PERCEIVED CONTROL

Theory, Research, and Practice in the First 50 Years

EDITED BY
JOHN W. REICH
FRANK J. INFURNA

OXFORD

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I want to acknowledge the help and, above all, patience, that my wife Deb has always shown in my work and family life.

—John W. Reich

To my parents, Anna and Joe, for your love and support and being the ultimate example of how hard work, dedication, and motivation can put you in the position to succeed in life.

—Frank J. Infurna

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CONTRIBUTORS

Lyn Y. Abramson
Department of Psychology
University of Wisconsin–Madison
Madison, Wisconsin

Lauren B. Alloy
Department of Psychology
Temple University
Philadelphia, Pennsylvania

Meaghan Barlow
Department of Psychology
Concordia University
Montreal, Quebec, Canada

Jerry M. Burger
Department of Psychology
Santa Clara University
Santa Clara, California

Marshall P. Duke
Department of Psychology
Emory University
Atlanta, Georgia

Patricia Frazier
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Jutta Heckhausen
Department of Psychology
and Social Behavior
University of California, Irvine
Irvine, California

Frank J. Infurna
Department of Psychology
Arizona State University
Tempe, Arizona

Margie E. Lachman
Department of Psychology
Brandeis University
Waltham, Massachusetts

Ellen J. Langer
Department of Psychology
Harvard University
Cambridge, Massachusetts

Sayyed Mohsen Fatemi
Department of Psychology
Harvard University
Cambridge, Massachusetts

Liza Meredith
Department of Psychology
University of Minnesota
Minneapolis, Minnesota

Beth Morling
Department of Psychology
University of Delaware
Newark, Delaware

Stephen Nowicki
Department of Psychology
Emory University
Atlanta, Georgia

John W. Reich
Department of Psychology
Arizona State University
Tempe, Arizona

Stephanie A. Robinson
Department of Psychology
Brandeis University
Waltham, Massachusetts

Liza M. Rubenstein
Department of Psychology
Temple University
Philadelphia, Pennsylvania

Richard Schulz
Department of Psychiatry
University of Pittsburgh
Pittsburgh, Pennsylvania

Ellen A. Skinner
Department of Psychology
Portland State University
Portland, Oregon

Bonnie R. Strickland
Department of Psychology
University of Massachusetts
Amherst, Massachusetts

Howard Tennen
Department of Community
Medicine and Health Care
University of Connecticut School
of Medicine
Farmington, Connecticut

Brandilynn Villarreal
Department of Psychology
and Social Behavior
University of California, Irvine
Irvine, California

Kenneth Wallston
School of Nursing
Vanderbilt University
Nashville, Tennessee

Carsten Wrosch
Department of Psychology
Concordia University
Montreal, Quebec, Canada

Perceived Control

1

Perceived Control

50 Years of Innovation and Another 50 to Go

FRANK J. INFURNA AND JOHN W. REICH ■

The importance of gaining a scientific understanding of the construct of perceived control has been a major focus in psychological science and practice for more than a half a century. This was largely initiated by the publication of Julian Rotter's (1966) paper on generalized expectancies for internal versus external control of reinforcement. For our purposes, the publication date of 1966 is particularly significant because the year of publication of our volume on perceived control is exactly 50 years after Rotter published his groundbreaking article. This edited volume is a tribute, an intellectual celebration, of the staying power of his basic ideas and their influence through time and across disciplines. Although counts vary, there have been at least 4,000 original source articles applying those ideas and more than 20,000 citations on Google Scholar. Few, if any, constructs in all of the psychological sciences have had such an extensive and enduring influence.

The purpose of this edited volume is to showcase the breadth of research that has accumulated since Julian Rotter's original article on locus of control. The construct spans multiple disciplines, not exclusively psychology, but also sociology, clinical, economics, health, and business, among others. Our goal was to include chapters that span these disciplines and cover the breadth and importance of the construct of perceived control. Furthermore, the authors of each chapter in our volume were instructed to focus not only on their research using constructs associated with perceived control in their area of expertise, but to also focus on future directions that are important to further illustrate how the construct of perceived control can continue to be important, meaningful, and relevant.

As work using the basic concept of locus of control has progressed, two major ways of thinking about the general concept have evolved. One is thinking of perceived control as a personality trait, stable, enduring over time and situations. This tradition encompasses such topics as the original locus of control concept and the many allied terms as reviewed by Ellen Skinner in her seminal paper (Skinner, 1996). This includes concepts that are related to control beliefs, such as self-efficacy, personal mastery, and competence, and more specific topics, such as health locus of control and desire for control. Of specific interest is the coverage of individualism-collectivism and cross-cultural differences in perceived control, which continues the tradition of approaching the issue from a trait perspective.

The second general category of thinking about perceived control focuses on cognitive processes. This tradition broadly refers to a more heterogeneous category of topics that emphasize control-related beliefs and processes influencing how the individual relates to his or her environment. Specific issues here involve the role of perceived control in influencing information processing, primary versus secondary control, accommodation, learned helplessness, modes of behavioral versus perceived control, illusion of control, control over health, adjustment to stressful life circumstances, and more recent heuristic concepts such as mindfulness. One separate distinctive tradition in this literature is the development and testing of interventions to enhance control beliefs through experimental

manipulations. As we describe later in this chapter, at least a dozen such interventions have been reported in the literature. All of them report resulting in positive effects on mental health and behavioral functioning. This "proof of concept" literature is convincing empirical evidence of the power of the perceived control approach to human functioning.

Historically, these literatures have developed separately. We asked ourselves: is there an overarching theme that can unite these functionally different areas especially in the face of their seemingly common terminology? Rotter himself has given us a useful way of thinking about this in his concluding thoughts (1966, p. 25):

> A series of studies provides strong support for the hypotheses that the individual who has a strong belief that he [sic] can control his own destiny is likely to (a) be alert to those aspects of the environment, which provide useful information for his future behavior; (b) take steps to improve his environmental condition; (c) place greater value on skill or achievement of reinforcements and be generally more concerned with his ability, particularly his failures; and (d) be resistive to subtle attempts to influence him.

From this perspective, perceived control can be thought of as a key component of either our trait personality makeup or our cognitive processing that, in either case, enhances functioning and, ultimately, survival. Adaptability and effective functioning are themes that can integrate both approaches. Given the similar overarching concepts but different approaches, each chapter in this volume considers and discusses how this way of thinking has given us such a powerful tool for understanding individual–environment dynamics. Questions include whether each author sees a connection between this area and contemporary (and future) developments in such productive topics as resilience, cognitive-behavior modification therapy, mindfulness meditation, life span developmental milestones and transitions, biological/neuropsychological understanding of health and adaptation, and the like. One purpose of our edited volume is to show the entire field of psychology how perceived control concepts

have been discovered, utilized, and can sustain a thriving area of research into the future.

Our own chapter here will provide a brief overview of each of the contributions to the edited volume without going into too much detail about each; we end by discussing future directions for research that we feel will be fruitful for further pursuit.

WHAT HAVE THE FIRST 50 YEARS OF RESEARCH ON PERCEIVED CONTROL BROUGHT US?

Each of the chapters of this edited volume covers a different topic, demonstrating the breadth of applicability of the construct of perceived control. Altogether, the authors have wide-ranging experience of and history with the construct, varying from working directly with Julian Rotter to being graduate students beginning their careers in this area of research. We next briefly discuss each of the chapters, how they contribute to the edited volume, and their main take-home points. Because our brief summary is by no means all-encompassing, we strongly urge you to read each chapter to see the power of the authors' insights into their various interpretations on the construct of perceived control.

Bonnie Strickland was a graduate student in clinical psychology at Ohio State and was a participant in Rotter's class as he worked on developing items for his initial work on what turned out to be his Locus of Control (LOC) scale. Her chapter explains in detail the activities of the various people (e.g., James, Phares) who also worked on the development of the scale. All were working within the social learning theory (SLT) conceptual framework of skill versus chance conditions that Rotter was attempting to capture in the psychometric developments active at that time. Strickland began applying Rotter's model to children's control beliefs. The Nowicki-Strickland scale (Nowicki & Strickland, 1973) is still the core of many investigations of children's beliefs and behaviors and is covered well in Nowicki's chapter in this volume (Nowicki & Duke, this volume). In her own investigations of locus of control in adults, Strickland reports

studying student political activism, religion, achievement, and competence, and, fortunately, she also discusses her major contributions in the area of health beliefs and behaviors. As with many of the other chapters in this volume, she describes the problems resulting from differing definitions and characterizations of control.

Jerry Burger (Chapter 3, this volume) devotes his chapter to reviewing the extensive body of research on the construct he developed; namely, desire for control (DC). Early in his career, he had the insight that the fast-developing literature on locus of control was limited to *perceptions of control* and did not deal with *motivation for control*. Still a graduate student, his initial forays into this new topic were first oriented toward assessment and resulted in his Desire for Control Scale, designed as a personality inventory (Burger & Cooper, 1979). Numerous language translations and hundreds of studies later, his current chapter reviews this literature with a focus on DC's relationship with locus of control constructs and measures. His results conclude that some relationships are usually found (greater DC relates to greater internality), but these depend on the particular dimension of control being assessed.

Burger then reviews the relationship of DC with illusions of control (e.g., gambling, superstitious behavior) and unrealistic optimism; high levels of DC relate to higher levels of such states. Finally, he discusses the "mismatch hypothesis," the degree of alignment between DC and situational control or lack thereof. Mismatch shows up as interactions of DC and control (high vs. low levels on each variable) on such conditions as depression, anxiety, and obsessive-compulsive behavior. This line of reasoning has led to successful interventions designed to give persons more control.

Beth Morling (Chapter 4, this volume) sets the task of connecting the by-now large body of research and theory on culture and constructs of control. Cultural psychology is the study of how cultural traditions and practices regulate psychological processes. Perceived control theory has been based overwhelmingly on Western, individualistic, middle-class samples and thereby misses much of the psychological world of non-Western cultures, as she so ably points out. A key development in elucidating the

problems in connecting these dots is the model of Rothbaum, Weisz, and Snyder (1982). Their approach discriminated between primary and secondary control; Western samples tend to emphasize the former, whereas many cultures in Morling's studies on Asian societies emphasize the latter. Her discussion of a number of intercultural differences then leads to the suggestion that we should shift attention from "inside the head" to outward situations. This "situation scope" approach suggests greater attention paid to the environment of the person and his or her cultural situation. This richer approach allows a more realistic understanding of the types of control that shape individuals' preferences and choices. This type of approach leads us to realize that people shape their beliefs, including their beliefs in their own personal control, in ways that are culturally shaped.

Ken Wallston took a first-year graduate class with Julian Rotter in clinical psychology but then switched to social psychology. Several years later, he (and his wife Barbara) revisited the original locus of control thinking by applying Rotter's main conceptual underpinnings (SLT) to health-related issues of patient populations. This involved moving the "generalized model" to a specific model of health-related locus of control. His chapter (Chapter 5, this volume) presents a detailed discussion of the many issues surrounding the construction and validation of his scale and how, after many studies, he decided that a multicomponent model is needed (involving chance and powerful others along with internality). Eventually, however, he discovered that even the component subscales did not always result in expected outcomes, with significant correlations with overt health behaviors. He has now concluded that perceived self-efficacy is the most effective way to think of personal control in health issues.

Fatemi and Langer (Chapter 6, this volume) present a detailed discussion of mindfulness, Langer's contributions in explicating the logical status of the concept, and a number of ways in which it plays out in improving mental health outcomes. The logic underlying the well-known Langer-Rodin study on nursing home residents is contrasted with that of the Schulz studies on a similar population. The former's intervention encouraged primary control, now characterized as a form of mindfulness,

whereas one of the latter's intervention conditions moved control out from the individual into the staff who were, in effect, encouraging secondary control; in this interpretation, the latter was encouraging mindlessness. Fatemi and Langer then argue that mindfulness creates greater flexibility, enhanced experiential awareness, greater choice and freedom of behavior, and greater mental processing of possibilities. With a global increase in mindfulness, there can be a greater sense of togetherness, synergy, understanding, and empathy.

