyond the pleasure principle, 454
- Bias
 examiner processing, 275
 researcher bias, 275
 respondent, 274–275
 sources of, 274
- Bias against disconfirmatory evidence (BADE), 144
- Bifactor model, 9, 57, 74, 75, 348
- Big Five factors, 234. *See also* Five-factor model
 in childhood and adolescence, 235
 criticisms of, 235–236
 cultural studies, 235
 dyadic interactional perspective on, 234
 model, 4
 NEO-PI, 4
 NEO-PI-3, 4
 NEO-PI-R, 4
 personality traits, 159, 234, 235
 range of developmental issues, 235
 social/institutional outcomes, 53
 temperament, relationship between, 159
 TIPI-J, 55
- Big 7 model, 236
- Binet-Simon Intelligence Scale, 3
- Biological sensitivity, 196
- Biopsychosocial approach, 320
- Biopsychosocial-sociocultural, 320
- Biosocial model, 306
- Bipolar disorder (BPD), 172, 313, 344
 attentional bias, 143
 characterization, 172
 information-processing models, 143
 personality profile associated, 172
- Bipolar pathology, 346
- Bipolar Personality Disorder (BPD), 444
- Bootstrapping techniques, 77
- Borderline personality disorder (BPD), 136, 295, 346, 450
- Bornstein's process-focused model, 6
- BPD. *See* Borderline personality disorder (BPD)
- Brain disease theory, 316
- BRIEF. *See* Behavior Rating Inventory of Executive Function (BRIEF)
- Brief Infant-Toddler Social and Emotional Assessment (BITSEA), 311
- Brigance Infant and Toddler Screen-II (BITS), 312
- Brigance Inventory of Early Development (BIED), 312
- Broad spectrum questionnaires (BSQ), 360
- C**
- California child Q-sort (CCQ), 173
- California Psychological Inventory (CPI), 245
- Cambridge Neuropsychological Test Automated Battery (CANTAB), 97
 modules, 98
- CANTAB. *See* Cambridge Neuropsychological Test Automated Battery (CANTAB)
- Care Index, 310
- CARS. *See* Cultural Assessment of Risk for Suicide (CARS)
- CAS. *See* Cognitive attentional syndrome (CAS)
- CAT. *See* Computer adaptive testing (CAT)
- Catalano and Hawkins social development model, 391
- Catastrophizing, 299
- Catatonic behavior, 317
- CAVS. *See* Criminal Attitudes to Violence Scale (CAVS)
- CBCL. *See* Child Behavior Checklist (CBCL)
- CBM paradigms. *See* Cognitive bias modification (CBM) paradigms
- CBQ. *See* Children's Behavior Questionnaire (CBQ)
- CBT. *See* Cognitive-behavioral therapies (CBT)
- CE. *See* Construct equivalence (CE)
- CEFI. *See* Comprehensive Executive Function Inventory (CEFI)
- Child Abuse Potential Inventory (CAPI), 198, 206
- Child and Adolescence Twin Study in Sweden (CATSS), 312
- Child Behavior Checklist (CBCL), 208, 239, 282, 306, 311
- Childhood adversities, 307, 314
- Childhood depression, 187
- Childhood dysregulation syndrome, 306
- Childhood externalizing behavior, 312
- Childhood interpersonal adversities, 306
- Childhood trauma, 309, 314
- Childhood Trauma Questionnaire (CTQ), 207, 307
- Child maltreatment
 developmental ecological model of, 198
 multilevel perspective, 197
 negative parenting, 197
- Child Problematic Traits Inventory (CPTI), 9, 369–370
- Children, adaptive behavior measurement vs. HFASDs, 117
- Children's Behavior Questionnaire (CBQ), 164
 Physiological Reactions Questionnaire (PRQ), 164
- Child Temperament and Personality Questionnaire (CTPQ), 165
- Chinese Classification of Mental Disorders (CCMD), 349–350
- Chinese Personality Assessment Inventory (CPAI), 272
- Chinese Personality Inventory, 267
- Chinese Society of Psychiatry (CSP), 349
- CII. *See* Construct irrelevant invariance (CII)
- Circumplex Model of Marital and Family Systems (CMMFS), 189
 balanced cohesion and balanced flexibility, 190
 curvilinear hypothesis, 189
 family cohesion, definition, 190
 relational diagnosis, 189
- CLA. *See* Cultural lens approach (CLA)
- Classical test theory (CTT), 4, 27, 30–31
 limitations, 30
- Classification of Violence Risk (COVR), 422
- Clinical assessment, developments in, 360
- Clinical psychology
 mediation analysis in, 77–78
 models for longitudinal data, 78
 cross-lagged panel models, 78
 latent change score models, 78
 latent growth curve models, 78
- Cloninger's theory, 172
 temperament and character variables, 234
- CMS. *See* Cultural Model of Suicide (CMS)
- Cogmed Working Memory Training (CWMT) program, 100
- Cognitive abilities, 45
- Cognitive-affective processing system (CAPS) model, 227, 356
 in relation to concurrent interactions and developmental influences, 356
- Cognitive-affective units, 357
 types in personality mediating system, 357
- Cognitive assessment system, 46, 319
- Cognitive attentional syndrome (CAS), 131, 133
- Cognitive-behavioral therapies (CBT), 143, 315, 385
- Cognitive biases, 137–145
 attributional style or bias, 140–141
 delusions, theoretical models of, 138–140
 as departures from normative models of rationality, 137–138
 hostile attributional bias, 140
 in psychotic disorders, 138–140
 types and patterns, 138
- Cognitive bias modification (CBM) paradigms, 142
- Cognitive emotion regulation, 296
 across cultures, 298
- Cognitive Emotion Regulation Questionnaire (CERQ), 8, 298, 299
- Cognitive empathy, 109
- Cognitive-experiential self-theory (CEST), 236
- Cognitive factors, 294
- Cognitive flexibility, 94
 set shifting measurement, 94
 intradimensional/extradimensional (ID/ED) test, 94
 wisconsin card sorting test (WCST), 94
 set shifting, relation with, 94
- Cognitive illusions, 137
- Cognitive impairments, 319
- Cognitive malfunctioning, 10
- Cognitive reappraisal, 294
- Cognitive Reflection Test (CRT), 138
- Cognitive strategy, 172
 of emotion regulation, 298
 rumination, 172
- Cognitive theories, 446–449
 comprehensive cognitive model, 446–448
 fluid vulnerability theory, 448–449
 hopelessness theory, 446–448
 Beck hopelessness scale (BHS), 447
 Snyder's hope scales, 447–448
 adult dispositional hope scale, 447
 adult state hope scale, 448
 children's hope scale (CHS), 448
 schematic appraisal model of suicide (SAMS), 449
 resilience appraisals scale (RAS), 449
- Cognitive traps, 143
- Coherence rationality, 138