Early in his career, Steven Nowicki worked with Bonnie Strickland in aiming to develop a locus of control scale for children comparable to the Rotter LOC scale for adults. Nowicki and Duke (Chapter 7, this volume) devote their chapter to discussing the many variations on the basic theme of children's control beliefs and revealing a number of conceptual differences. A key conceptual advancement in this area was made by the Rothbaum, Weisz, and Snyder discussion of primary versus secondary control. More recent advancements have extended this thinking to developmental changes over the life span (Villareal & Heckhausen, Chapter 11, this volume), with discussion of Nowicki's longitudinal studies of changes in control beliefs over a 30-year time span. Pat Frazier's work on temporal dimensions of control beliefs (past, present, and future, presented in Chapter 8 in this volume) is shown to be related to mental health. Chapter 7 also reviews Nowicki's work that has been influential in revealing control belief variables' effects in academic achievement and mental and physical health.

Frazier, Tennen, and Meredith (Chapter 8, this volume) have become linked professionally through collaboration on issues of mutual interest. In their chapter, Tennen describes his work on associations between control and health; in turn, his work was picked up by Frazier, resulting in collaborative work on post-traumatic stress disorder (PTSD). Meredith, working with Frazier, has been instrumental in developing an online intervention centered on perceptions of controllability of one's current condition. Tennen's contribution focuses on his work, much of it in collaboration with Glenn Affleck, on the role of control in contributing to adjustment to physical illnesses. Employing the Rothbaum, Weisz, and

Snyder conceptualization of primary and secondary control, they found that perceived benefits of illness acted as good indicators of adjustment, characterizing them as a "backup" of secondary control in the face of uncontrollable factors in illness. Frazier has found that a key dimension to adjustment is the temporal dimension (i.e., perceived control over the past and present and anticipations of control over future events). Control over the present, the most healthful form of control perception, has led to Meredith's current work on developing therapeutic interventions. They report on the various versions of their online control-enhancing modules. These have been shown to enhance perceptions of present control, which in turn is related to improvements in measures of adjustment.

Robinson and Lachman (Chapter 9, this volume) provide a broad overview of antecedents and outcomes of perceived control. They review differences based on sociodemographics and focus on the implications of perceived control for building interventions to improve quality of life for individuals in midlife and old age (a topic reviewed from a different perspective by Barlow, Wrosch, Heckhausen, and Schulz, Chapter 12, this volume). In developing this framework, they review the literature on perceived control and health beliefs and behaviors, cross-cultural differences (as did Beth Morling, but as a between-person factor for contributing to differences in perceived control), age, and longitudinal changes in control over the life span. They clarify issues involved in research on self-control and self-regulation and control beliefs; this suggests important distinctions between beliefs and actual performance. Their main topic concerns the value of optimizing perceived control interventions. Such interventions to enhance control can be made more effective by incorporating information from the individual's current control beliefs, perceived abilities, and related beliefs and cognitions. Cognitive restructuring techniques have been shown to be effective in enhancing performance, and, they discuss the role of behavioral skills training for enhancing control beliefs and leading to better health and well-being. They suggest personalized interventions to foster adaptive behavior changes by taking into account levels of perceived control as the next frontier in their research on perceived control and in the field as a whole.

Rubenstein, Alloy, and Abramson (Chapter 10, this volume) briefly review the historical development of the learned helpless/reformulated model of depression that evolved from Rotter's original LOC model. This area focused on the perceptions that people have in dealing with judgments of the contingent relations between their efforts and the controllability of their events (skill vs. chance). Some people do not readily see such connections and develop generalized perceptions of not having a causal relationship with their experiences, thus leading to a state of learned helplessness. An entire body of research literature developed from these initial insights is reviewed by the authors. They focus on a variety of main themes, including judgments of control and analysis of perceptions of contingency in the context of clinical depression, prediction behavior and levels of optimism toward predicting future outcomes, classic research on internal versus external attributional style for positive and negative events, and the boundary conditions of these basic effects. The authors project possible trajectories of this kind of work into the future. They suggest that more attention be given to biological factors, particularly making the point that neuroscience techniques can be used to locate brain neural regions responsible for these effects. Behavioral neuroeconomics analyses may be helpful because much of the learned helplessness research is based on skill versus chance conditions. Perceptions of control may be ultimately found to be based in functional brain structural differences.

Villareal and Heckhausen (Chapter 11, this volume) present a review of the key components of the motivational theory of life span development (see Heckhausen, Wrosch, & Schulz, 2010). This model traces out the theoretical and empirical implications of melding perceived control constructs with a dynamic model of goal striving. Concepts of primary and secondary control are enlisted as responses to personal actions that are, to varying degrees, successful at achieving desirable goals. In applying this general model, important changes in these components are necessitated by advancing age, thus resulting in a model of life span development. Different goals arise during the course of advancing age, and these in turn are met with dynamic changes in primary and secondary

control strategies. Successful aging results when a match occurs among personal control beliefs, optimum choices of goals in the context of appropriate personal resources, and selective but appropriate use of primary and secondary control strategies.

In terms of future directions for this line of research, the authors suggest that interventions should focus on maximizing flexibility in finding ways to enhance the match or congruence between actions and goal attainment. This must necessarily take into account changes in goals that occur over the life span. One individual difference variable that could be targeted for intervention is optimism, which should function to enhance persistence in goal striving. This model would be particularly useful when applied to young adults as they face multiple challenges in their transition to full adulthood. Another fruitful area of application is developing effective models to help students achieve greater perceived academic control.

Barlow, Wrosch, Heckhausen, and Schulz (Chapter 12, this volume) focus on how constructs associated with perceived control, such as goal engagement and goal disengagement, are instrumental in protecting older adults from age-related declines in physical health. They couch their discussion in the context of the motivational theory of life span development (Heckhausen, Wrosch, & Schulz, 2010) and how older adults can rely on different strategies of goal engagement and disengagement for managing physical health declines in old age. Future directions for research include, first, studying how it is that perceived control constructs can help individuals manage well as they move from disease-free to subclinical and chronic illness and then to terminal illness (e.g., disablement process model, Verbrugge & Jette, 1994), which can be done via the lines-of-defense model (see Heckhausen et al., 2013). Second, the focus of control strategies should not be constrained to old age, but applied to all parts of the life span. Third, the mechanisms that link control strategies to the protection from decline with physical health need to be explored. This research can help illuminate the factors that facilitate an adaptive use of control strategies. Finally, they discuss the importance of interventions and how control strategies are a viable target to help improve physical health and successful functioning.

Ellen Skinner (Chapter 13, this volume) presents an overview of the important lessons learned from the concept of perceived control over the past several decades. She focuses her chapter on seven guideposts for current and future research; these broadly focus on the construct of perceived control and the concepts associated with it and the multiple pathways through which perceived control influences pertinent outcomes and antecedents of perceived control throughout the entire life span (from infancy to adulthood and old age). Future directions that Skinner highlights include the dynamic feedback that constructs of perceived control engages and how future research should focus on ways to capture this (e.g., daily dairy research designs). An additional focus for future research is on interventions to improve the competence system. There are multiple avenues and systems through which researchers can intervene, and perceived control can be instrumental in effecting this; studying developmental transformations presents opportunities to focus on periods of development in which there is the potential for much positive change.

WHAT ARE IMPORTANT FUTURE DIRECTIONS TO PURSUE?

Given the breadth of the perceived control construct and the contributions of each of the authors to enhancing the field, this leaves us with the question of what else is there to be studied? This is something we wanted each author to discuss in his or her chapter, and we have already briefly mentioned some of their ideas. The first 50 years have brought a wealth of knowledge, and perceived control has been studied across a myriad of contexts and disciplines. We next discuss the potential for expanding and deepening the reach of this highly productive approach into the next 50 years and perhaps beyond. At this point, we see three major areas in which current developments show promise for carrying the field of control studies into future theory, research, and action.

Expanded person-by-environment models. Rotter based his initial model on an expansion of SLT, an amalgamation of learning theory with

the newly developing interest in cognitive processes. Basing his approach on fundamental principles of learning was probably key to its reception in the broader field of psychology. However, his rather dry cognition approach essentially ignored the motivational and emotional aspects of perceived control beliefs. By engaging with this new approach, Burger (Chapter 3, this volume) opened up the field to the language of personal strivings and motivations. Along with Rotter's main theme, this second approach consolidated an already individualistic, mental trait approach that continues to this day. But, with increasing theoretical and particularly methodological sophistication developing in the broader field of psychology, this new wave ultimately necessitated a more inclusive approach. These developments made it possible for the field to incorporate information about the environment of events in which the person is functioning in addition to the person's inner mental states.

We now see the spread of person-by-situation (P×E) models of the linkage of a person's personal traits and his or her experiences of events. Beth Morling's discussion (Chapter 4, this volume) of "situation scope" to explain intercultural differences in control processes related to environmental differences is very much in tune with this general model. Stemming from the pioneering work of Holmes and Rahe (1967), examining the impact of life events through the assessment of both major and small daily events that people report experiencing became a major methodological advancement. Events were shown to be a separate significant source of variance in accounting for well-being. A perceived control perspective on events became a valuable addition to this approach. Seeing oneself as a cause of events as opposed to passively experiencing them in DeCharms's (1978) model of causation of events, categorized as "origin events" versus "pawn events," showed the positive effects on perceptions and behaviors when a person has more origin than pawn experiences. Interestingly, Rotter had anticipated this issue by manipulating skill versus chance variables in performance. More recently, this general model has perhaps had its most striking effect in influencing our models of health behavior. Studying the health consequences of perceptions of control—or lack of it—over illness, health, and disease variables

(described by Wallston [Chapter 5], Strickland [Chapter 2], and Frazier, Tennen, and Meredith [Chapter 8, all in this volume]) reflects the heuristic power of this type of approach.

Both major and minor daily events have the potential to influence well-being and health. Daily diary studies show that reporting events as stressors is associated with declines in negative affect and increases in positive affect (Almeida, 2005) and that major life events influence well-being (see Infurna & Luthar, 2016; Lucas, 2007). However, we argue that events can be examined more closely with their level of controllability. For example, some of these events, especially at the daily level, can be controllable (as when someone overdraws his bank account) or not controllable (as when someone hits your car in the parking lot). Furthermore, daily events are not only negative, but also involve positive events occurring in the form of a deep and meaningful conversation with a loved one, a co-worker bringing in food to the office, or a friend surprising you with a gift.

A third avenue through which perceived control can be examined further is in the context of major life stressors. Major life stressors are events that result in a qualitative shift in one's life circumstances (Hultsch & Plemons, 1979). Examples include acute-onset stressors such as cancer diagnosis, spousal loss, or unemployment, as well as chronic stressors that include childhood abuse and growing up in poverty. These stressors can have severe implications for functioning across domains such as well-being, health, and social relationships (Infurna & Luthar, 2016). Perceived control can play a vital role in helping individuals overcome major life stressors. For example, Infurna and colleagues (Infurna, Rivers, Reich, & Zautra, 2015) found that individuals who reported more childhood abuse were more emotionally reactive to daily negative and positive events in midlife, and that higher levels of perceived control increased one's sensitivity to emotional reactivity. Shelley Taylor's research in patient populations has shown the effectiveness of reported higher levels of perceived control on adjustment (Taylor, Kemeny, Reed, Bower, & Grunewald, 2000). Furthermore, Ranchor and colleagues (2010) found that, in cancer patients, those who were able to maintain perceived control despite the

diagnosis showed less psychological distress in the years thereafter (see also Infurna, Gerstorf, & Zarit, 2013).

Given these impressive lineages, we believe that a fruitful avenue for future research is to examine the role that control variables in both the person and in the environment can play in shaping the course of daily lives. This requires the separate assessment of experienced controllable and uncontrollable daily negative and positive events. For instance, if events are cross-categorized as controllable or uncontrollable but also as positive or negative (Reich & Zautra, 1983, 1984; Reich, Zautra, & Hill, 1987), self-caused positive events are significantly related to positive outcomes, but externally caused positive events are also related to negative affect, showing that event control effects can outweigh event valence (Strand, Reich, & Zautra, 2007). We conclude that personal mastery (Pearlin and Schooler's scale: 1978) has sensitizing effects when assessed in light of a person's environment of controllable and uncontrollable positive and negative events. People with high mastery beliefs are made more reactive to the positive effects of positive events and controllable events, but are also highly reactive to the negative effects of both uncontrollable negative and uncontrollable positive events. This pattern does not appear in people who report lower personal mastery beliefs; those who feel less personal control in their lives are not as highly responsive to a world of events over which they feel less personal control in the first place.

In sum, a rich new approach to perceived control appears on the horizon if we lift our sights to studying not only personal control beliefs in all of their variety (Skinner, 1996), but also simultaneously assess the environment of events in which people with varying control beliefs conduct their lives. Those events carry different types of valence and different degrees of personal controllability, so further study would illuminate the relationships between both domains of causation. As Ken Wallston has reiterated in Chapter 5 of this volume, "the action is in the interaction." It may well take another 50 years to learn all that we can about this more complex picture of well-being.

Aging, control, and longitudinal methodology. The evidence now seems compelling enough to at least tentatively conclude that the

"one-size-fits-all" model of the all-encompassing positive power of high degrees of belief in one's personal control may be inadequate, if not inaccurate, to explain the data obtained from recent studies. Robinson and Lachman (Chapter 9, this volume) have described this as "the downside of control," with evidence coming from many areas of investigation. There are both conceptual and methodological reasons why it now appears that some rethinking is needed of the near-universal belief that high levels of personal mastery are, inevitably and invariably, a positive cause of positive well-being. Stemming from Skinner's (1996) landmark paper and reviewed again by Skinner in Chapter 13 of this volume, empirical studies are demanding a rethink of this construct. We proposed earlier that we need to investigate more thoroughly how personal beliefs match the environment in which the person engages in daily living. Those beliefs may well change in character depending on the events that the person experiences, as well as on other properties of the person, especially his or her age.

New research since Rotter's initial work has made it clear that control beliefs are not stable, at least when considered over the full course of the life span. A majority of research examining the effect of perceived control across a wide range of outcomes, such as disease, disability, and mortality, has primarily focused on one-time assessments. We feel that it is just as important to focus on how changes in perceived control are linked to meaningful outcomes across the life span. Changes in perceived control can signify meaningful shifts in one's belief system and expectations in one's contextual surroundings (Infurna, Ram, & Gerstorf, 2013). Previous research found that more positive rates of change in perceived control over a 16-year period is protective against 19-year mortality risk (Infurna, Ram, & Gerstorf, 2013). More recently, we found that the beneficial effects of change in perceived control are contingent on one's levels of functional limitations, depressive symptoms, and emotional support (Infurna & Okun, 2015).

Are there situations when it is best to relinquish control and utilize other strategies? The research of Heckhausen and colleagues has examined this idea, which they describe in each of their chapters in this volume. For example, Hall and colleagues (Hall, Chipperfield, Heckhausen, & Perry,

2010) found that individuals with more chronic health problems but who reported more goal disengagement were more likely to survive nine years. Infurna and Okun (2015) recently investigated situations in which there are benefits but also drawbacks to reporting high levels of perceived control. They found that positive rates of change in perceived control protected against mortality risk for those with fewer functional limitations and depressive symptoms and more emotional support. It may be that, in the context of high functional limitations, striving for control or changing one's environment is maladaptive, and utilizing other strategies, such as secondary control, may prove more beneficial. Furthermore, Specht and colleagues (2011) found that a high level of internal control was associated with stronger declines in life satisfaction when experiencing the loss of one's spouse but a quicker recovery, whereas high levels of external control beliefs were associated with less steep declines in life satisfaction when experiencing the loss of one's spouse but slower recovery in the years thereafter. These themes are elaborated upon in several chapters in this volume (e.g., Villareal & Heckhausen [Chapter 11]; Robinson & Lachman [Chapter 9]; Barlow, Wrosch, Heckhausen, & Schulz [Chapter 12]).

All the same, a number of questions are not yet clearly answered. For example, Grob, Little, and Wanner (1999) showed that the effects of control must be measured by different techniques largely because the effects of control vary over the life span; control can be conceptualized as an *expectancy* for control because striving for goals varies by the age of the person making the judgments. In turn, these constructs have differing effects at varying levels of age. Evidence is quite inconsistent as to whether control beliefs change over longer term development. There appears to be a negative correlation between age and control, but the relationship is not linear and it depends on the type (domains) of control being assessed (Grob et al., 1999; Wolinsky & Stump, 1996; Wolinsky, Wyrwich, Babu, Kroenke, & Tierney, 2003). As for the age and well-being relationship, some studies show that age and well-being are positively correlated (Lachman & Agrigoroeai, 2010), but additional studies find a number of important qualifications to a direct relationship (Lachman, 2006). Methodologically, studies in which age is a variable should make attempts

to handle the complication of separating out aging processes from cohort effects (Wolinsky & Stump, 1996), a complication that represents a strength of the new information that we have gained since the original perceived control studies.

In summary, a majority of research examining perceived control has primarily focused on one-time assessments. We feel that it is becoming increasingly clear that longitudinal designs are going to become central assessment methodologies to answer the questions that investigators are asking. For example, a body of studies in the life span tradition is seeking to determine the relationships among control, age, and changes in control and aging outcomes, including longer term well-being, cognitive functioning, physical health, and longevity. These types of questions initially received a good deal of attention in the seminal volume entitled *The Psychology of Control and Aging* by Baltes and Baltes (1986). We have learned a lot since then, as the chapters in this volume demonstrate, but some fundamental questions raised at that time are still with us. Fortunately, we have more data from longitudinal studies that are being brought to bear on these key processes. It is now appropriate for the field to turn its attention to this more complex but more productive way of doing our science. Thus, future studies must have the important caveat that they should build in methods that at least sample different age levels, if not formally apply classical longitudinal models of multiple, across-time repeat sampling of variables for the same person (including reassessments of control beliefs as they pertain to both the person and the person's environment of variables).

New models of interventions. Given all the new questions and answers about perceived control that are forcing revisions to our classical models, these developments may well lead to revisions in our tradition of developing interventions for enhancing personal control beliefs and behaviors. The early and by-now classic intervention studies by Langer and Rodin (1976), Rodin and Langer (1977), and Schulz and Hanusa (1978) established a relatively small but highly influential body of evidence that control beliefs can be manipulated (enhanced), as can, to some extent, behavior techniques (see also Baltes, 1995). Reich (2015) summarized the dozen studies following from the original studies and that now form a

distinct body of research as a core of findings in this intervention tradition. That review shows that all these studies showed positive benefits for such basically psychoeducational techniques. That tradition has been continued into this volume by the work of Frazier, Tennen, and Meredith (Chapter 8, this volume) and Robinson and Lachman (Chapter 9, this volume).

There are two major recent developments that bode well for expanding the range and effectiveness of such interventions; given those developments, it now seems that some fundamental and productive changes are possible. One new line is conceptual, expanding our understanding of what properties of events, particularly controllability, can enhance the participant's approach to daily experiences. The second new line of intervention research takes advantage of technological advancements in the broader society.

First, the models of event causation described earlier now make it clear that the control properties of events (as well as control beliefs in the person) are a rich source of variance in accounting for well-being outcomes. One model incorporating this distinction is reported in Zautra, Davis, Reich, Sturgeon, Arewasikporn and Tennen (2012). This intervention study tested two separate models of intervention, both employing structured telephone calls to community-residing middle-aged adults daily for 30 days. One condition, the personal mastery intervention, provided suggestions for daily activities involving personally controllable versus uncontrollable positive, neutral, and negative events and also suggested control-enhancing techniques for dealing with such events. The other condition, a mindfulness meditation condition, provided mindfulness techniques for ruminating and deepening one's experiencing of daily events. Results showed positive effects for both interventions, with the personal mastery condition enhancing emotional well-being and the mindfulness condition enhancing both emotional and physical reactions. Fatemi and Langer (Chapter 6, this volume) discuss some of the major distinctions between mindfulness and personal control, and the data of this intervention study suggest that, indeed, there are important differences between these two models. Given this, intervention research now has new ways of approaching future studies.

A second line of recent developments can change the ways we do interventions. Frazier, Tennen, and Meredith (Chapter 8, this volume) report employing control-enhancing modules that are made available online to supply techniques for intervention methodology. Zautra and colleagues (2012) employed automated telephone contacts, delivered daily for 30 days, with a high degree of participant retention. Robinson and Lachman (Chapter 9, this volume) report on the effectiveness of cognitive strategies for memory improvement. This strategy of personalizing the intervention material is highly promising for future developments. Both the increased conceptual depth and technological range of applicability of control-enhancing interventions show great promise for evolving the initial thinking of the founders of this branch of perceived control studies.

CONCLUSION

In summary, the construct of perceived control has received major attention in psychological theory, research, and practice and other disciplines since its formal introduction by Julian Rotter in 1966. As shown by the impressive contributions represented in the chapters of this commemorative volume, the past 50 years have brought a great deal of knowledge about the role of one's perceptions and motivations for control in relating to measures of physical and mental health. Impressively, effective interventions have proved in practice that this way of thinking can have real influence in helping people to live better lives. Given the power of the concept of perceived control, we believe that this edited volume can become a resource on what the past 50 years of research on perceived control has contributed and also serve as a guide to the great potential for even more contributions in the next 50 years.

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2

Internal Versus External Locus of Control

An Early History

BONNIE R. STRICKLAND ■

It was the age of grand theory. In the 1950s, psychologists had returned from World War II, re-established themselves in colleges and universities, and embarked on the daunting task of developing further theories of human behavior. Moreover, it was clear that clinical psychologists were needed to provide mental health services for veterans returning from the war. Education and training standards developed during the Boulder Conference proposed the scientist-practitioner model for educating and training clinical psychologists in both research and practice. This model urged clinicians to use their empirical research to influence their applied practice while simultaneously allowing their experiences during applied practice to shape their further research endeavors.

Julian B. Rotter was a participant in the conference. He returned to the Ohio State University, where he was to become an exemplar of this model, integrating psychological theory, research methodology, and practice. In 1954, Rotter published *Social Learning and Clinical Psychology* and

proposed a social learning theory of personality. He notes that it was an attempt to synthesize the available knowledge and theorizing that preceded it and credits Kurt Lewin's firsthand influence and Clark Hull's books as impressing him with the importance and potential value of carefully articulated theory. He turned to learning theorists such as Hull, Thorndike, and Tolman and relied on Adler, Kantor, and Krech in an attempt to integrate the two extant theoretical trends in American psychology at that time: namely, the stimulus-response or reinforcement theories on the one hand, and the cognitive or field theories on the other (Rotter, 1982). This was probably Rotter's greatest achievement, although he is perhaps best known for his work on internal versus external locus of control of reinforcement.

Rotter's social learning theory utilizes three basic constructs in the measurement and prediction of behavior: behavioral potential, expectancy, and reinforcement value. The basic formula is stated: BP = f (E & RV). More specifically, it reads that the potentiality of functionally related behaviors to occur in specified situations in relation to potential reinforcements is a function of the expectancies of these behaviors leading to these reinforcements in these situations and the values of these reinforcements.

Internal versus external locus of control is an expectancy variable within Rotter's theory. Expectancy is defined as a subjective probability or contingency held by the individual that any specific reinforcement or group of reinforcements will occur in any given situation or situations. Expectancies are determined by the probability calculated on the basis of one's past history of reinforcement and by the generalization of expectancies from other behavior-reinforcement sequences.

The development of the notion of internal versus external locus of control of reinforcement arose from clinical observations. Rotter was supervising the clinical work of one of his graduate students, E. Jerry Phares. They noticed that in a client's attempts to find a job, he did not perceive any causal relationship between his behavior and the occurrence of rewards. Indeed, he seemed to believe that behaviors such as obtaining a job or asking a woman for a date were controlled by external factors rather than by any aspect of himself or his behavior. Extrapolating from this clinical

case, the construct of internal/external (IE) locus of control emerged and was identified as an expectancy variable within Rotter's social learning theory (Phares, 1976).