- Cold processes
 cognitive flexibility (CF), role in, 92
- Collectors of injustice, 440
- Colorado Child Temperament Inventory (CCTI), 161
- Columbia-Suicide Severity Rating Scale (C-SSRS), 458
 constructs, 458
 behavior subscale, 458
 intensity of ideation, 458
 lethality subscale, 458
 severity of ideation, 458
- Common cause model, 224, 246
- Common humanity, 324
- Common Language Effect Size (CLES), 413
- Commonsense psychology, 101
- Comorbid disorders, 315
- Comorbidity, 244, 349
- Compensatory model, 224
- Complex span tasks, 96
- Composite reliability, 29
- Comprehensive Executive Function Inventory (CEFI), 98
- Computer adaptive testing (CAT), 34
- Computerized Diagnostic Interview Schedule for Children (C-DISC), 362
- Comrey Personality Scales (CPS), 245
- Concomitant/state model, 247
- Conditional analysis, 81
- Confirmatory bias, 275
- Confirmatory factor analysis (CFA) model, 29, 57, 73, 74, 76
 multitrait-multimethod models (CFA-MTMM), 72
- Conscientiousness, 235
- Construct bias, 276
- Construct equivalence (CE), 47
 Confirmatory Factor Analysis (CFA), 47
 evaluation, 47
 weighted multidimensional scaling (MDS), 47
- Construct irrelevant invariance (CII), 48
- Constructive Thinking Inventory (CTI), 236
- Construct representation, 48
- Construct validity, 46, 72
 consequential aspect of, 48
 convergent validity, 46
 discriminant validity, 46
 multitrait-multimethod (MTMM) analysis for, 72
 threats to, 48
- Content-based tests, 46
- Content validity, 46, 54
 empirical applications of, 55
 evidence, 4
 quality control procedures, examples, 55
- Coping, 323
 models, 323–324
 strategies, 175, 324
 aggressive and ruminative, 324
 behavioral disengagement, 324
 disengagement, 175
 engagement, 175
 problem solving, 324
 temporal distancing, 324
- Core Self-Evaluation Scale (CSES), 463
- Corporal punishment, 308
- Covert delinquency, 385
- Criminal aggressive behavior (CAB), 386
- Criminal Attitudes to Violence Scale (CAVS), 395
- Criminal behavior, 385
 biological and trait theories, 385–386
 categories, 385
 definition, 385
 developmental theories of, 388–389
 advantages, 388
 antisocial potential (AP), 389
 core concepts of, 389
 development of juvenile offending, 389
 precursor behaviors, 388
 dimensions, 385
 domestic violence, 385
 intelligence and, 391–392
 high IQ and crime, 392–393
 personality theories of, 386–387
 protective factors, 393–394
 associated with delinquency and antisocial behavior, 393
 risk, 393–394
- Criminal careers, 387
- Criminal friend index, 395
- Criminal Sentiments Scale-Modified (CSS-M), 397
- Criminal thinking, 384
- Criminogenic Cognitions Scale (CCS), 397
- Criterion index, 46
- Criterion-related evidence, 45
- Criterion validity, 46
 concurrent validity, 46
 predictive validity, 46
- Cronbach's α , 37
- Cross-cultural
 applications, risk assessment in China, 417
 measures, 272
 Chinese personality assessment inventory, 272–273
 perspectives, 320
 psychiatry, 321
 psychopathology, 320
- Cross-level interactions, 318
- CSES. *See* Core Self-Evaluation Scale (CSES)
- C-SSRS. *See* Columbia-Suicide Severity Rating Scale (C-SSRS)
- CST. *See* Cultural scripts theory (CST)
- CTPQ. *See* Child Temperament and Personality Questionnaire (CTPQ)
- CTT. *See* Classical test theory (CTT)
- Cultural Assessment of Risk for Suicide (CARS), 453
- Cultural bias, 276
- Cultural context, of psychopathology, 320
- Cultural dynamics, 320
- Cultural empathy, 273
- Cultural Formulation Interview, 321
- Cultural hybridity, 322
- Cultural lens approach (CLA), 62
- Cultural meaning, 453
- Cultural Model of Suicide (CMS), 452
- Cultural relativism, 276
- Cultural scripts theory (CST), 453
- Cultural validity, 62
 emic approach, 62
 etic approach, 62
- Cultural variations, 321
- Culture-bound syndromes, 349
- Culture-related disorders, 294, 320
- Culture-related psychopathology, 320
- Culture role in development of specific disorders, 322
 affective disorders, 322
 culture-bound syndromes, 322
Dhat, 322
hikikomori, 322
koro, 322
Taijin kyofusho, 322
 empirical findings, 323
 psychotic disorders, 322
- Cumulative risk model, 198
- Curvilinear hypothesis, 189
- Cute aggression, 383
- Cybernetic big five theory (CB5T), 237
- Cyclothymia, 168
- D**
- Darlington Family Assessment System (DFAS), 190, 191
- Darlington Family Interview Schedule (DFIS), 190
- Darlington Family Rating Scale (DFRS), 190
- Death anxiety, 314, 315
- Decision Support for Violence Management-Prisoners (DSVM-P), 413
- Deliberate self-harm (DSH), 439
- Delinquent behavior, 385
- Delusion/hallucination proneness scales, 317
- Depression, 309, 357, 442
 CCMD, diagnosis of, 350
 cognitive elements of, 366
 depressed mood, 321
hikikomori, 322
 language, 322
 measuring, 366
 SWAP-II data yielded, 367
- Desirability Response Inconsistency (DRIN), 368
- Developmental and life-course (DLC) theories, 388
- Developmental behavior checklist, 300
- Developmental criminology, 387
- Developmental Disabilities Assistance and Bill of Rights Act, 111
- Developmental models, 303
- Developmental niche, 187
- Developmental psychopathology, 302
 recent achievements of, 307
- Developmental spectrum approach, 305
- Deviance (DEV), 368
- Diagnostic Adaptive Behavior Scale (DABS)
 item response theory (IRT), 115
 overall adaptive behavior standard score (OABSS), 115
 receiver operating characteristics (ROC) analyses, 115

- Diagnostic and Statistical Manual of Mental Disorders (DSM)
 conditions, 346
 disorder, 347
 DSM-5
 alternative personality disorder model
 traits, 350
 using item-response theory analysis,
 350–351
 dimensional trait model, 348
 Emerging Measures and Models, 347
 DSM-IV, 398
 ADHD rating scale, 173
 diagnostic system, 347
 personality disorders
 diagnostic interview for, 364
 structured interview for, 364
 ICD
 approach, 346
 classification scheme, 346
 polythetic categorical approach to mental
 disorder, 346
 Diagnostic Assessment for the Severely
 Handicapped (DASH-II), 300
 Diagnostic interview schedule for children, 361
 Diagnostic label, 293
 Dialectical behavioral therapy, 295
 Diathesis-stress model, 196, 309, 449–452
 integrated motivational-volitional (IMV)
 model of suicidal behavior, 451–452
 interpersonal theory, 450–451
 suicidal behavior, clinical biological models
 of, 450
 three-step theory, 452
 ideation to attempts, progression from, 452
 strong vs. moderate ideation, 452
 suicidal ideation development, 452
 DIF. *See* Differential item functioning (DIF)
 Differential Ability Scales, 46
 Differential item functioning (DIF), 47, 57, 276
 Differential susceptibility hypothesis, 196
 Difficulties in Emotion Regulation Scale
 (DERS), 299
 DERS-16, 299
 Difficult temperament concept, 235
 Digit span backwards task (DSB), 96
 Dimensional Assessment of Personality
 Pathology-Basic Questionnaire
 (DAPP-BQ), 245
 Dimensional Assessment of Personality
 Pathology Short Form
 (DAPP-SF), 367
 basic questionnaire, 367
 DAPP-90, 368
 short form, 367
 Dimensional Personality Symptom Item Pool
 (DIPSI) structure, 302, 368
 5-Dimensional Personality Test (5DPT), 348
 Dimensional temperament traits, 305
 Disorganization, 307
 Dispositional optimism, 248
 Disruptive Behavior Diagnostic Observation
 Schedule (DBDOS), 309
 Disruptive behavior (DB) disorder, 305
 Dissociative Experiences Scale (DES), 314
 Distress tolerance (DT), 296
 Divorce, 293
 Domain-related self-regulation, 305
 Domestic violence, 385
 Down syndrome, 100, 308
 DSB. *See* Digit span backwards task (DSB)
 DSH. *See* Deliberate self-harm (DSH)
 Dual diagnosis, assessment for, 300
 Durkheim's anomic suicide, 446
 Dyadic Adjustment Scale, 204
 Dyadic Parent-Child Interaction Coding System
 (DPICS), 205
 Dynamic multivariate set point model, 245
 Dynamic risk factors, 408
 Dysthymia, 345
- E**
 Early Adolescent Temperament Questionnaire-
 Revised (EATQ-R), 164
 Early Childhood Behavior Questionnaire
 (ECBQ), 164
 Early Trauma Inventory (ETI), 307
 Eating disorders, 314
 ECBQ. *See* Early Childhood Behavior
 Questionnaire (ECBQ)
 Ecocultural approach, 320
 Ecological validity, 61
 EFA. *See* Exploratory factor analysis (EFA)
 Ego-bounded identity, 315
 Electronic communications, 322
 Emotional distress, 314
 Emotional inertia, 294
 Emotional intelligence theory, 249
 Emotional/Internalizing Dysfunction
 (EID), 365
 Emotionality, Activity, and Sociability (EAS)
 temperament scales, 161, 245
 Emotional security theory, 194
 Emotional stability, 273
 Emotion and ToM imitation training
 (ETIT), 145
 Emotion dynamics, 294
 Emotion dysregulation (ED), 296
 Emotion Management Training (EMT), 145
 Emotion regulation (ER), 294
 Laboratory-Temperament Assessment
 Battery (Lab-TAB), 162
 metaanalytic studies of, 296
 Toddler Behavior Assessment Questionnaire
 (TBAQ), 162
 Emotions, 294
 Empathy, 135–137
 empathizing-systemizing theory of
 autism, 136
 facets of, 135
 measurement, 137
 neuroscience, 136
 Empathy Quotient (EQ), 109, 137
 EMT. *See* Emotion Management
 Training (EMT)
 Environmental specificity, 196
 Environmental stressors, 304
 EQ. *See* Empathy Quotient (EQ)
 Equivalence, 78
 functional, 78
 metric, 78
 scalar, 78
 structural, 78
 Ethnicity, 344
 Ethnocentrism, 276
 Etiological factors, 318
 ETIT. *See* Emotion and ToM imitation training
 (ETIT)
 Examiner processing bias, 275
 heuristics, 275
 mindful processing, 275
 misattribution, 275
 stereotypes, 275
 Executive Functioning (EFs), 91–92
 assessment of, 93–100
 classification, 92
 cold processes, 92, 93
 hot processes, 92, 93
 comprehensive measurement, 97–99
 behavior rating inventory of executive
 function (BRIEF), 98
 Cambridge neuropsychological test
 automated battery (CANTAB), 97–98
 Comprehensive Executive Function
 Inventory (CEFI), 98–99
 control system, 92
 deficits, 92
 domains
 attentional control, 91
 cognitive flexibility, 91
 goal setting, 91
 information processing, 91
 empirical research on, 99–100
 key aspects, 91
 processes, framework of, 93
 skills, 100
 engagement, 100
 generalization, 100
 goal setting, 100
 skill mastery, 100
 strengths and needs, awareness of, 100
 three-component model, 92
 transdiagnostic intermediate phenotypes, 92
 Exhibitionistic suicides, 453
 Existential anxiety, 314, 315
 Experience sampling method (ESM), 81, 307
 Experiences in Close Relationship scale
 (ECR-R), 171
 Explicit personality, 267
 aspects of, 267
 definition, 267
 Exploratory factor analysis (EFA), 73, 426
 Exploratory structural equation modeling
 (ESEM), 73–74
 Expressive suppression, 294, 299
 Extended process model (EPM), 295
 Eyberg Child Behavior Inventory (ECBI), 207
 Eysenck Personality Questionnaire (EPQ), 236
- F**
 Facet-level analyses, importance of, 345
 Factor mixture models (FMM), 6, 68
 False-belief task, 102

- Family Adaptability and Cohesion Evaluation Scale (FACES), 190
- Family annihilation suicide, 453
- Family Assessment Device (FAD), 189
- Family Assessment Model (FAM), 188, 202
assessment objectives, 206
Beavers System Model of family functioning (BSMFF), 190
- Circumplex Model of Marital and Family Systems (CMMFS), 189–190
- Darlington Family Assessment System (DFAS), 190, 191
- dyadic interactions measurement, 205
- externalizing and internalizing problems, 208
- family environment scale, dimensions/subscales of, 203
- internalized problems, 211
Children's Depression Inventory (CDI), 212
Internalizing Symptoms Scale for Children, 212
Multidimensional Anxiety Scale for Children (MASC), 213
Revised Children's Manifest Anxiety Scale-2nd Ed (RCMAS-2), 212
Reynolds Children Depression Scale-2nd ed, 212
- interviews/self-reports/other report inventories, 202
- marital inventories, 204
- McMaster model, 189
- measures for assessing externalizing behavior, 208
behavioral and emotional screening system (BESS), 209
child behavior checklist, 208
conners' scales for teachers and parents 3rd edition, 210
personality inventory for children (PIC-2), 210
reactive/proactive questionnaire, 210
- observational coding systems, 202
- observational procedures, 202
- predicting child abuse, 205
- process model, 188–189
- Family-Assisted Social Cognition and Interaction Training (F-SCIT), 145
- Family Environment Scale (FES), 4, 203
- Family resilience, 199
definition, 199
framework for, 200
key processes in, 200
positive adaptation in children and families, 201
- Farrington's integrated cognitive antisocial potential (ICAP) theory, 390
- FCI. *See* Fluid-Crystallized Index (FCI)
- Five-factor model (FFM), 223, 232, 348.
See also Big Five factors
dimensions of big five, 233
domains and facets, 233
of general personality, 348
Maslow's Hierarchy of Needs, 234
origins and, 232
agreeableness, 233
conscientiousness, 233
extraversion, 233
language's growth and transformation, 232
neuroticism, 233
openness to experience, 233
organizational scheme, for basic units of personality, 232
personality factors, 233
- Five-factor theory (FFT), 223
- Fixed-effects analysis, 81
- Flexibility, 273
- Flexible thinking factor, 118
- Fluid-Crystallized Index (FCI), 46
- Fluid intelligence, 6
- Fluid vulnerability theory, 448
- FMM. *See* Factor mixture models (FMM)
- Folk psychology, 101
- Fragile X syndrome, 100
- Freudian elements, 454
- Frontal lobe tasks, 91
- Fully Dimensional Model (FDM), 313
- Functional brain imaging, 308
- Functional Emotional Assessment Scale (FEAS), 310
- Fundamental motives theory (FMT), 226
- Fussy Baby questionnaire, 303
- Future suicidal behavior, predictor, 447
- G**
- G-coefficients, 32
- Gene-environment correlations, 308
- Gene-environment interplay, 308
- General Assessment of Personality Disorder (GAPD), 370
- Generalizability theory (GT), 31–32, 48
advantages of, 31
facets of, 31
- Generalized anxiety disorder (GAD), 296, 345, 359
- Generalized partial credit model (GPCM), 34
- General linear model (GLM), 29
- General Personality and Cognitive Social Learning (GPCSL), 410, 423
- General psychopathology factor (*p* factor), 359–360
- General Statistical Information for Recidivism (GSIR), 416
- Genetic vulnerability, 313
- g* factor, 344, 348
- GMM. *See* Growth mixture modeling (GMM)
- Gough's folk concepts, 234
- GPCM. *See* Generalized partial credit model (GPCM)
- GPCSL. *See* General Personality and Cognitive Social Learning (GPCSL)
- Growth mixture modeling (GMM), 6, 68–70
latent change score models (LCSM), 69
latent class growth model (LCGM), 69
latent growth curve models (LGCM), 68–69
- Growth trajectories, 68
- GT. *See* Generalizability theory (GT)
- Guilford-Zimmerman Temperament Survey (GZTS), 231, 245
- H**
- Hallucination proneness scales, 317, 322
- Happiness, 315
- Hayling sentence completion test, 95
- Heterotypic continuity, 244, 308
- HEXACO model, 7, 237
- HFASD. *See* High-functioning autism spectrum disorder (HFASD)
- Hierarchical Personality Inventory for Children (HiPIC), 166
- High-functioning autism spectrum disorder (HFASD), 113
adaptive behavior, 113
- Hindsight bias, 138
- HiPIC. *See* Hierarchical Personality Inventory for Children (HiPIC)
- Historical clinical risk management-20 (HCR-20), 422
- HIT. *See* How I Think questionnaire (HIT)
- Hogan Personality Inventory (HPI), 245
- Homicide-suicide
conceptualization, 456
lethal violence, stream analogy for, 456
outward and inward directed aggression, two-stage model of, 455
principles and theories, 453–456
psychoanalytic theories, 454–455
strain theories, 455–456
- Hopelessness, 442
- Hostility, 357
- Hot processes, orbito-frontal cortices role, 92
- How I Think questionnaire (HIT), 398
- Humor, role in coping and adaptation, 251
- Humor Styles Questionnaire (HSQ), 251
- Hybrid models, 344
- Hypothalamic-adrenal-pituitary axis dysregulation, 306
- I**
- ICC. *See* Item characteristic curves (ICC)
- ICM. *See* Independent cluster model (ICM)
- IDDs. *See* Intellectual and developmental disabilities (IDDs)
- IEP. *See* Instrumental Enrichment Program (IEP)
- Implicit Association Test (IAT), 456
- Implicit personality, 267
aspects of, 267
definition, 267
- Impulsivity/carelessness style (ICS), 462
- Incremental validity, 46
- Independent cluster model (ICM), 73
- Indiana Psychiatric Illness Interview (IPII) transcripts, 133
- Individual trajectories, estimation methods, 68
- Infant behavior, 304
- Infant Behavior Questionnaire, 303
- Infant Behavior Record, 303
- Infant Characteristics Questionnaire (ICQ), 158, 303
- Infant mental health disorders, classification of, 304
- Infant mental health symptoms, 304
- Infant-Toddler Social and Emotional Assessment (ITSEA), 311