From the theoretical side, early research, especially in regard to skill/chance situations, began to define and give empirical legitimacy to the IE construct. (Phares, 1976). This research likely began with Phares's dissertation (1957). He found that a participant's perception of control was related to expectancy of success or failure in a judgment task. Under perceived skill conditions, participants responded to a past experience of success or failure by appropriately wagering bets on their next judgment. Those given chance instructions were more likely to adopt a "gambler's" stance as if, indeed, their success was dependent on luck. James and Rotter (1958) also found that varying instructions as to whether a task was considered skill or chance influenced extinction trials, with participants in the chance condition showing the usual greater resistance to extinction in a partial reinforcement condition but a reversal of this effect in the 100% skill condition. In his doctoral research, James (1957) found differences between skill and chance groups in acquisition of expectancies and significantly greater generalization of expectancies from one task to another under skill rather than chance instructions. Other studies conducted by Bennion (1961); Blackman (1962); Holden and Rotter (1962); and Rotter, Liverant, and Crowne (1961) likewise demonstrated the importance of expectancy of response-reinforcement upon learning and perceptual tasks. Beliefs about locus of control of reinforcement clearly influence behavior.

If instructions or perceptions about skill and chance could so dramatically affect performance, then a logical next step was to consider whether people ordinarily carry with them a generalized expectancy about the locus of control of reinforcement. To this end, a number of early assessment instruments were devised to develop a tool to identify individuals along a continuum of an IE orientation.

The first of these attempts was Phares' (1957) Likert-type scale with 13 items listed as external attitudes and 13 as internal attitudes (Phares, 1957). Items for this scale were gleaned from a priori notions about the nature of skill–chance situations and common sense. It was hoped that

on this scale individuals who predominantly endorsed the internal (or skill) items would exhibit expectancy changes similar to those produced by skill instructions; a comparable opposite reaction was anticipated from those who chose the external (chance) items. His hypotheses were not confirmed, but his predictions approached statistical significance. The results suggested that it would be worthwhile to continue to pursue the measurement of individual differences in locus of control beliefs or expectancies.

James (1957) revised the Phares scale, still using a Likert-type format, and produced 26 items plus filler items based on those that appeared to be the most successful in the Phares study. Like Phares, he similarly hypothesized that individuals achieving external scores would tend to behave on an experimental task as if they were the group receiving chance instructions, whereas an internal group's performance would parallel that produced by skill instructions. His hypotheses were largely substantiated, and his scale was used subsequently in several additional studies (e.g., Lipp, Kolstoe, James, & Randall, 1968). Lending validity to the construct, other early research with the various IE scales found the IE dimension to predict attention and information-seeking (Davis & Phares, 1967; Getter, 1966; Lefcourt & Wine, 1969; Phares, 1968; Seeman, 1963; Seeman & Evans, 1962), behavior in skill/chance situations (Bialer, 1961), conformity (Crowne & Liverant, 1963), participation in college activities (Brown & Strickland, 1970), perceptual sensitivity (Phares, 1962; Rothschild & Horowitz, 1970; Ude & Vogler, 1969; Williams & Stack, 1972), resistance to influence (Gore, 1962; Getter, 1966; Strickland, 1970), and risk-taking (Liverant & Scodel, 1960).

Building on the scales of Phares and James, Shephard Liverant and Melvin Seeman (a sociologist) worked with Rotter to broaden the test. The next earliest version contained 100 forced-choice items. One item in each pair dealt with an internal belief and the other with an external belief. The scale was also designed to identify several different subareas: academic recognition, social recognition, love and affection, dominance, social-political events, and general life philosophy. Efforts were made to control for social desirability.

Following an item analysis and a factor analysis, Liverant reduced the 100 items to a 60-item version on the basis of internal consistency criteria. An item analysis on this new scale revealed that the subscales were not generating separate predictions. Achievement items tended to correlate highly with social desirability, and some subscales correlated with other scales at approximately the same level as their internal consistency. On this basis, items to measure more specific subareas in IE control expectancies were abandoned.

Rotter, Liverant, and Crowne (1961) then further refined the 60-item instrument with data collected from a large group of individuals who had also completed the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964). Items that either had high correlations with the Social Desirability Scale, a nonsignificant relationship with other items, or a correlation approaching zero with the validation criteria were eliminated. Internal consistency data and item validity had been assessed through studies by Rotter, Liverant, and Crowne (1961) and Seeman and Evans (1962). The final version of the Internal versus External Locus of Control Scale consisted of 23 forced-choice and 6 filler items and was published in Rotter's 1966 monograph "Generalized Expectancies for Internal Versus External Control of Reinforcement" (Rotter, 1966).

During the time that the scale was developed and refined, I was a graduate student in the clinical psychology graduate program at Ohio State. I recall that Rotter would ask us graduate students to complete innumerable items as he worked to establish reliability and validity for the scale. We, of course, were curious and wanted to find out what he was trying to assess. We speculated that the scale had something to do with control, although we were by no means certain about what it was measuring.

Rotter's IE scale was for adults and was at about a 10th-grade reading level. Some of the students who had worked with him believed there was a need for a children's version. Crandall, Katkovsky, and Crandall (1965) developed a more specific scale for children, the Intellectual Achievement Responsibility Questionnaire (IAR). Not convinced that IE operates uniformly over a wide range of motivational areas, they chose to measure locus of control solely in intellectual achievement situations.

Later, at Emory University, a number of us became involved with research on IE expectancies, and I was working with a colleague, Steve Nowicki. He came to my office one day and said we needed a more generalized locus of control scale for children, something to assess expectancies across various domains beyond intellectual achievement. We began to develop such a scale. Starting with a pool of more than 100 items, the scale was reduced to 40 yes–no items that describe reinforcement in a variety of areas such as affiliation, achievement, and dependency. Items were also subjected to item analyses and reliability and validity analyses, and they were also retained based on comments from teachers and children. The Nowicki-Strickland Locus of Control scale for Children was published in 1973 (Nowicki & Strickland, 1973), became a Citation Classic, and is still used extensively around the world. Nowicki and Duke describe the Children's Scale and some of the significant research conducted with it in Chapter 7 of this volume.

At Emory, we noticed that the 10th-grade reading level was too difficult for some adult populations. So, Nowicki and Duke (1974) developed an adult version of the Nowicki-Strickland Scale. Additionally, a preschool and primary children's IE scale was developed by Wilson, Duke, and Nowicki (1972).

Those of us who worked with Rotter at Ohio State were involved early in research with the completed scale. My dissertation was an experiment on the relationship of awareness to verbal conditioning and extinction among 187 female college students who had completed the IE Scale (Strickland, 1970). Verbal conditioning to verbs (which were embedded with nouns and adjectives) did occur, as did extinction, primarily among those who were aware of the desired response. Those in an aware influenced group ($n = 15$) who denied being influenced were significantly more internal ($p < .01$) than those who did not deny being influenced. Eight of these deniers did respond to the stimulus verbs and were conditioners. Seven did not. As might be expected, there was a trend for the nonconditioners to be more internal than the conditioners ($p < .07$). Another interesting result with this awareness group was that, during the extinction trials, the more internal subjects, perhaps in an

act of defiance or to assert their control, began to respond to the verbs once again.

As an aside, I might note that in all of my earlier research, I analyzed data using the old Wang and Monroe calculators. For my dissertation data, I had access to the first computer at Ohio State available to faculty and students. I dutifully punched in two sets of IBM cards and took them to the computer, which covered the entire floor of a building. For the first time, my colleagues and I were introduced to this amazing technological advance.

Along with research in the laboratory, considerable work with the IE Scale was being conducted in the field. Seeman and Evans (1962) found internal residents of a tubercular hospital to know more about their disease, be better informed about tuberculosis, and be regarded by staff as better patients than more external patients. Building on this research, another graduate student in my class, also working with Rotter, Pearl Mayo Gore, thought that internal patients' efforts to learn about their illness might be relevant to other social change desires. She hypothesized that social action-taking behavior could be likewise predicted from the IE dimension in the domain of civil rights activities. Participants in her study were students at a southern black college that had figured predominantly in social protest movements during the late 1950s and early 1960s. She administered the Rotter IE Scale and the Marlowe-Crowne Social Desirability Scale to 62 males and 54 females. Four weeks later, a student confederate had them complete a questionnaire determining the degree to which they would commit themselves to social action. Items ranged from attending a rally for civil rights through signing a petition, marching, or joining a Freedom Riders group. There was a trend for those participants high in social desirability to be less likely their internal counterparts to commit themselves to social action, but this did not reach significance. As expected, however, internal individuals were significantly more likely to respond that they would take more personal and decisive social action than external students. Gore and Rotter sent the article to a very prestigious journal. The editor rejected it, however, saying that it was only a paper-and-pencil correlation with

no behavioral indices. It was then accepted by another journal (Gore & Rotter, 1963).

In 1962, I had the good fortune of accepting a position at Emory University in Atlanta, the center of the civil rights movement. This gave me the opportunity to replicate Gore and Rotter and add a behavioral component to their study. Atlanta was home to several civil rights organizations, with one of the best known being the Student Nonviolent Coordinating Committee (SNCC). Formed in 1960, SNCC, with leaders such as Julian Bond, Stokely Carmichael, John Lewis, Andy Young, and others, played a major role in voter registration, sit-ins, freedom rides, and the March on Washington. In 1963, I collected data from two independent samples of civil rights activists. It should be noted that this was before the general onset of protest demonstrations that would eventually gain strong support within black communities. The activists were early pioneers, placing themselves every day in situations of danger and harassment to themselves and their families, and were clearly and dramatically committed to direct action. The first sample consisted of 33 members of SNCC and 20 others suggested by leaders as being active in the movement. The second sample consisted of 27 SNCC members who were attending a civil rights rally in Atlanta. These individuals, all black, were individually asked to participate in a research study in conjunction with a large-scale project. Nineteen females and 34 males agreed to participate and were individually administered the Rotter IE Scale, the Marlowe-Crowne Social Desirability Scale, and a questionnaire assessing their degree of involvement in civil rights activities. Three white experimenters, one female and two males, collected the inventories. Every one of the active participants stated on the civil rights questionnaire that he or she had participated in some phase of the civil rights protests such as voter registration, sit-ins, and demonstrations. The mean number of arrests in conjunction with their actions was 5 with a range from 0 to 62.

One hundred five (33 females and 72 males) students enrolled in three different required classes in three negro colleges served as a control group. The three experimenters who had tested the active participants administered the same inventories (the IE and Social Desirability scales and the

civil rights involvement questionnaire). Professors within the institutions, active in civil rights movements, assured the examiners that the classes tested would include few, if any, students active in protest movements. Responses were analyzed for gender differences, and none was found; nor were there any differences between the two separate active samples. Data were subsequently analyzed without regard to gender, and the scores of the two active samples were merged. Individuals in the active samples were older and had completed more grades in school than the control group, but no differences were found between IE scores and age and education. And no significant results were found for the Marlowe-Crowne Social Desirability Scale between the active and nonactive groups. The Rotter IE scale did, however, predict involvement in social action. Active participants were significantly more internal (7.49) than the control group (9.64) ($p < .01$). I wrote up the study, with its behavioral component, and sent it to the same prestigious journal to which Gore and Rotter had first submitted their study. I was rejected by the same editor who wrote that Gore and Rotter had already completed the study. I then submitted the study to the *Journal of Social Psychology*, where it was accepted and eventually named a Citation Classic.

Predictions from the IE scale appeared to reflect more complex relationships as some black activists moved from a nonviolent approach to espousing more dramatic confrontations. Sank and Strickland (1973) found in the later days of the civil rights protests that individuals who urged a militant, as opposed to a more moderate revolutionary stance, were significantly more external than internal. Ransford (1968), within the context of the Watts riots, found that, among 312 black males who were heads of households, those scoring toward the external end of the Rotter scale viewed violence as necessary for racial justice, Of the 16 men who admitted participating in violent action, 15 were external, possibly due to feelings of powerlessness. With the rise of the women's movement, several studies investigated IE beliefs among women involved in social activism. Pawlicki and Almquist (1973) found members of a women's liberation group to be significantly more internal than college female nonmembers. When education and family income were controlled, internality was still

related to group membership although only marginally when age was controlled. Rosen and Salling (1971) reported that internality was positively related to reported political activity.