- Infant-Toddler Symptom Checklist (ITSC), 311
 Inferential confusion, 142
 Inkblots, 3
 Insecure attachment styles (IAS), 306
 Insecurity, 307
 Instrumental Enrichment Program (IEP), 145
 Integrated cognitive antisocial potential (ICAP) theory, 390
 Integrated Psychological Therapy (IRT), 145
 Integrating culture in the DSM-5, 321
 Intellectual and developmental disabilities (IDDs), 111
 Intellectual disability (ID), 300
 childrens, executive function difficulties
 cognitive training, role of, 100
 psychopathology of, 300
 Intellectual disorder, 308
 Intellectual functioning
 classification criteria, 112–113
 Intellectual retardation, 308
 Intelligence, 137
 crystallized aspects, 103
 Internal-external metastructure, 344
 Internal-external model, 344
 Internalizing-externalizing spectra, 344
 Internal, Personal and Situational Attributions Questionnaire (IPSAQ), 140
 International Classification of Diseases (ICD), 343
 Interpersonal reactivity index (IRI), 135
 Interpersonal theory, 442
 Interpretation of Intrusions Inventory (III), 134
 semiidiographic questionnaire, as, 134
 Interrater agreement (IRA) coefficients, 38
 Interview for Traumatic Events in Childhood (ITEC), 307
 Interviews, 361–364
 Intimate or domestic lethal violence-suicide, 453
 Intolerance of uncertainty, 314
 Invariance models, 80
 Inventory of Personality Characteristics (IPC-5), 348
 IPSAQ. *See* Internal, Personal and Situational Attributions Questionnaire (IPSAQ)
 Ipsative stability, 7
 IRI. *See* Interpersonal reactivity index (IRI)
 IRT. *See* Item response theory (IRT)
 Item ambiguity, 28
 Item bias, 276
 Item characteristic curves (ICC), 35
 Item characteristic surface (ICS), 33
 Item content heterogeneity, 28
 Item extremity, 36
 Item-factor relationships, 73
 Item information functions (IIF), 33
 Item response function (IRF), 36
 Item response theory (IRT), 4, 33–36, 57
 advantages of, 34–35
 empirical studies using, 36
 limitation of, 35
 linear item factor analysis model, formulation for, 34
 MIRT models, 33–34
 models, 32, 35–36, 80
 Maladaptive transdiagnostic constructs, 315
 Many-facet Rasch measurement (MFRM), 35
 Marital quality, 194
 Marital satisfaction inventory, 205
 Marlowe-Crowne Social Desirability Scale (MCDS), 274
 MAS-A. *See* Metacognition Assessment Scale (MAS-A)
 Maslow's Hierarchy of Needs, 234
 Mass-murder-suicide, 440
 Maternal depression, 199, 309
 MATRICS Consensus Cognitive Battery (MCCB), 319
 Maturation, 347
 Maturity-stability hypothesis, 232
 Maximal reliability, 29
 MCAT. *See* Multidimensional computer adaptive testing (MCAT)
 MCFA. *See* Multilevel confirmatory factor analysis (MCFA)
 McMaster Family Assessment Device, 4
 McMaster Model of Family Functioning (MMFF), 189
 dimensions of, 189
 Family Assessment Device, 189
 subscales, 189
 MCT. *See* Metacognitive training (MCT)
 Meaning in Life Questionnaire (MLQ), 460
 Measurement and Treatment Research to Improve Cognition in Schizophrenia (MATRICS) project, 319
 Measurement invariance, 18–19
 structural invariance tests, 19
 factor covariance invariance, 19
 factor mean invariance, 19
 factor variance invariance, 19
 testing of, 18–19, 78–80
 configural invariance, 18
 error variance invariance, 19
 latent factor means and structural coefficients, comparison, 79
 metric invariance, 19
 scalar invariance, 19
 Measurement noninvariance, causes of, 79
 Measure of Offender Thinking Styles (MOTS), 396
 Measures of Criminal Attitudes and Associates (MCAA), 395
 Mechanistic cognition, 308
 Mediational analysis, 77–78
 Medically serious suicide attempt (MSSA), 439
 Memory updating paradigm, 96
 Mental Development Index, 303
 Mental disorders, 9, 295, 308, 314
 metastructure of, 343
 Mental health
 issues in infancy, 303
 symptoms, 294
 Mental illness, 315
 Mentalizing, 101
 Merton's strain theory, 455
 Messick's model, 49, 50
 Messick's unified model, 6
 Metaanalysis, 309
- J**
 Jackson Personality Inventory (JPI), 245
 Joiner's interpersonal theory, 452
 JTC. *See* Jumping to conclusions (JTC)
 Jumping to conclusions (JTC), 139
 Junior Temperament and Characteristic Inventory (JTCl), 312
- K**
 Klein's theory, 455
- L**
 Language, 320
 assessment, 318
 Latent change score models (LCSM), 69
 Latent class analysis (LCA), 70–71
 in classification of ASD child patients, 71
 for developmental research, 71
 vs. latent profile analysis (LPA), 67
 Latent classes (LC), 68
 regression analysis, 70
 Latent class growth model (LCGM), 69
 vs. GMM, 67
 Latent curve model, univariate, 68
 Latent growth curve models (LGCM), 68–69
 advantage of, 71
 Latent profile models, 76
 Latent State-Combination-Of-Methods model (LS-COM), 72
 Latent trait models, 76
 Latent variable mixture modeling (LVMM), 67–68
 Latent variable models (LVM), 70
 types of, 70
 Law-court-police (LCP) subscale, 397
 LCGM. *See* Latent class growth model (LCGM)
 LCSM. *See* Latent change score models (LCSM)
 Learning disabilities
 executive function, effect on, 99–100
 Level of Service Inventory instruments (LSI), 423
 Level of Service Inventory-Revised (LSI-R), 416
 LGCM. *See* Latent growth curve models (LGCM)
 Life-threatening diseases, 315
 Likert scale, 34, 137
 Logical positivism, 46
 Longitudinal mediation models, 78
 Longitudinal studies, 305
 Loss of temper, 309
 LS-COM. *See* Latent State-Combination-Of-Methods model (LS-COM)
 Luria and Halstead-Reitan Batteries, 4
 LVM. *See* Latent variable models (LVM)
 LVMM. *See* Latent variable mixture modeling (LVMM)
- M**
 Magical ideation, 314
 Major depressive disorder (MDD), 172, 295, 300, 347
 Maladaptive cognitive strategies, 298
 Maladaptive schemas, 447

- Meta-analytic stability and change (MASC) model, 229
- Metacognition, 131–134
- Metacognition Assessment Interview (MAI), 294
- Metacognition Assessment Scale-Abbreviated Scale (MAS-A), 133, 294
- Metacognitive Beliefs Questionnaire (MCBQ), 134
- Metacognitive capacity, 132
- Metacognitive theory, 294
- Metacognitive training (MCT), 143
- Method bias, 276
- METT. *See* Micro-Expressions Training Tools (METT)
- Micro-Expressions Training Tools (METT), 145
- Middle Childhood Temperament Questionnaire (MCTQ), 161
- Millon Clinical Multiaxial Inventory-I (MCMI-I)
Millon clinical multiaxial inventory, 365
- Millon clinical multiaxial inventory-III (MCMI-III), 245
- Millon's personality disorders, 234
- Mindblindness (MB) theory, 101–110
- Mindfulness, 324, 325
- Mind reading, 101
- Minnesota Multiphasic Personality Inventory (MMPI), 4, 272, 458
- Minnesota Multiphasic Personality Inventory-2 Restructured Form (MMPI-2-RF), 364
scales, 364
suicidal death ideation scale (SUI), 458
- Mistaken or accidental homicide suicide, 453
- MLQ. *See* Meaning in life questionnaire (MLQ)
- MMPI. *See* Minnesota Multiphasic Personality Inventory (MMPI)
- Modified Stroop tasks, 456
- Moffitt's developmental taxonomy, 389
executive function, 389
life-course persistent offenders, 389
types of young offender, 389
verbal intelligence, 389
- Moffitt's three-factor model, 387
- Monotonicity, 33
- Monte Carlo confidence intervals, 77
- Monte Carlo simulations, 4
- Moralistic suicide, social logic, 440
- Mortality, 315
- Movie for the assessment of social cognition (MASC), 108
- Multicultural effectiveness, 273
- Multiculturalism, 320
- Multicultural personality questionnaire, 273–274
- Multidimensional Assessment of Preschool Disruptive Behavior (MAPDB), 305, 309
- Multidimensional computer adaptive testing (MCAT), 34
- Multidimensional IRT (MIRT) models, 32
compensatory, 33
noncompensatory, 33
- Multidimensional Personality Questionnaire (MPQ), 36, 270
development of alternative MPQ instruments, 271
measurement of specific lower-order traits, 270
- Multifaceted Empathy Test (MET), 136, 137
- Multilevel confirmatory factor analysis (MCFA), 29
- Multilevel developmental approaches, 197
- Multilevel reliability, 29
- Multimodal risk assessment factors/measures/scales, 420
- Multiple cognitive processes, 93
- Multiple indicator multiple cause (MIMIC), 79
- Multiple sclerosis, 316
- Multistage sampling, 28
- Multivariate analyses, 365
- Munich personality test, 168
- Murray's needs model, 234
- Myers-Briggs Type Indicator (MBTI), 269
- Mystical-transformative, 316
- N**
- Narcissism, 55
- Narcissistic Personality Inventory (NPI), 55
- National comorbidity survey, 439
- National Institute of Mental Health (NIMH), 319
- National Longitudinal Survey of Youth (NLSY), 392
- National society for the prevention of cruelty to children, 197
- Natural experiments, 308
- Negative emotionality, 160
- Negative memory biases, 143
- Negative predictive value (NPV), 413
- Negative problem orientation (NPO), 462
- Negative symptoms, 319
- Negative urgency, 444
- NEO five factor inventory (NEO-FFI), 169
- Neo-Kraepelinian approach, 346
- Network analysis, 80–82
- Network approach
Early Developmental Stages of Psychopathology (EDSP) study, 357
to environmental impact in psychotic disorders, 357–359
network visualization of interrelations between, 358
- Network theory, 345
- Neural resonance, 136
- Neurocognition, 132
- Neurological substrate, 317
- Neuropsychological assessment, 317, 318
- Neuropsychological deficits, 312
- Neuropsychological impairment, 317
- Neuropsychology, 45
- Neuroticism, 81, 159, 235
- Nisonger Child Behavior Rating Form (NCBRF), 301
- Nonacceptance of emotional responses, 299
- Nonadaptive personality, 368
- Noncompliance, 309
- Nonsuicidal self-injury (NSSI), 439, 443
- Not otherwise-specified (NOS) category, 343
- NSSI. *See* Nonsuicidal self-injury (NSSI)
- Number needed to detain (NND), 413
- Number safely discharged (NSD), 413
- O**
- Obsessive beliefs questionnaire-44 (OBQ-44), 134
- Obsessive Compulsive Cognitions Working Group (OCWG), 141
- Obsessive-compulsive disorder, 242, 314, 321
- Obsessive-Compulsive Disorder (OCD), 301, 346, 357
attentional bias, 143
cognitive-behavioral model (CBM), 133
cognitive biases, 142–143
cognitive processes, 141
inferential confusion, 142
maladaptive thought control strategies, 133–134
memory biases, 143
metacognition measurement, 134
interpretation of intrusions inventory (III), 134
metacognitive beliefs questionnaire (MCBQ), 134
obsessive beliefs questionnaire-44 (OBQ-44), 134
metacognitive models and assessment measurement, 133
reality monitoring and intrusive imagery, 142
thought-action fusion, 142
- Obsessive-compulsive personality disorder (OCPD), 360
- Offense control theory, 386
- O'Leary-Porter scale, 204
- Open-mindedness, 273
- Openness/intellect, 235
- Oppositional defiant disorder (ODD), 305, 312
temperament/character traits, 173
- Outcome bias, 138
- Overconfidence bias, 138
- Overidentification, 325
- Overt delinquency, 385
- P**
- Panic disorder, 359
- PAPA. *See* Preschool age psychiatric assessment (PAPA)
- Paranoid personality disorder traits, 318
- Paranoid symptoms, 307
- Parasuicide, 439
- Parental control, 191
- Parental ethnotheories, 170
- Parental inconsistency, 193
- Parental rejection, 187
- Parental stress, 199
- Parental warmth and caring, 193
- Parent-child
behavior, 187
conflict tactics scale, 207
relationships, 306
- Parent-Child Early Relational Assessment, 310