In view of shifting cultural and social norms, to what degree is the dimension of internal versus external locus of control stable across time, if at all? Rotter (1975), who had assessed college students with his scale over a span of some 15 years, found that in the late 1950s, mean scores were around 8 (standard deviation [s.d.] 4). By the early 1970s, mean scores were significantly more external, around 12 (s.d. 4). Twenge, Zhang, and Im (2004) conducted two large meta-analyses of IE scores covering the time from 1960 to 2002. One analysis was with 97 college student samples and the other with 41 children's (age 9–14) samples. Both samples showed mean scores to become substantially more external across time. Average college student scores on the Rotter IE Scale in 2002 were more external than were 80% of college student scores in 1960. These were, of course, decades of rapid social change, particularly in regard to civil rights and the war in Vietnam. It is not surprising that generational mean scores would shift.

In terms of individual changes across the life span, children appear to become more internal as they age (Gruen, Korte, & Baum, 1974; Nowicki & Strickland, 1973; Penk, 1969). Older adults appear to be more internal than younger adults assessed at the same time (Duke, Shaheen, & Nowicki, 1974; Wolk & Kurtz, 1975). And individual scores may also change as a result of changes or life crises (Eisenman, 1972; Smith, 1970).

It would be expected that IE expectancies might be related to political beliefs or affiliation. In early research, Rotter (1966) found no differences in IE scores among college students who identified themselves as Democrat, Republican, or Independent. Internals, particularly males, appeared to more strongly endorse the Protestant ethic than did externals (MacDonald, 1972; Mirels and Garett (1971). Fink and Hjelle (1973) looked at several ideology belief scales and found internals to score higher on "traditional American" and lower on a "New Left" scale that emphasized control of individual behaviors via institutions and impersonal bureaucracies.

One would also expect that IE scores might be related to religious beliefs. As predicted, Shaffer and I (Strickland & Shaffer, 1971) found internal members of several Presbyterian churches in Atlanta to believe more in "extrinsic" forms of religion (utilitarian and self-protecting), whereas externals adapted more "intrinsic" beliefs (faith is the supreme values in its own right). In a rather quirky study, Sosis, Strickland, and Haley (1980) looked at scores on the Rotter and Levenson IE scales in relation to beliefs about supernatural phenomena, namely, astrology. Females were more likely to believe in astrology, and "Believers" were more external.

In those early days, we were eager to expand research on the IE dimension to consider belief systems in different populations. Seeman and Evans (1962), for example, collected data on hospitalized tubercular patients and prison inmates (Seeman, 1963). Numerous studies had been conducted with children (e.g., Crandall et al., 1965). Living in the south, I wanted to study the dimension of internal versus external expectancies in black populations.

Using his adapted IE Children's Scale, Bialer (1961) found a correlation of .47 between internal beliefs and delay of gratification in a sample of 89 white 6- to 14-year-olds, both normal and mentally challenged. We administered the Bialer Scale to 145 black and white ninth graders, aged 14–17, from three urban public high schools that served inner-city districts classified as poverty areas. A week later, two white experimenters, one of whom, dressed in business clothes, introduced himself as Dr. Watson, an official of the Atlanta Public Schools. The other, dressed more casually, was introduced as a college student. They asked students to complete a delay of gratification questionnaire task under the two status conditions. No gender differences were found, but black students were significantly more likely to be external and less likely to delay gratification than their white counterparts (Strickland, 1971). No relationship was found between IE scores or the status conditions and delay behavior (Zytkoskee, Strickland, & Watson, 1971). When we submitted this study for publication, an anonymous reviewer mentioned that results might have been different if we had controlled for the race of the experimenter. Of course, using only white experimenters surely biased the results.

I then designed a similar study to consider the effect of the race of the experimenter on delay behavior among children. Two black and two white experimenters administered our newly developed Nowicki-Strickland Children's Scale to 300 sixth-grade students, aged 11–13, who were drawn from two segregated schools, one predominantly white and the other predominantly black. A white experimenter then engaged 36 male and 48 female students in classes in the black school and 26 male and 24 female students in the white school in a delay of gratification task. A black experimenter conducted the same delay task with 53 males and 34 females in the black school and 43 males and 36 females in the white school. Students were told that the experimenter wanted to give each student a reward, a 45 rpm record, because of their help in the research. Unfortunately, he said he had run out of records. He could give each student one record at that time or return three weeks later with three records for each student who opted to wait. No gender differences were found, nor were there different delay responses for the white students in regard to either the black or white experimenter. Black students, however, were significantly more likely to choose the delayed reward under the instructions of the black experimenter as opposed to the white experimenter. Internal white children were significantly more likely to choose a delayed reward than their external counterparts. IE scores did not, however, predict delay responses among black children (Strickland, 1972) .

This early research was crude and could have been downright dangerous. If we had not replicated our first delay study with a black experimenter, we may have inadvertently labeled the black children as deficient in delaying gratification, which we know is related to a number of adaptive behaviors (e.g., academic achievement). We also found black children to be more external than white children. Since internal expectancies are related to more positive attributes, this finding could have been detrimental to the black children and, indeed, may occur for a number of reasons that we didn't take into account. There may well be certain situations in which black children are more internal. These results could have been explained by any number of variables—evidence once again for replication, methodological precision, and continued research.

Once the Rotter IE scale was published (Rotter, 1966), researchers had a new tool to investigate an expectancy about internal versus external locus of control and its effect on a wide range of human behavior. The research was very prolific. At one point, Rotter remarked that it was as if he had dropped a match and, all of a sudden, looking behind him found a forest fire raging. Between 1966 and 1977, Rotter's 1966 monograph was the most cited article in the published social science literature, being cited more than twice as often as any other article (Garfield, 1978). Presently, the Rotter IE scale is reported to have been cited more than 40,000 times.

Still and all, the scale has had its limitations and problems. One of the most pervasive problems with research with the IE dimension has to do with the differing definitions that have been attached to this construct and the fact that IE expectancies are often, even usually, explored outside the theoretical net in which the scale was conceived and developed. Rotter (1966, 1975) has always noted that IE is only one of a number of variables that would be expected to predict behavior in specific and novel situations. An equal concern with the nature of the situational demands and reinforcement value should improve prediction.

Factor analyses of the Rotter IE scale were not always consistent, sometimes suggesting a unidimensional construct and at other times being more multidimensional (Rotter, 1975). Another major methodological problem has to do with response bias that haunts any self-report measure. It is difficult to know the degree to which IE responses reflect veridical descriptions of locus of control beliefs or are colored by the respondent's attempt to present him- or herself in a favorable light. Especially since control items may be seen as more favorable, respondents may be biased toward internal responses.

In the early development of the IE scale, Rotter (1966) attempted to lessen social desirability bias by using a forced-choice format and eliminating items with high social desirability. Nonetheless, examination of studies correlating IE and the Marlowe-Crowne Social Desirability Scale reveal an average correlation of –.23. Other studies have also found moderately high correlations between IE scores and social desirability measures (Cone, 1971; Hjelle, 1971; Vuchinich & Bass, 1974). Mediating variables

such as socioeconomic status and culture impact IE scores (Hsieh, Shybut, & Lotsof, 1969; McGinnis, Nordholm, Ward, & Bhanthumnavin, 1974; Parsons, Schneider, & Hansen, 1970; Reitz & Groff, 1972; see also the reviews of Joe, 1971; Lefcourt, 1972). Participant gender may also be a factor. In an item analysis of IE responses of 200 males and 200 females, Strickland and Haley (1980) found no significant differences in overall scores, but male and female participants responded differentially to more than a third of the items, 8 out of 23.

Nowicki and Duke (1973) had college students complete the IE scale as if they were "super male" or "super female." When asked to assume a highly masculinized role, the mean IE scores for both sexes was 1.78. In the highly feminine role, the mean was 22.65. Hochreich (1975) replicated this study with essentially the same results. The fact that people can dissimulate and bias assessment instruments in the direction they wish is not surprising but does, of course, raise time-worn questions concerning the accuracy and meaning of scores on personality instruments that purport to measure individual differences.

Whatever its limitations, research with the IE scale continued on many fronts (Strickland, 1989), and other generalized expectancy scales were developed (e.g., The Generalized Expectancy of Success Scale; Hale, Fiedler, & Cochran, 1992). In an early review of IE research, Strickland (1977) notes some of the characteristics that distinguish those with an internal locus of control of reinforcement orientation versus those who are more external.

Achievement and Competence Behaviors. An internal orientation appears to be directly related to achievement behavior. Not only do internals work harder at intellectual and performance tasks, but their efforts also appear to be rewarded by better grades and improved rewards. These findings have particular salience for education.

Conformity and Resistance to Social Change. Internals are more likely to maintain their own individual judgment in the face of contrasting evidence from external sources that call their perceptions and/or behaviors into question. Externals, on the other hand, succumb to pressure from others, particularly when the outside source is seen as prestigious or an

"expert." Moreover, internals not only appear to resist influence but react more strongly than externals to the loss of personal freedom. Internals do this in some cases by engaging in behaviors that are oppositional to those who attempt to manipulate or change their behavior. Internals appear to want to "keep the reins in their own hands," behaving in ways that facilitate independence and negate influence.

Defensive Externality. Whereas much of the IE research has focused on the positive attributes of internals, who are seen as achieving and engaging in active mastery behaviors, less attention has been paid to a description of individuals who are assessed as external. It does appear that there may be two possible interpretations of a high externality score. In some cases, an external belief may represent an accurate portrayal of a person's reality. Some cultures espouse external, fatalistic attitudes, and an individual assimilated into such a culture would be assumed to hold these beliefs. External expectancies on the part of persons who are members of such societies or groups may indeed have little influence over the economic and social forces surrounding them and may quite realistically assume that their behavior results from outside influences.

A second possibility is that externals may use their beliefs to shield or protect themselves from anxiety and/or distress that occurs as a function of personal inadequacies. The espousal of an external locus of control orientation may be a defensive maneuver that functions to reduce stress and the acceptance of responsibility for one's own behavior. Considerable research suggests that externals appear to be more willing to admit threatening stimuli to awareness and have less need to deny unfavorable personal information since they may have already decided that events beyond their control are responsible for their failures or shortcomings.

Health-Related Behaviors. IE beliefs appear to be related to a number of aspects of emotional and physical well-being (Strickland, 1978, 1979). This is discussed more fully in another chapter in this volume.

Information Seeking and Past Performance. Internals, as opposed to externals, appear to depend on their own abilities and interpretation of task demands. They take time to deliberate about task performance, they value

success, and they focus on the relevant stimulus cues of a task without leaning on others.

Interpersonal Behaviors. Overall, internals and externals appear to have differing styles of interpersonal interaction. Internals seem less threatened by persons who are different from them and report themselves to be more tolerant of others. Generally, internals appear to be better liked than externals. In dyadic interchange, internals are more persuasive, with a preference for personal and positive influence, in contrast to externals who rely more on coercive power.

Social Action. Generally, internals endorse a traditional "Horatio Alger" orientation emphasizing individual responsibility, whereas externals may be more concerned with the control exerted on individuals by institutional pressures. Generally, the research suggests that internals do attempt to take responsibility for their lives and to change uncomfortable and aversive situations. But prediction by the IE scale is complicated not only by the different meanings people hold about sources of oppression but also by the diverse goals that people may hold in their attempts at change (Strickland, 1965). In summary, people who hold internal versus external expectancies about locus of control of reinforcement appear to engage in more adaptive behaviors and effective functioning than those who are more externally oriented. They seek out information and act on their expectations in that they have a perception of the locus of reinforcement and whether they can influence outcome. This stance has become a major underpinning or concomitant of concepts such as "perceived control," "mastery," "self-efficacy," "self-esteem," and "resilience."

PSYCHOLOGY AND IE BELIEFS: PRESENT AND FUTURE

Contemporary psychology is in the midst of a cognitive revolution that touches every aspect of the discipline and profession. Psychological scientific investigations build on theories that can include the consideration of cognitions, beliefs, perceptions, and more. Applied psychology as well has embraced new approaches to organizational and human development

as well as clinical techniques. Professional endeavors such as the prevention, identification, and treatment of health and emotional problems embrace cognitive approaches that are newly developed and empirically supported. Cognitive psychology has influenced every domain of psychological inquiry in regard to understanding the internal processes of the mind—attention, conceptual development, creativity, decision-making, language, learning, memory, perception, responses to psychotherapy, problem-solving, reasoning, self-regulation, and so on. Moreover, technical advances have enabled us to, through various imaging techniques, see the brain at work. Both the scientific and the professional arenas of psychology are changing dramatically with new findings every day.

Cognitive psychology underlies every aspect of our lives. An understanding of mental processes (thoughts, cognitions) and their influence can have an unprecedented impact on contemporary social problems and public policy. Educational efforts can be directed toward a child's development of adaptive ways of thinking in order to enhance academic achievement and success. Using attitude change to overcome prejudice may reduce discrimination and harmful actions toward the "Other." Beliefs about major social issues, such as views about climate change, poverty, technology, violence, war, and so on, may be tempered for the greater good. With our citizens living longer and subject to the frailties of age, cognitive processes may have a profound effect on a person's reaction to the effects of aging. A sense of personal responsibility and control appears to enhance a person's health and well-being (Gawande, 2015).

Rotter's social learning theory was an early impetus in these developments. Eschewing theories based solely on behavioral responses to external stimuli, Rotter made belief systems and expectancies a major component in attempting to understand and explain human behavior. His theory provided a foundation on which to develop new psychological research models that included both beliefs and behaviors. The internal versus external locus of control expectancy concept found substantial empirical support as an explanatory variable in predicting behavior and has been a major influence in social and personality research. Applications of Rotter's social learning theory and the IE dimension have

been particularly influential in regard to attribution theory, choice and perceived control, cognitive-behavior theory and therapy, physical and behavioral health behaviors, and social cognition. Following the early research, many more generalized expectancy scales were developed, efforts were directed toward assessing reinforcement value for the individual, and more theoretical and methodological advances were made. Building on the early theory and research, contemporary work continues to validate the internal versus external locus of control expectancy as a powerful predictor of beliefs and behavior.

No doubt this influence will extend into future understandings of human behavior. We will find new ways in which individual beliefs and expectancies can be better delineated. The present will evolve into a future in which complex behaviors, including thoughts and expectancies and their impact on behavioral outcomes, will be far advanced from where we are now and lead to further extraordinary understandings of beliefs and behavior.

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3

And the Wisdom to Know the Difference

Locus of Control and Desire for Control

JERRY M. BURGER ■

A decade after the publication of Rotter's (1966) influential monograph, psychology was awash in research on personal control. In addition to the abundance of studies on locus of control ushered in by Rotter, investigators in the 1970s were busy examining the role of perceived control in such diverse areas as how to treat the elderly (Langer & Rodin, 1976), the causes of stress (Miller, 1979), reactions to crowding (Schmidt & Keating, 1979), and psychological influences on health (Glass, 1977). Several investigations identified conditions that facilitated an illusion of control (Langer, 1975), whereas numerous others demonstrated the detrimental effects of losing control (Seligman, 1975).

This was the *zeitgeist* I encountered when I entered graduate school, and, like many others at the time, I was quickly swept up in the discipline's fascination with personal control. However, as I pored over this literature, it occurred to me that an important piece of the puzzle was

missing. Most researchers assumed that it was "a truism that we strive to control our world" (Seligman, 1976, p. 1), yet personal observation suggested that not everyone was equally motivated to exercise control over situations and outcomes. Research on locus of control clearly demonstrated the importance of individual differences in *perceived* control, but what about differences in *motivation* for control? Long story short, I set to work and, while still a graduate student, published the Desirability of Control (DC) Scale, a 20-item personality inventory designed to measure individual differences in the motivation to feel in control of the events in one's life (Burger & Cooper, 1979).

In the many years since its publication, the DC Scale has been translated into numerous languages and used in hundreds of published studies that convincingly demonstrate the usefulness of the construct. This chapter will focus on one question that threads its way through that literature. Specifically: what is the relationship between desire for control and locus of control, or more generally, between how much control a person wants and how much control that person believes he or she has? Relevant studies for answering this question can been divided into three general areas: the correlation between scales, the illusion of control, and what has been called the "mismatch hypothesis."

CORRELATIONS BETWEEN SCALES

The most obvious way to examine the relationship between desire for control and locus of control is to look at the correlation between measures of the two constructs. From the outset, I argued that there likely exists a small to moderate correlation between these two traits, such that people with a high desire for control would also have a tendency to be more internal than external. My speculation was based on the notion that people with a strong need to be in control are likely to interpret situations in a way that satisfies that need. A person who generally wants control will seek out information that reinforces a perception of personal control and ignore or downplay cues that suggest otherwise. Of course, the

causal arrow might also point in the opposite direction. People who typically believe they can exercise control may come to value and thus desire that control. I reasoned that both of these effects likely operate to some degree, resulting in a noteworthy but moderate correlation between the two concepts.

In one of my first efforts to validate the DC Scale, I gave the scale and the Rotter Internal/External (IE) Scale to a large number of undergraduates and found a modest correlation of $r = -.19$ between the two measures. Although in the expected direction, the correlation was considerably smaller than I had anticipated. Nonetheless, the figure is in line with correlation coefficients reported by other investigators who have looked at the relationship between these two scales: $r = -.11$ (Dembroski, MacDougall, & Musante, 1984), $r = .08$ (Gebhardt & Brosschot, 2002), and $r = -.29$ (Zimmerman & Rappaport, 1988). In short, the DC Scale and Rotter's IE Scale seem to be only slightly correlated.

A somewhat different picture emerges when we look at correlations between the DC Scale and other locus of control measures. Levenson's (1981) locus of control scales assess the extent to which test takers believe what happens to them is the result of their own actions (Internal Scale), the acts of other individuals (Powerful Others Scale), or simply luck (Chance Scale). Scoring high on the Internal Scale is indicative of an internal locus of control, whereas high scores on the other two scales indicate an external locus of control. The results of several studies that report correlation coefficients among these three scales and the DC Scale are shown in Table 3.1. A fairly consistent pattern demonstrates that desire for control is indeed moderately correlated with a belief that outcomes are under one's own control. To a lesser degree, DC Scale scores are negatively correlated with beliefs that powerful others or chance are responsible for outcomes.

Correlations between DC Scale scores and scores from other locus of control measures paint a similar picture. One team of researchers found positive correlations between desire for control and the Personal Control ($r = .39$) and Interpersonal Control ($r = .21$) scales of Paulhus's (1983) Spheres of Control Scales (Burns, Dittmann, Nguyen,

Table 3.1. Correlations Between DC Scale Scores and Scores on the Levenson Scales

	Internal	Powerful Others	Chance
Burger (1984)	.46	–.36	–.36
Zimmerman & Rappaport (1988)	.32	–.27	–.21
Gebhardt & Brosschot (2002)	.41	–.18	–.16
Ghorbani et al. (2008)	.48	–.07	–.15
Fluke et al. (2014)	–.20	–.20	–.11

& Mitchelson, 2000). Another pair of studies found positive correlations (r = .37; r = .47) between modified versions of the DC Scale and the Spheres of Control Scales (Amoura, Berjot, Gillet, & Altinas, 2014). In short, there is ample support for my initial speculation that a high desire for control is moderately related to an internal locus of control. Importantly, the correlations between the measures also are low enough to conclude that the scales measure different concepts. Desire for control and locus of control are important but separate pieces in the personal control mosaic.

However, one team of investigators has added an intriguing twist to this conclusion. Zuckerman, Knee, Kieffer, and Gagne (2004) divided locus of control into realistic and unrealistic beliefs. They assessed perceived control over events that may be controllable (e.g., "I can initiate and maintain friendships") and perceived control over events that are not likely to be controllable (e.g., "Any person who tries can become a world class scholar"). Interestingly, the investigators found DC Scale scores were moderately predictive of realistic control beliefs (r = .47), but only weakly related to unrealistic control beliefs (r = .18). In other words, in their efforts to satisfy their need for control, high-DC individuals typically do not ignore evidence that some events are outside their control. This observation is relevant to the topic covered in the next section—the high desire for control person's susceptibility to an illusion of control.

DESIRE FOR CONTROL AND THE ILLUSION OF CONTROL

Back in the salad days of personal control research, Langer (1975) identified some conditions that lead people to believe they have more control over events than reality would dictate, a phenomenon she dubbed the "illusion of control." Participants were more likely to succumb to an illusion of control, for example, when given a choice of options, when dealing with familiar instead of unfamiliar objects, or when a game of chance was structured to resemble a task with skill-determined outcomes. If high-DC individuals are motivated to see themselves in control, we might expect that people high in desire for control would be especially susceptible to the illusion of control.

Several studies support this prediction. Undergraduates in one experiment attempted to guess the outcome on each of 30 coin tosses (Burger, 1986). Although all participants were led to believe they "won" 15 out of 30 times, the wins for some participants were concentrated during the early part of the sequence, a time when they supposedly were asking themselves whether the outcome of this game was something they could control (Langer & Roth, 1975). Other participants lost on most of these early trials. Participants then estimated how many tosses they would guess correctly if they were to continue for 100 more trials. Of course, the most reasonable answer is 50, with estimates higher than 50 indicative of an illusion of control. Low-DC participants who had won on most of the early trials showed no evidence of an illusion of control (mean estimate = 50.45). However, high-DC participants in this condition believed they could guess the outcome of the upcoming trials at a rate considerably better than chance (mean = 59.87). This illusion of control was not found in the high-DC participants who believed they had guessed incorrectly on most of the early coin tosses.

Participants in another study played a series of card games in which they bet on whether they could guess which of four cards matched the winning card shown by the experimenter (Burger, 1986). Some participants played with the four aces from a regular deck of playing cards; that

is, with familiar cards. Other participants played with a deck created by the experimenter with cards containing unusual symbols. As expected, high-DC participants exhibited an illusion of control by betting more in the familiar-card condition than when playing with unfamiliar cards. Once again, low-DC participants showed no evidence of an illusion of control.

An exaggerated perception of personal control can also be seen in research on unrealistic optimism. Investigators find that most people believe they are less likely than the average person to experience unfortunate events (e.g., car accident, cancer, divorce) in the future (Sheppard, Klein, Waters, & Weinstein, 2013). Because each of these events is at least partly under our control, one explanation for the unrealistic optimism effect is that most of us believe that, more than most people, we can take actions to prevent bad outcomes from happening. If high-DC individuals are especially prone to the illusion of control, we can speculate that they are more likely than lows to embrace the notion that they can do something to avoid unfortunate events. Consistent with this expectation, researchers find that high-DC people are more susceptible to unrealistic optimism than are individuals low in desire for control (Burger, 1992*a*; Drake, 1987). Similarly, we find that high-DC people tend to make attributions in achievement settings that satisfy their need to feel in control (Burger, 1985, 1987). High-DC individuals are more likely than lows to attribute their successes to their own ability and effort and to see their failures as the result of unstable but controllable causes (e.g., "I didn't have enough time to study").

The relationship between desire for control and the illusion of control also can be seen in the extent to which people see causal relationships between events. As a rule, high-DC individuals are more likely than lows to seek out and attend to causally relevant information (Burger & Hemans, 1988). Researchers also find people are especially likely to see causal relationships when they need to restore a sense of control. A world filled with controllable outcomes is more comforting than a chaotic and largely uncontrollable world. This observation led one team of investigators to speculate that high-DC people are more likely than lows to see

causal relationships when under stress, which is a situation that threatens their sense of control (Keinan & Sivan, 2001). Undergraduates took a sentence completion test shortly before an important examination (high stress) and again on a day when there was no examination (low stress). The researchers calculated how often participants completed sentences with a causal statement (e.g., "She stood by the window . . . *because she wanted to see who was coming*"). In both high- and low-stress situations, high-DC participants made more causal attributions than did low-DC participants. More important, the tendency for high-DC participants to use more causal statements than lows increased when participants were under stress.

In short, researchers consistently find that high-DC people are especially susceptible to perceiving more control over events than reality would dictate (i.e., the illusion of control). But this conclusion raises another question. Is this proneness to the illusion of control a benefit or a liability for high-DC people? In most cases, a moderate amount of the illusion probably is an asset, what Taylor (1989) described as a "positive illusion." Within limits, believing one can control outcomes has advantages. For example, in one study, high-DC women diagnosed with breast cancer were more likely than lows to believe that they had some control over curing the disease (Henselmans et al., 2010). The women who held these beliefs were better able to adjust to the diagnosis and to adapt to setbacks. Similarly, attributing successes and failures in a way that maintains a sense of control is often an asset in achievement situations (Burger, 1985). Studies find that high-DC students typically perform better academically than low-DC students (Burger, 1992*b*).