- Parenting
- assessment, 191
 - historical overview, parenting dimensions, 192
 - parenting research, 191
 - behaviors, measures of, 203
 - alabama parenting questionnaire, 203
 - parenting scale, 203
 - parenting style and dimensions questionnaire, 204
 - definition, 191
 - styles and behaviors, 192
- Parenting Stress Index-Second Edition (PSI), 205
- Parenting Stress Index-Short Form (PSI-SF), 205
- Parenting styles, 192
- affective dimensions of, 193
 - aspects of, 194
 - interparental conflict and externalizing problems, 194
 - quality of marital relationship, 194
 - Baumrind's parenting styles, 193
 - cumulative risk model, 198
 - developmental ecological model of child maltreatment, 198
 - dyadic interactions, between parent and child, 194
 - bidirectionality in, 195
 - bidirectional models of parenting and temperament, 196
 - child abuse and maltreatment, 197
 - multilevel perspective, 197
 - predicting child abuse, 198
 - patterns of child rearing, 192
 - supervising and monitoring, 192
- Parenting Styles and Dimensions Questionnaire (PSDQ), 7
- Parent provision of structure, 193
- Parent Rating Scales (PRS), 115
- PAS. *See* Psychache Scale (PAS)
- Pathology-level psychosis, 314
- Pathoplasty/exacerbation model, 246
- PD. *See* Personality disorders (PD)
- Performance-based tests, 276
- contemporary scoring systems, 277
 - fairy tale test (FTT), 280
 - advantages and limitations, 280
 - assets of, 280
 - personality variables and indicators, 281
 - reliability, 282
 - sample cards, 280
 - scoring and interpretation, 282
 - standardization sample, 281
 - validity, 282
 - aggression questionnaire, 283
 - association with CBCL, 283
 - beck youth inventories, 283
 - correlations with AQ inconsistent responding index, 283
 - major investigatory aspects of journal articles, on projective techniques, 276
 - psychometric properties of RIM scores, 278
 - reliability, 278
 - validity, 278
- Rorschach Psychoanalytic Science and Practice (RPSP) model, 277
- second-order rotated component analysis, of five-factor solution, 282
- Thematic Apperception Test/SCORS-G assessment system, 279
- Performance deficit model, 224
- Persecutory delusions model, 139
- Personal digital assistants (PDAs), 307
- Personal, interpersonal, and community-reinforcement (PIC-R) theory, 387
- Personality, 69, 293
- assessment, 267
 - explicit personality, 267
 - implicit personality, 267
 - psychological tests, 267
 - causes and evaluation models of, 227
 - autoregressive state model (ASM), 228
 - desire to change oneself, 228
 - maturity principle, 228
 - meta-analytic stability and change (MASC) model, 229
 - psychobiological model, 228
 - stability and change of personality, 228
 - trait-state-error model (TSE), 228
 - in childhood, 157–160
 - cognitive implications of, 225
 - conceptions of change, 71–73
 - EFA and CFA, 73
 - longitudinal CFA-MTMM models, 72
 - multitrait-multimethod analysis in longitudinal research, 72
 - continuity and stability of personality traits
 - across life-span, 229
 - differential continuity, 229
 - differential stability, 230
 - individual-level change, 230
 - ipsative stability, 230
 - mean-age stability, 230
 - mean-level stability, 229
 - rank-order stability, 229
 - structural continuity, 230
 - culture and, 238
 - aspects of, 238
 - combined emic-etic approaches, 241
 - cross-cultural variability, in personality traits, 239
 - dependability, 238
 - etic and emic approaches, 240
 - individualism, 238
 - interpersonal relatedness, 238
 - relatedness and self-definitions, 239
 - social potency, 238
 - definition, 223
 - intelligence, and cognitive abilities, 224
 - etiological model, 224
 - risk factors for, 224
 - role of intelligence in, 224
 - intraindividual change in personality stability, 231–232
 - psychometric analyses of, 74
 - riverside situational Q-sort, 227
 - stability and social personality models, 229
 - intrinsic maturation, 229
 - socializing influences, 229
 - sociogenomic model, 229
 - subjective age and personality development, 232
 - traits predict cognitive tendencies, 225
 - trait theories, 227
- Personality Assessment Inventory (PAI), 245, 365
- theoretical basis and test development, 366
- Personality disorders (PD), 71, 312, 318, 344
- definition, 243
 - 16 Personality factor (16PF), 4
 - Personality inventory, for *DSM-5* (PID-5), 9, 369
 - child age 11-17, 369
- Personality measures, 427
- personality assessment inventory, 427–428
 - Rorschach performance assessment system, in risk assessment, 428
 - idiographic assessment of dangerousness, 429
 - Rorschach aggression indicators, 429
- Personality pathology, 76, 318
- Personality Psychopathology 5 (PSY-5), 370
- Personality tests, 15
- personality questionnaires, 15
 - projective tests, 15
- Personality traits, 7, 45
- Personality types
- overcontrollers, 159
 - resilients, 159
 - study approaches
 - person-centered, 159
 - variable-centered, 159
 - undercontrollers, 159
- p* factor, 9, 344
- Phobias, 315
- Phonemics, 240
- Physical child abuse, 197
- Positive and Negative Symptoms Scale (PANSS), 314
- Positive emotions, 298
- Positive predictive value (PPV), 413
- Positive problem orientation (PPO), 462
- Positive reappraisal, 299
- Positive refocusing, 299
- Positive symptoms, 319
- Posttraumatic stress disorder (PTSD), 296, 344
- PPO. *See* Positive problem orientation (PPO)
- Precursor/prodrome model, 246
- Predisposition/pathoplasty/concomitants/scar models, 246
- Preschool age psychiatric assessment (PAPA), 163
- Preschool assessment, 304
- Preschool Assessment Battery (PR Lab-TAB), 162
- Preschool psychopathology, 304
- Primal mode, 447
- Primary care settings, 305
- Proactive criminal thinking styles, 385
- Process-focused (PF) model, 49
- Processing speed, 319
- Process model (PM), 295
- family functioning, 188

- basic constructs, 188
 - Family Assessment Model (FAM), 188
 - self-report scales, 188
 - significance, 188
 - Promotive factors, 409
 - Propensity theories, in criminology, 386
 - Protective factors, 409
 - Pseudo-guessing, 35
 - Psychache scale (PAS), 445
 - ADD Checklist, 301
 - Psychiatric Assessment Schedule for Adults
 - with a Developmental Disorder (PAS-ADD), 301
 - Psychiatric diagnosis across cultures, 349
 - Psychiatric disorders, 294, 313
 - Psychiatric disturbance
 - cognitive processes associated with, 447
 - Psychiatric evil, 293
 - Psychiatric illness, 450
 - Psychiatric symptoms, 345
 - Psychiatric taxonomies, alternative models
 - for, 350
 - Psychobiological model, 228
 - Psychodynamic Diagnostic Manual (PDM), 8
 - derived empirical tools, 354
 - psychodiagnostic chart, 354
 - psychodynamic diagnostic prototypes, 355
 - version 2, 353–354
 - Psychodynamic/structural model of
 - psychopathology, 355–356
 - Psychodynamic theory, 455
 - Psychological assessment
 - formal, definitions of, 361
 - historical account of, 5
 - in 21st century, 4–10
 - latent variable measures, advances in, 6
 - mental illness and violence, advances in, 10
 - parenting research, advances in, 7–8
 - psychopathology, advances in, 8
 - reliability, advances in, 4
 - suicide research, advances in, 10
 - taxonomies and measures, advances in, 8–9
 - temperament and personality, advances in, 6–7
 - theory of mind, advances in, 6
 - validity, advances in, 4–6
 - violence risk assessment, advances in, 9–10
 - in 20th century, 3–4
 - Psychological control, 192
 - Psychological disorders, 3
 - Psychological Inventory of Criminal Thinking Styles (PICTS), 394
 - Psychological measures, evaluation of
 - bifactor statistical indices, application in, 74–77
 - construct-related multidimensionality, sources of, 75
 - factor mixture models, 75–76
 - in latent structure of personality disorders examination, 76–77
 - Psychological phenomena, measurement of, 45
 - Psychological risk assessments, 406
 - Psychological tests
 - construction, 11–14
 - data collection and administration, 11–13
 - test adaptation, 12–13
 - test development standards, 11–12
 - nomothetic vs. idiographic approaches, for clinical data analysis, 13–14
 - standardization process, 13–14
 - origins of, 3
 - translating and adapting, guidelines for, 13
 - types of, 14–18
 - improving response format, using focus groups and rasch item response theory, 17–18
 - maximum performance tests, 14
 - psychometric properties, 18
 - test domain, 16–17
 - abilities, 16
 - behavior, 16
 - concepts, 16
 - item development and test scoring, 17
 - item traits, 16–17
 - typical performance tests, 15
 - usage, 10–11
 - decisions making, 10
 - diagnostic purposes, 10
 - psychological research, 10
 - risk assessment, 11
 - Psychometric indices, 74
 - Psychometrics, 14
 - Psychomotor abilities, 317
 - Psychomotor Development Index, 303
 - Psychopathic Personality Inventory (PPI), 36
 - Psychopathology, 6, 8, 30, 35, 53, 82, 294
 - four-parameter logistic model (4PLM) in, 35
 - model/personality traits, 243
 - Bass Ackward approach, 243
 - etiological models of, 245–247
 - general factor of personality (GFP), 245
 - hierarchical models of personality and, 244–245
 - two-polarities models of, 247
 - psychometric analyses of, 74
 - psychopathological relevance, 316
 - structural model of, 8
 - Psychopathology Instrument for Adults with Mental Retardation, 301
 - DSM-III criteria, 301
 - PIMRA-II, 302
 - Psychopathy Checklist-Revised (PCL-R), 386
 - Psychopathy theory, 386
 - Psychoplastic effect, 320
 - Psychoreactive effect, 320
 - Psychoselective effect, 320
 - Psychosis, 294, 314, 316
 - continuum, 313
 - development, 316
 - risk, 317
 - pyramid model, 317
 - symptoms, 316
 - Psychotherapy, 132
 - Psychotic clients, 316
 - Psychotic disorders, 306, 316, 318
 - Psychoticism, 344
 - Psychotic-like experiences (PLEs), 315, 316
 - Psychotic-like features, 308
 - Psychotic-like symptoms, 316
 - Public killing spree suicide, 453
 - Public order crime, 385
- ## Q
- Quasi-Dimensional Model (QDM), 313
 - Questionnaire big six scales model, 237
- ## R
- Racial discrimination, and violent behavior, 409
 - Randomized control trial (RCT), 408
 - Rapid risk assessment for sexual offense
 - recidivism (RRASOR), 426
 - Rare Virtues (RV), 368
 - RAS. *See* Resilience appraisals scale (RAS)
 - Rasch model, 4, 30–31
 - Rational experiential inventory (REI), 236
 - Rational problem solving (RPS), 462
 - Reading Mind in Eyes Test, 6
 - Reasoning and problem solving, 319
 - Reasoning rationality, 138
 - Reasons for living scale-older adult version (RFL-OA), 461
 - Rebelliousness, 234
 - Receiver/Related Operating Characteristic curve (ROC), 412
 - Reckless behavior, 385
 - Refocus on planning, 299
 - Regulation disorders, 312
 - Regulative theory of temperament (RTT), 167
 - framework, 167
 - Regulatory disorder (RD), 294, 303
 - Regulatory Disorders Checklist (RDC), 303
 - Reiss Screen for Maladaptive Behavior (RSMB), 302
 - Relational frame theory (RFT), 102, 226
 - Reliability, 27–28
 - coefficients, 31
 - confirmatory factor analysis framework, estimation in, 28–32
 - alpha(α), 29
 - classical test theory and rasch model, 30–31
 - alternate-forms reliability, 31
 - interrater reliability, 30
 - composite, 29
 - generalizability theory (GT), 30–32
 - maximal, 29
 - multilevel, 29
 - using structural equation modeling, 29
 - developments and types of, 36–40
 - consistency in scoring, 38–40
 - coefficient alpha (α), 39–40
 - interrater reliability, 38–39
 - internal consistency, 37–38
 - alternate forms, 38
 - split-half, 37
 - temporal stability, 38
 - types of, 37
 - Research Domain Criteria (RDoC)
 - objectives, 295
 - project, 351–353
 - Researcher bias, 275–276

- Resilience, 199, 248, 324
 altruism, 248
 children's personality traits, 248
 definition, 248
 dispositional optimism, 248
 high self-esteem, 248
 key protective factors, from review of international research, 249
 mastery, 248
 measures of, 250
 Connor-Davidson Resilience Scale (CD-RISC), 250
 Strengths and Difficulties Questionnaire (SDQ), 250
 sense of humor, 248
 Resilience appraisals scale (RAS), 449
 Resilient personalities, 248
 Respondent bias, 274–275
 acquiescence/agreeing response style, 275
 impression management, 274
 item level, 275
 scale level, 275
 self-enhancement, 274
 Socially desirability responding (SDR), 274
 disadvantages of, 274
 Response inhibition, 95
 interference control, 95
 measurement, 95
 go/no-go task, 95
 hayling sentence completion test, 95
 stop-signal reaction time (SSRT), 95
 stop-signal task, 95
 motor response inhibition, 95
 Reynolds Intellectual Assessment Scales, 46
 Risk factors, 408
 categories, 408
 clinical factors, 408
 contextual antecedents, 408
 dispositional factors, 408
 historical factors, 408
 causes of offending, 409
 classification
 causal risk factor, 408
 fixed marker, 408
 variable marker, 408
 variable risk factor, 408
 measurements of, 394
 antisocial beliefs and attitudes scales (ABAS), 397
 criminal attitudes to violence scale (CAVS), 395
 criminal sentiments scale-modified (CSS-M), 397
 criminogenic cognitions scale (CCS), 397
 how I think questionnaire (HIT), 398
 measure of offender thinking styles (MOTS), 396
 measures of criminal attitudes and associates (MCAA), 395
 psychological inventory of criminal thinking styles, 394
 Texas Christian university criminal thinking styles (TCU-CTS) scales, 395
 protective factors, 393
 and promotive, 409–410
 racial discrimination, 409
 types of
 dynamic, 408
 risk and protective factors, 410
 static, 408
 Risk markers, 198
 Risk-need-responsivity model (RNR), 410
 associated with general personality and cognitive social learning, 410
 central eight risk/need factors, 411
 antisocial associates, 411
 antisocial cognition, 411
 antisocial personality pattern (APP), 411
 family/marital circumstances, 411
 in general personality and cognitive social learning theory, 412
 history of antisocial behavior, 411
 leisure/recreation, 411
 school/work, 411
 substance abuse, 411
 rehabilitation of offenders, 410
 risk of recidivism, 410
 Rorschach Inkblot Method (RIM), 3, 277
 Rorschach Oral Dependency (ROD) scale, 49
 Rorschach performance assessment system (R-PAS), 277
 RPS. *See* Rational problem solving (RPS)
 RTT. *See* Regulative theory of temperament (RTT)
 Rumination, 172, 299
 brooding, 172
 dampening, 172
- S**
 Sampson and Laub's age-graded theory, 390
 SAMS. *See* Schematic appraisal model of suicide (SAMS)
 Samsonic suicide, 440
 Satisfaction with life scale (SWLS), 460
 SAVRY. *See* Structured assessment of violence risk in youth (SAVRY)
 Scales of Independent Behavior-Revised (SIB-R), 114
 Scar/complication model, 247
 SCET. *See* Social cognition enhancement training (SCET)
 Schedule for Nonadaptive and Adaptive Personality (SNAP), 9
 Schedule for Nonadaptive and Adaptive Personality-Youth (SNAP-Y), 368
 Schematic appraisal model of suicide (SAMS), 449, 460
 Schizophrenia, 308, 309, 314, 316, 317, 345
 attributional style and self-esteem, 144
 cognitive bias, 143–145
 comprehensive treatments, 145
 metacognitive training (MCT), 143–145
 research, 317
 social cognitive treatments, 145
 spectrum features, 306
 spectrum phenotypes, 307
 targeted treatments, 145
 Schizophrenia spectrum disorder (SSD), 318
 adaptive functioning and IQ, 118
 Schizotypal personality disorders, 318
 Schizotypal Personality Questionnaire (SPQ), 313
 Schizotypal traits, 318
 Score
 types, 57
 composite score, 57
 score profile, 57
 subtest scores, 57
 variance, 27
 SCST. *See* Social cognitive skill training (SCST)
 Self-blame, 299
 Self-compassion scale, 324, 325
 Self-destruction, 440
 Self-destructive behaviors, 444
 Self-directedness, 163
 Self-judgment, 325
 Self-killer, 440
 Self-kindness, 324, 325
 Self-rating validation, 46
 Self-reflectivity, 132
 Self-report assessment, 364
 Self-reported SCS scores, 325
 Self-report inventories, 268
 Big Five in personality questionnaires, 268
 NEO Five Factor Inventory (NEO-FFI), 268
 NEO-PI-3, advantage of, 268
 personality dimensions, 268
 multicultural personality questionnaire, 273–274
 multidimensional personality questionnaire, 270
 Myers-Briggs type indicator (MBTI), 269
 Neuroticism/Extraversion/Openness (NEO), 268
 severity indices of personality problems, 271
 sixteen personality factor questionnaire fifth edition, 269
 Self-Report of Personality Scale (SRP), 115
 Self-report questionnaires, 15, 17
 Self-transcendence, 163
 SEM. *See* Standard error of measurement (SEM)
 Semistructured interviews (SSI), 360
 Sensation Seeking Scales (SSS-V), 169
 Sequential ignorability assumption, 77
 Sequential mixed method (SMM), 17
 Serious mental illness (SMI), 10, 406
 risk of violence, 406
 violence and, association between, 10
 Serotonin neurotransmission system, 450
 Sex Offender Risk Appraisal Guide (SORAG), 416
 Sexual orientation, 344
 Sexual violence, 424
 sexual offender risk appraisal guide (SORAG), 424
 sexual offender version, 426
 sexual violence risk-20 (SVR-20), 425–426
 future plans, 425
 psychometric properties of, 426
 psychosocial adjustment, 425
 sexual offenses, 425