But there is another side to this coin. We can also identify situations in which an overzealous belief in control creates problems. One team of investigators tested participants in a driving simulation (Hammond & Horswill, 2002). They found that high-DC participants drove faster and were more likely to squeeze into small traffic gaps than were low-DC participants. The researchers attributed this behavior to an illusion of control. That is, high-DC drivers overestimate their ability to avoid accidents and consequently take unnecessary risks. Other researchers argue that

the illusion of control may make high-DC people more likely to engage in corporate crime (Piquero, Exum, & Simpson, 2005; Piquero, Schoepfer, & Langton, 2010; Schoepfer, Piquero, & Langton, 2014). Like the speeding drivers, business managers may overestimate their ability to avoid risks when engaging in ethically and legally questionable behavior. MBA students in one study were presented with scenarios in which managers engaged in criminal business practices like price-fixing and bribery (Piquero et al., 2005). The higher the participants' DC score, the more participants believed they would have acted like the managers in the scenarios.

It thus seems that the tendency for high-DC individuals to experience an illusion of control has advantages and disadvantages. This dichotomy can be seen in two other areas of research; specifically, how desire for control affects gambling and how desire for control relates to superstitious behavior.

Gambling

Langer (1975) demonstrated the illusion of control by placing people in situations where outcomes were clearly chance-determined (e.g., coin tosses and lotteries). Nonetheless, under certain conditions, participants exhibited a confidence that they were capable of winning at a rate that was better than chance. It is not difficult to make the leap from these laboratory tasks to gambling situations. If high-DC people are more susceptible than lows to the illusion of control, are they also more likely to be drawn to gambling? More important, could this exaggerated belief in personal control lead to gambling problems?

My initial efforts to examine the connection between desire for control and gambling were conducted in the laboratory. Undergraduates in one study were given poker chips they could use for betting in a dice game (Burger & Cooper, 1979). The chips were referred to as dollars, and participants were instructed to play with the chips as if they were real dollars. Some participants were told the winning number for the trial before they placed their bet and before they threw a pair of dice to see if they won.

This was the illusion of control condition; that is, knowing the number they were trying to throw resembled a game in which the outcome was determined by skill. Other participants placed their bets and tossed the dice (kept hidden under a dice cup) before knowing the winning number. The total number of chips bet over the course of 18 trials was the dependent variable. As expected, knowing the winning number beforehand led to more betting, but this was the case only for high-DC participants.

This effect was replicated in a follow-up investigation in which participants tried to guess the suit of a face-down playing card (Burger & Schnerring, 1982). Some participants shuffled the cards themselves, heard before betting what the winning suit was on that trial, and then selected the card they thought matched that suit. Other participants watched the experimenter shuffle and then select one card. These participants placed their bet before learning the winning suit. Once again, compared to the control condition, high-DC participants bet more in the condition designed to create an illusion of control. Low-DC participants did not show this effect. Interestingly, the increased betting by high-DC participants emerged only when participants could trade their chips for real prizes at the end of the game. When participants were told nothing about the value of the chips (not even to pretend that they were dollars), no effect was found.

These laboratory studies suggest that high-DC individuals may be susceptible to the illusion of control in some gambling settings and that this illusion may lead to an increase in betting. But what about real gambling in which participants can potentially lose serious amounts of money? We asked Gamblers Anonymous (GA) members to describe some of their previous gambling behaviors (Burger & Smith, 1985). As expected, high-DC participants had been largely attracted to gambling situations with an element of personal control—poker and card games, horse races, sports events. These events are more likely to create an illusion of control than events with clearly chance-determined outcomes, like casino games and lotteries. We also found that the amount of money the GA members reported losing in their worst year of gambling was positively correlated with their DC Scale scores ($r = .38$, and $r = .40$ when adjusted for income).

However, these correlations should be interpreted with caution because of the small sample size ($N = 18$).

In another study, California lottery players were interviewed when exiting convenience stores on the night of a lottery drawing (Burger, 1991). The lottery game at that time offered players the choice of selecting the numbers themselves (the illusion of control option) or allowing a machine to randomly select six numbers. The lottery players who had chosen the numbers themselves scored significantly higher on the DC Scale than those who accepted the randomly selected numbers. Another group of researchers asked adults in Florida how much money they had spent during the previous month playing the state-sponsored lottery (Sprott, Brumbaugh, & Miyazaki, 2001). Participants with a high desire for control spent more money on the lottery than lows; however, this was the case only for high-DC participants who also had an internal locus of control.

In sum, several laboratory and real-world studies find a link between a high desire for control and a susceptibility to approach gambling situations with an illusion of control. However, there also are a couple of glaring exceptions to this pattern. For example, the study with California lottery players found a significant *negative* correlation ($r = -.23$) between desire for control and the amount of money players reported that they typically spent on the lottery (Burger, 1991). Moreover, when compared to a matched control group, the GA members had a significantly lower mean DC score than the non-gambling matched control group (Burger & Smith, 1985). Thus, it seems that sometimes a high desire for control is associated with more gambling, but other times a low desire for control predicts higher rates of gambling.

How can we reconcile these inconsistent findings? One explanation is suggested by the coin toss study described earlier (Burger, 1986). Recall that high-DC participants who had won on most of the early coin tosses demonstrated an illusion of control by estimating that they would be able to guess nearly 60 of the next 100 coin tosses correctly, whereas the low-DC participants gave estimates close to 50. Low-DC participants also showed no evidence of an illusion of control when they had lost most of the early coin tosses (mean estimate = 47.46). However, the high-DC

participants in this condition not only failed to show an illusion of control, they expressed what one might call an "illusion of negative control," guessing they would win only 42.36 times out of 100. These participants apparently concluded during the first few trials not only that the outcome was something they could not control, but that they could not even win at a chance level.

If we apply this finding to gambling situations, we can speculate that some gambling settings provide cues that suggest outcomes may be controllable, whereas the cues in other gambling settings send the opposite message. Because high-DC individuals are especially interested in who or what controls outcomes, they readily attend to and respond to these cues. As a result, they may gamble more than low-DC people in some situations and may gamble less in others. Needless to say, at this point, this interpretation is sorely in need of some empirical validation.

Superstitious Behavior

Superstitious behavior is far more prevalent than most scientists would like to believe (Vyse, 1997). People wear lucky shirts, avoid unlucky numbers, carry lucky charms, and engage in a wide variety of pre-game rituals in part because these acts provide an illusory sense of control (Rudski, 2004). Superstitious behaviors are most commonly associated with outcomes that are largely determined by uncontrollable or unknowable causes. Performing a superstitious act can be seen as an effort to gain some or some additional amount of control over those outcomes. Consistent with this analysis, the more an outcome is seen as under the influence of uncontrollable forces, the more likely people are to turn to superstition (Burger & Lynn, 2005). In other words, superstitious behavior is often an example of the illusion of control.

This illusion is especially likely when the superstition comes from personal experiences, such as when someone perceives a causal connection after wearing a green shirt and winning at bingo. Because people with a high desire for control are especially susceptible to the illusion of control, we might expect that high-DC people are more likely than lows to engage in superstitious acts. This hypothesis was examined in

a study in which right-handed participants played 20 games of "Rock, Paper, Scissors" against a computer (Hamerman & Johar, 2013). For half the games, participants were instructed to use their right hand, for the other half, their left hand. In addition, some participants were led to believe they had won significantly more often when using their left hand, whereas others saw no advantage to using one hand over the other. Participants were then given a choice of which hand to use for five final games. Seventy-eight percent of the participants in the experimental condition opted for their left hand, compared to only 25% in the control condition. That is, most of these participants experienced an illusion of control that led them to engage in the superstitious behavior. However, the likelihood that participants would act superstitiously was significantly influenced by their desire for control level. The higher the desire for control, the stronger the effect. In fact, the researchers found no evidence of superstitious behavior among participants with the lowest DC scores.

In another investigation, interviewees were presented with three questions designed to illicit a "knock on wood" response: for example, "Has anyone in your immediate family suffered from lung cancer?" (Keinan, 2002). As expected, high-DC participants were more likely than lows to give the superstitious response. Moreover, this effect was more pronounced when participants were placed in a stressful situation (anticipating an upcoming exam). The stress increased the high DC-participants' motivation to re-establish a sense of control (Keinen & Sivan, 2001), which led them to engage in the superstitious behavior.

Although to date we have only a few studies to draw from, a high desire for control does seem to be associated with an increased reliance on superstitious behavior. Unfortunately, once again, a few inconsistent findings cloud the interpretation. One study asked adults visiting a bingo parlor whether they typically did something to help themselves win at bingo, such as wear lucky clothes or bring a lucky charm (Burger, 1991). The bingo players who said they engaged in these kinds of behaviors had lower desire for control scores than those who said they did not. Other researchers find that desire for control scores do not correlate with scales

measuring either a general belief in superstition (Fluke, Webster, & Saucier, 2014) or paranormal beliefs (Lindeman & Aarnio, 2006).

How can we explain these disparities? I suggest that they have to do with the difference between saying and doing. When asked directly, people who engage in superstitious acts often acknowledge that the behavior probably has little effect (Burger & Lynn, 2005). The irrational part of their mind allows them to act superstitiously, whereas the rational part answering the question recognizes the folly. High-DC people may not be aware of or may not be willing to acknowledge that they sometimes believe they can influence uncontrollable outcomes. When presented with scale items such as, "A good luck charm can change the outcome of chance events" (Fluke et al., 2014), high-DC individuals are unlikely to see themselves as believing such foolishness. However, they probably aren't aware of their oversized confidence when playing with familiar cards or throwing the dice themselves.

THE MISMATCH HYPOTHESIS

In an ideal world, the amount of control people desire would align with the amount of control they perceive they have. Unfortunately, in the real world, this is not always the case. This observation has given rise to the "mismatch hypothesis" (Evans, Shapiro, & Lewis, 1993; Shapiro, Schwartz, & Astin, 1996). According to the hypothesis, when people experience a gap between their desired and perceived control, problems are likely to arise. We can extend this hypothesis to suggest that individuals with desire for control scores that do not match their locus of control scores frequently find themselves in mismatched situations and may therefore be especially likely to experience difficulties.

Most of the research on the mismatch hypothesis has been concentrated in two areas. Some investigators have examined how a mismatch of desired and perceived control affects psychological well-being. Others have studied the effect of desired and perceived control during dental treatments.

Psychological Well-Being

There is ample evidence that high-DC people typically opt for control and respond positively when given control. Participants in one study were given a choice of pricking their own finger to give a blood sample or allowing the experimenter to prick their finger (Burger, McWard, & LaTorre, 1989). High-DC participants were significantly more likely than lows to select the self-administered option. High-DC participants in another study experienced less discomfort when allowed to choose between two supposedly soothing colors to look at while listening to loud blasts of noise (Geers et al., 2013). Having a choice of colors had no effect on the low-DC participants.

But what happens when high-DC people perceive they have few or no choices? And how do low-DC individuals respond when given more control than they desire? The mismatch hypothesis predicts that perceiving more or less personal control over events than one prefers takes a toll on a person's psychological well-being. Researchers have invoked the mismatch hypothesis to explain at least three psychological problems: depression, anxiety, and obsessive-compulsive behavior.

Depression

A number of studies have looked at the connection between desire for control and depression. Inevitably, we all encounter unpleasant events that we can do little or nothing about. Low-DC individuals are likely to take this lack of control in stride. But high-DC people may find themselves in a kind of "learned helplessness" situation in which they encounter something they want to control yet discover that they cannot. Indeed, when I asked undergraduates to describe a recent experience with depression, high-DC students were more likely than lows to mention that they could not control the depressing event (Burger, 1992*a*). In another study, I placed participants in a learned helplessness lab setting in which they could not control a series of aversive noise blasts (Burger & Arkin, 1980). Performance and depression measures indicated that high-DC

participants had a stronger negative reaction to the experience than did the low-DC participants.