- STATIC-99/Static-99R/Static-2002R, 425
 transtheoretical model of change (TTM), 426
 violence risk scale (VRS-50), 426
- s* factors, 348
- Shedler-Westen Assessment Procedure (SWAP-200), 9, 366–367
- Shedler-Western Assessment Procedure-II (SWAP-II), 443
- Short-Term Assessment of Risk and Treatability (START), 423
- SIDAS. *See* Suicidal Ideation Attributes Scale (SIDAS)
- Simulation theory, 101
- Situated cognition approach (SCA), 295
- Situation appraisal system, 449
- Situation construal model (SCM), 226
- Sixteen personality factor questionnaire (16PF), 267
 - fifth edition, 269
 - factor names and descriptors, 270
- Skepticism, 304
- SLE. *See* Stressful life event (SLE)
- SMI. *See* Serious mental illness (SMI)
- SMM. *See* Sequential mixed method (SMM)
- SNAP-Y and SNAP-2 scoring procedures, 369
- SNAP youth, 368
- Snyder's hope scales, 447–448
 - adult dispositional hope scale, 447
 - adult state hope scale, 448
 - children's hope scale (CHS), 448
- Social anxiety disorder, 321
- Social cognition, 131–134, 319
 - multidimensional hierarchical construct, 132
 - schizophrenia, relation with, 132–133
 - Beck cognition insight scale (BCIS), 133
 - metacognition assessment scale (MAS-A), 133
- Social Cognition and Interaction Training (SCIT), 145
- Social Cognition Enhancement Training (SCET), 145
- Social-cognitive information-processing models, 384
- Social Cognitive Skill Training (SCST), 145
- Social control, 441
- Social development model, 391
- Social dysfunction, 306
- Social dysregulation, 307
- Social functioning, 132
- Social information processing theory, 140
- Social initiative, 273
- Social integration, 455
- Social isolation, 450
- Socially Desirability Responding (SDR), 274
- Social personality models (SPMs), 229
- Social phobia, 359
- Social-problem-solving inventory (SPSI), 462
- Societal reprisals, 440
- Sociobiological approach, 320
- Socioperceptual or mental state decoding, 107
- Somatic disorders, 346
- Somatoform, 345
- Spearman-Brown formula, 37
- Spectrum/continuity model, 246
- Spectrum relationship, 242
- SPSI. *See* Social-problem-solving inventory (SPSI)
- SSRT. *See* Stop-signal reaction time (SSRT)
- Standard error of measurement (SEM), 28
- Standards for Educational and Psychological Testing (SEPT), 12, 18
- Stanford-Binet Intelligence Scale, 3
- START. *See* Short-Term Assessment of Risk and Treatability (START)
- Static risk factors, 408
- Stigmatization, 304
- Stimulus seeking (ANT-S), 427
- Stop-signal delay (SSD), 95
- Stop-signal reaction time (SSRT), 95
- Strengths and difficulties questionnaire (SDQ), 239
- Stressful life event (SLE), 443
- Stress inoculation model, 309
- Stress reactivity, 318
- Stress sensitization, 309
- Stroop-like classroom-based task, 93
- Structural continuity, 7
- Structural equation model (SEM), 29, 57, 68
- Structured Assessment of Protective Factors for violence risk (SAPROF), 421–422
- Structured Assessment of Violence Risk in Youth (SAVRY), 416
- Structured Clinical Interview for DSM-5 Disorders (SCID-5), 9, 362
 - SCID-5-CT, 363
 - SCID-5-CV, 362
 - SCID-5-PD, 363
 - SCID-5-RV, 362
- Structured clinical interview for DSM-IV childhood diagnoses, 363
- Structured Clinical Interview for Personality Disorders (SCID-II), 348
 - reliability and validity, 363
- Structured clinical judgment (SCJ) tools, 416
- Structured interview for DSM-IV personality disorders (SIDP-IV), 364
- Structured personality test, 4
- Structure of Temperament Questionnaire (STQ)
 - compact Russian structure of, 169
- Subclinical psychotic symptoms, 313
- Suicidal behavior
 - American Psychiatric Association (APA) guidelines, 457
 - integrated motivational-volitional (IMV) model, 451
 - motivational phase, 451
 - premotivational phase, 451
 - volitional phase, 451
 - psychiatric disorders as risk factor, 442
- Suicidal belief system, 448
- Suicidal Ideation Attributes Scale (SIDAS), 458
- Suicidal Ideation (SUI) scale, 366
- Suicide
 - aggression, and impulsivity, relationship between, 443–444
 - arrested flight model (cry of pain), 446
 - cultural model of, 452–453
 - cultural assessment of risk for suicide (CARS), 453
 - escape theory, 445
 - from self, 446
 - interpersonal-psychological theory, 446
 - overview of, 439–445
 - relationship between aggression and self-harm, studies on, 444–445
 - risk assessment, 452–453
 - risk factors of, 441–443
 - other significant risk factors, 442–443
 - selected static risk factors with individual risk, 442
 - suicidality, personality, 443
 - theories and corresponding measures, 445–446
 - psychological pain theories, 445
 - psychache scale (PAS), 445
 - Shneidman's theory of psychache, 445
- Suicide assessment, 456–463
 - challenges, 457
 - review of, 457
 - suicide ideation and behaviors, measures of, 457–459
 - Beck scale for suicide ideation (BSSI), 457
 - Columbia-suicide severity rating scale (C-SSRS), 458
 - Minnesota multiphasic personality inventory-2-restructured form (MMPI-2-RF), 458–459
 - protective factors and resilience, 459–460
 - suicidal ideation attributes scale (SIDAS), 458
 - against suicide ideation, 460–463
 - coping orientation to problems experienced inventory, 462
 - core self-evaluation scale (CSES), 463
 - meaning in life questionnaire (MLQ), 460
 - reasons for living scale, 461
 - satisfaction with life scale (SWLS), 460
 - social problem-solving inventory-revised (SPSI-R), 462
 - ways of coping questionnaire (WCQ), 461
- Suicide attempters, 444
- Suicide attempts, 439
 - selected static risk factors with individual risk, 442
- Suicide Cognitions Scale (SCS), 10
- Suicide mode, 448
- Suicide-murder, 454
- Suicide notes, 441
- Suicide potential index (SPI), 427
- Suicide-relevant attention biases, 447
 - dispositional vulnerability factors, 447
- Suicide research, 441
- Sunk cost effect, 138
- SWAP-II. *See* Shedler-Western Assessment Procedure-II (SWAP-II)
- SWLS. *See* Satisfaction with Life Scale (SWLS)
- Symptom-based approaches, 312
- Syndromal-level indicators, 344
- Synthetic metacognitive acts, 131
- Systemic-interactional models, 321

T

- Tactual Perception Test (TPT), 117
TAF. *See* Thought-action fusion (TAF)
TAM. *See* Threat anticipation model (TAM)
TAR. *See* Training in affect recognition (TAR)
TAT. *See* Thematic Apperception Test (TAT)
TBAQ. *See* Toddler Behavior Assessment Questionnaire (TBAQ)
Teacher Rating Scale (TRS), 115
Temperament
 behavioral approach system (BAS), 160
 behavioral inhibition system (BIS), 160
 big five factors, relationship between, 159–160
 in childhood, 157–160
 contemporary models, 167–169
 akiskal affective temperaments model, 167–168
 temperament evaluation of Memphis, Pisa, Paris and San Diego–autoquestionnaire version (TEMPS-A), 168
 functional ensemble of temperament (FET) model, 168–169
 regulative theory of temperament (RTT), 167
 formal characteristics of behavior-temperament inventory (FCB-TI), 167
 coping, and resilience, relation with, 175–176
 culture, relation with, 169–170
 definition, 157
 differential linkage model, 171
 measures, 160–161
 models, 160–161
 psychopathology, relation with, 170–171
 attachment, temperament, and personality disorders, 171
 depression, temperament, and cognition, 171–173
 mood disorders, 172–173
 questionnaires, 160
 schizophrenia, relation with, 174
 social process model, 171
 traditional models, 161–166
 behavioral styles approach, 161
 criterial approach, 161
 emotion regulation model, 161–162
 Kagan’s behavioral inhibition model, 166
 hierarchical personality inventory for children (HiPIC), 166
 inventory for child individual differences (ICID), 166
 neurobiological developmental approach, 163–166
 Adult Temperament Questionnaire (ATQ), 165–166
 children’s behavior questionnaire (CBQ), 164
 early adolescent temperament questionnaire-revised (EATQ-R), 165
 early childhood behavior questionnaire (ECBQ), 164
 infant behavior questionnaire (IBQ), 164
 infant behavior questionnaire-revised (IBQ-R), 164
 temperament in middle childhood questionnaire (TMCQ), 165
 temperament, 163
 and character inventory-revised (TCI-R), 163
 traits/types, 158–159
 activity level, 158
 attention/persistence, 158
 behavioral inhibition, 158
 irritability/frustration, 158
 positive emotionality, 158
 sensory sensitivity, 158
 variable-centered approach, 159
 vs. personality, 167
Temperament and Character Inventory (TCI), 245
Temperament Assessment Battery for Children (TABCR), 160
Temperament Evaluation of Memphis, Pisa, Paris & San Diego (TEMPS-A), 313
Temperament scales, 6
 Adult Temperament Questionnaire, 7
 Children’s Behaviour Questionnaire, 7
 Early Childhood Behavior Questionnaire, 6
 Inventory of Children’s Individual Differences–Short Form, 7
Temporal Distancing Questionnaire (TDQ), 324
Temporal dynamics, 294
Ten Item Personality Inventory–Japanese (TIPI-J), 55
Terror management theory (TMT), 315
Test dimensionality
 examining and validating, 32
Test information functions (TIF), 33
Test of adaptive behavior in Schizophrenia (TABS), 116
Test score validation
 four-step approach in, 49
Texas Christian University Criminal Thinking Styles (TCU-CTS), 395
The awareness of social inference test (TASIT), 92
Thematic Apperception Test (TAT), 3
Theory of ego control, 159
Theory of ego resilience, 159
Theory of mind (ToM), 6, 101–110, 132
 across life span advancement, 103–104
 assessment, 106–108
 comprehensive measurement, 108
 conceptual change hypothesis, 103
 contents false belief (FB), 107
 definition, 101
 developmental functions, 102–103
 development of, 104
 diverse beliefs (DB), 107
 diverse desires (DD), 107
 extractable eye movement measurement, 111
 false-belief framework
 Happé’s strange stories, 107
 picture sequencing, 107
 stories, 107
 subjective ToM assessment, 107
 ToM test, 107
 hidden emotion (HE), 107
 knowledge access (KA), 107
 relational frame theory, relationship between, 102
 Sally-Anne test, 106
 Smarties test, 106
 task batteries, 110
Theory of Mind Assessment Scale (Th.o.m.a.s.), 108
Theory of Mind Inventory-2 (ToMI-2), 108
Thinking biases, 137
Thinking errors, 137
Thought-action fusion (TAF), 133
Thought Dysfunction (THD) scales, 365
Threat anticipation model (TAM), 138
Three-step theory (3ST)
 ideation-to-action framework, role in, 452
 variables, 452
Thwarted belongingness, 450
Toddler Behavioral Screening Inventory (TBSI), 311
Toddler Behavior Assessment Questionnaire (TBAQ), 162
 scales, 162
Toddler Temperament Scale (TTS), 161
Tolerance for law violations (TLV), 397
ToM. *See* Theory of mind (ToM)
Tourette’s syndrome
 executive function, effect on, 99
TPQ. *See* Tridimensional personality questionnaire (TPQ)
Training in affect recognition (TAR), 145
Trait activation theory (TAT), 227
Trait-state-error model (TSE), 228
Transdiagnostic approach, 314
Transdiagnostic constructs, 314, 315
Transdiagnostic nature of death anxiety, 315
Transdiagnostic psychosis factor, 313
Transient error, 28
Transnational migration, 322
Transnosological specifiers, 347
Traumagenic neurodevelopmental model (TNM), 314
Treatment response, 349
Tridimensional Personality Questionnaire (TPQ), 163
Tridimensional temperament model
 psychobiological model of temperament and character, as, 163
Tridimensional Personality Questionnaire (TPQ), 172
Trimodal framework, 320
True Response Inconsistency (TRIN), 368
Two-factor theory, 58
Two-Tiered Violence Risk Estimates Scale (TTV), 424
- U**
Unilateral brain damage, 308
University of California at San Diego (UCSD)
 performance-based skills assessment (UPSA), 116
Unreliability, sources of, 28
Unusual subjective experience (USE), 314, 316
Urbanization, 322

V

- Validation research, 48, 50
- Validity, 50
- argument, 48
 - assessment strategies, 51
 - consequential, 53
 - empirical applications of, 53–54
 - cultural, 62
 - evidence-based types, 52–61
 - analysis of, 58
 - factor extraction techniques, 58
 - factors retained, 58
 - rotation methods, 58
 - associations with other variables, based on, 55–56
 - consequences for testing, based on, 52–54
 - empirical applications of
 - internal structure validity, 59–60
 - validity with other variables, 56
 - face validity, 55
 - internal structure, based on, 57
 - interpretations and naming of, 59
 - response processes, based on, 60–61
 - test content, based on, 54–55
 - historical and theoretical developments of, 45–48
 - construct validity and Messick's unified approach, 47–48
 - measurement invariance assessment, 47
 - for measurement, types of, 52
 - types of, 45
 - unitary conceptualization of, models against, 48–52
 - Validity modifier labels (VML), 51
 - Values in action inventory of strengths (VIA-IS), 249
 - Verbal learning, 319
 - and memory, 319
 - Veridicality, 61
 - Verisimilitude, 61
 - Vigilance, 319
 - Vineland adaptive behavior scales 2nd ed. (VABS-II)
 - forms, 115
 - Vineland social maturity scale (VSMS), 111
 - adaptive behavior assessment, role in, 111
 - social competence, role in, 111
 - social maturity, role in, 111
 - Violence Prevention Research Unit (VPRU)*, 413
 - Violence Risk Appraisal Guide (VRAG), 416, 420, 424

Violence risk assessment

- accuracy in, 412
 - false positives and false negatives, 412
 - method of measurement, 412
 - prediction for violence, 412
 - true positives and true negatives, 412
- approaches of, 406
 - actuarial risk assessment, 406–407
 - dynamic-actuarial approach, 407
 - integrated-actuarial approach, 407
 - structured professional clinical judgment, 407
 - unstructured clinical judgment, 406
- components, 406
- cross-cultural applications, China, 417
- degree of the danger of violence, 406
- generations theory of instrument
 - development, 408
 - first-generation (1G) risk assessment, 408
 - fourth-generation (4G) risk assessment, 408
 - second-generation (2G) risk assessment, 408
 - third-generation (3G) assessment, 408
- guide, 420
- historical overview, 405
- key issues of, 406
- low/moderate/high, 406
- measurements, overview, 417
 - instrument selection, 419
 - limitations, 418
 - purpose/structure/validation, of instruments, 418–419
 - reporting risk assessment, 419
 - specialized measures, for dangerousness risk assessment, 420
- metaanalytic studies of, 415–417
 - drawbacks, 415
 - random-effects models, 415
 - tool for violence prediction, 415
 - violent recidivism, prediction, 416
- parental monitoring and, 409
- performance of, 406
- prediction and assessment of violence,
 - issues in, 414
- predictive validity of, 413–414
- serious mental illness (SMI), 406
- Visual learning
 - and memory, 319
- VML. *See* Validity modifier labels (VML)

W

- WAIS. *See* Wechsler Adult Intelligence Scales (WAIS)
- Ways of Coping Questionnaire (WCQ), 461
- WCQ. *See* Ways of Coping Questionnaire (WCQ)
- WCST. *See* Wisconsin Card Sorting Test (WCST)
- Webb method, 54
- Wechsler Adult Intelligence Scales (WAIS), 17, 97, 320
- Wechsler-Bellevue Intelligence Scale, 3
- Wechsler Intelligence and Memory Scales, 4
- Wechsler Intelligence Scales, 3
 - for children-III, 96
- Wechsler Memory Scale (WMS), 97, 320
- index scores, 97
 - auditory memory index (AMI), 97
 - delayed memory index (DMI), 97
 - immediate memory index (IMI), 97
 - visual memory index (VMI), 97
 - visual working memory index (VWMI), 97
 - subtests, 97
- White-collar crime, 385
- Whole trait theory (WTT), 226, 227
- Williams syndrome, 100
- Wisconsin card sorting test (WCST), 94
- Woodcock-Johnson Tests of Cognitive Abilities, 46
- Working memory (WM), 95–97, 319
 - comprehensive measurement, 97
 - Wechsler memory scale (WMS-IV), 97
 - psychometric properties, 97
 - working memory test battery for children (WMTB-C), 97
 - span tasks classification, 96–97
 - digit span backwards task, 96–97
 - N*-back task, 96
- Working Memory Test Battery for Children (WMTB-C), 97
 - phonological loop, 97
 - specific language impairment (SLI), 97

Y

- Youth violence, 426
 - structured assessment, for violence risk in youth, 426–427

Z

- Zuckerman-Kuhlman Personality Questionnaire (ZKPQ), 236