These findings suggest that desire for control may be positively correlated with depression. However, an examination of published correlation coefficients between DC Scale scores and various measures of depression finds the opposite to be the case (Amoura et al., 2014; Burger, 1984; Burger & Arkin, 1980; Gebhardt & Brosschot, 2002; Ghorbani, Krauss, Watson, & LeBreton, 2008; Kleftaras & Georgiou, 2014; Moulding & Kyrios, 2007). Investigators consistently find a small, negative correlation between desire for control and depression. Compared to lows, people high in desire for control tend to experience lower levels of depression.

However, the mismatch hypothesis predicts that desire for control interacts with perceived control, making only individuals with a high desire for control and a perception of low control particularly prone to depression. Support for this prediction can be found in an eight-year longitudinal study with adults (Brandtstadter & Rothermund, 1994). The researchers assessed perceived control over a number of developmental goals (e.g., health and physical well-being) as well as the importance of being able to reach each goal (i.e., desired control). The results revealed that as participants aged and were less able to control some of their goals, they tended to reduce their desire to reach the goal. The participants seemed to have intuitively understood the negative consequences if a mismatch between desired and perceived control and, as a coping strategy, took steps to reduce the gap. Most important, reducing the discrepancy between perceived and desired control was related to lower levels of depression.

Additional—but qualified—support for the mismatch hypothesis can be seen in a pair of studies that examined the discrepancy between desired and perceived control but did not consider the direction of that discrepancy. For example, one team of investigators measured desired control and perceived control over participants' lives and emotions (Conway, Vickers, & French, 1992). Both control measures predicted levels of negative affect in the expected directions. More important, the researchers found that the difference between participants' desired and perceived

control accounted for significant amounts of variance beyond the effects of desired and perceived control alone. The bigger the mismatch between desired and perceived control, the greater the negative affect. Unfortunately, the direction of the difference was not considered in these analyses. Another investigation measured desire for control and perceived control in undergraduate and elderly women (Mossbarger, 2009). The researchers also calculated the degree of disparity between desired and perceived control for each participant. Although the direction of the discrepancy was not part of the analysis, the higher the discrepancy, the lower participants scored on a measure of positive affect.

In my own test of the mismatch hypothesis, I asked undergraduates to complete the DC Scale, the Levenson locus of control scales, and a measure of depression at the beginning of the school year (Burger, 1984). The students were contacted six months later and asked about their experiences with depression during the intervening period of time. Contrary to expectations, desire for control and locus of control did not interact to create higher levels of depression either at the initial assessment period or at the six-month follow-up. A similar study by another team of researchers examined depression one month after the initial assessments of personality (Amoura et al., 2014). These investigators also failed to find higher levels of depression among participants with a high desire for control and an external locus of control. However, a couple of interesting interactions did surface in my six-month study. High DC-high chance (external) students were more likely than students in the other categories to seek out nonprofessional help for depression during the school year. In addition, the high DC-high chance students were more likely than others to have experienced suicidal thoughts during the six-month period.

In sum, there appears to be something to the notion that discrepancies between desired and perceived control may lead to problems with depression. However, finding long-term consequences of a high desire for control combined with an external locus of control may be quite difficult. People often take steps to reduce a perceived gap between desired and perceived control (Brandtstadter & Rothermund, 1994). Moreover, individuals with a high desire for control tend to use more effective coping strategies than

do lows (Aspinwall & Taylor, 1992; Burger, 1992*a*; Tykocinski, 2001). Thus, even if some high-DC individuals are prone to episodes of depression, they may also possess the ability to overcome those episodes and thereby avoid chronic problems with depression.

Anxiety

A mismatch between desired and perceived control can also occur in the opposite direction—low desired control and high perceived control. There are reasons to speculate that this mismatch could result in higher levels of anxiety (Burger, 1984). Participants in lab studies often have a negative emotional reaction when given more responsibility for outcomes than they prefer, particularly when they feel ill-prepared to deal with the situation (Burger, Brown, & Allen, 1983). Because people low in desire for control inevitably find themselves in situations for which they have a significant amount of responsibility, we might expect that low-DC individuals are especially prone to negative emotional reactions, particularly anxiety. Consistent with this reasoning, researchers typically find a small, negative correlation between DC Scale scores and measures of trait anxiety (Burger, 1992*a*; Gebhardt & Brosschot, 2002; Ghorbani et al., 2008; Goldstein, Dudley, Erickson, & Richer, 2002; Ludwick-Rosenthal & Neufeld, 1993). That is, a low desire for control predicts higher levels of anxiety.

The mismatch hypothesis predicts that low-DC individuals will be especially prone to anxiety when they find themselves in situations over which they have a great deal of control. Unfortunately, relevant data for this prediction are limited to a handful of studies. Undergraduates in one investigation were instructed to imagine themselves as the manager in a business setting who has to deal with performance evaluation issues (Parker, Jimmieson, & Amiot, 2009). Among the variables manipulated in this scenario was the extent to which participants believed they had control over the process. The researchers also created high- and low-stress conditions by introducing severe time limitations for some participants. As indicated by measures of satisfaction and perceived performance, high-DC participants performed well in the stressful conditions when they were given increased control over the process. However, low-DC

participants exhibited "stress-exacerbating" effects when given additional control in the stressful situation. Consistent with the mismatch hypothesis, these participants performed more poorly than low-DC participants given little control.

The mismatch hypothesis also predicts that low-DC individuals with an internal locus of control will be especially prone to anxiety. In a test of this prediction, one team of investigators measured anxiety, locus of control, and desire for control in outpatients seeking treatment for anxiety as well as in a nonclinical sample of adults (Wilkinson & Chamove, 1992). They found that a difference score calculated from the two personality scales was the strongest predictor of anxiety, with larger gaps between desired and perceived control predicting higher levels of anxiety. This finding is consistent with those described earlier in which larger discrepancy scores predicted higher negative affect and lower positive affect (Conway et al., 1992; Mossberger, 2009). Unfortunately, because none of these studies reports the direction of the mismatch, the support for the hypothesis is limited. In short, although we have some evidence that a mismatch between desired and perceived control may be related to anxiety, at this point we have too little data upon which to draw clean interpretations.

Obsessive-Compulsive Behavior

Some researchers have speculated that a high desire for control combined with an external locus of control may be related to obsessive-compulsive behavior (Moulding & Kyrios, 2006, 2007; Moulding, Kyrios, Doron, & Nedeljkovic, 2009). A strong need for control is often identified as an important component of obsessive-compulsive disorder (OCD) (Sookman, Pinard, & Beck, 2001). Investigators also find that obsessive-compulsive episodes frequently are associated with a perception of low control over stressful life events (McLaren & Crowe, 2003). Some of the repetitive and ritual behaviors that characterize OCD can be seen as efforts to regain a sense of control (Moulding & Kyrios, 2006).

When applied to the mismatch hypothesis, we might predict that OCD individuals with a high desire for control who find themselves in uncontrollable stressful situations are especially likely to experience OCD

thoughts and engage in OCD behaviors. Although to date only a few studies have tested this hypothesis, the findings generally are supportive (Moulding & Kyrios, 2007; Moulding et al., 2009). In these investigations, DC Scale scores are related to OCD thoughts and behaviors primarily when high-DC participants perceive that they have little personal control.

Dental Treatments

Researchers also have applied the mismatch hypothesis to address a serious and common health issue—the anxiety and pain often associated with dental treatments (Baron & Logan, 1993; Logan, Baron, Keeley, Law, & Stein, 1991; Sartory, Heinen, Pundt, & Johren, 2006). Dental patients typically believe there is little they can do about the discomfort associated with routine dental work. Some researchers speculate that this perceived lack of control contributes to the anxiety experienced by many patients. And if that is the case, then patients who also have a strong desire for control would be the most likely to suffer.

Rather than rely on general measures, investigators developed scales to assess desired and perceived control specifically as they relate to dental situations (Brunsman, Logan, Patil, & Baron, 2003; Coolidge et al., 2005; Logan et al., 1991). Consistent with the mismatch hypothesis, researchers find that, compared to other patients, dental patients with high desired control and low perceived control are more fearful about visiting a dentist, experience more pain during treatment, and are more likely to avoid dental procedures altogether (Baron & Logan, 1993).

The findings also suggest avenues for minimizing these effects. In particular, dentists can give patients tools they can use to reduce their anxiety and discomfort; that is, increase the patients' perceived control.

Root canal patients in one study were given instructions to focus on physical sensations during the treatment (Baron, Logan, & Hoppe, 1993). As in earlier studies, prior to the procedure, the high desired control/low perceived control patients anticipated more pain than the other patients. However, by using the sensory focus tactic as a way to distract themselves

from thinking about their anxiety, these patients experienced significantly less pain than those not given the instructions. Patients in another study were given several techniques for controlling stress and pain, such as monitoring sensations, deep breathing, imagery, and positive self-statements (Law, Logan, & Baron, 1994). As in the earlier study, patients with high desired control and low perceived control benefitted the most when given these tools.

In sum, we have some evidence to support the notion that a mismatch between the amount of control a person believes he or she has and the amount of control that person wants can create difficulties. The mismatch hypothesis seems most applicable to specific situations in which individuals perceive more or less control than they desire. Evidence for chronic problems stemming from a discrepancy between general levels of perceived and desired control is less persuasive.

CONCLUSION AND FUTURE DIRECTIONS

Locus of control and desire for control appear to be distinct concepts, each representing an important piece of the personal control literature. Although each of these personality traits has separately been the focus of a large number of studies, it is also useful to consider how both perceived control and desired control come into play in certain situations. Moreover, as reviewed here, the amount of control an individual desires can influence the amount of control that person perceives. Although not yet a topic of research, it also is possible that the amount of control a person perceives affects the amount he or she desires.

Where do we go from here? One of the strengths of the research covered in this chapter is the frequent examination of real-world behavior and the application of the findings to real-world problems. The list to date includes, among other topics, gambling behavior, emotional disorders, and dental pain. One recommendation for future research is to expand this list to include other psychological and social issues. In particular, I would like to see more work on the role desire for control plays in the

treatment of psychological disorders. Belief that one can control a problem behavior has long been recognized as a key to successful treatment (Bandura, 1997). It is difficult to imagine that the extent to which people want to control a problem behavior would not also play a crucial role, perhaps interacting with self-efficacy beliefs.

As I described at the outset, the concept of personal control has been applied to a wide variety of topics of interest to psychologists, and researchers find that locus of control often comes into play in each of these areas. But a complete understanding of personal control requires that we also examine the extent to which people desire control in these settings. Indeed, research to date indicates that desire for control may play an important role in how we treat the elderly (Brandtstadter & Rothermund, 1994), the causes of stress (Lawler, Schmied, Armstead, & Lacy, 1990), reactions to crowding (Burger, Oakman & Bullard, 1983), and physical health (Henselmans et al., 2010). In short, the ubiquitous effects of personal control on behavior create ample opportunities for future researchers to examine the independent and combined effects of perceived and desired control in these and many other areas of research.

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4

The Cultural Context of Control

BETH MORLING ■

"When I make plans, I am almost certain that I can make them work."

"What happens to me is my own doing."

"By taking an active part in political and social affairs, the people can control world events."

—Rotter's *(1966) locus of control items (internal choices)*

"Willow trees do not get broken by piled-up snow."

"When you face a long one, better let it wind you around."

"You cannot win over a crying child and a [feudal landowner]."

—Japanese maxims, *as translated by Azuma (1984)*

These statements illustrate how different cultures might portray the ideal relationship between individuals and their environment. In one, the healthy person, acting on his or her own wishes, changes things in the environment for the better. In the other, the healthy person is aware of his or her own desires but also considers the wisdom of flexibly adapting to

the environment. Which of these approaches is the normal, psychologically healthy one? This chapter explains how cultural psychologists would answer that question.

WHAT IS CULTURAL PSYCHOLOGY?

According to a recent review that traces the history of culture in psychology (Kashima & Gelfand, 2012), empirical cultural psychological research began seriously in the 1960s with cross-cultural developmental work (e.g., Whiting, Child, & Lambert, 1966). This start gained momentum in the 1970s with research in organizations (Hofstede, 1980) and with influential theorizing about the importance of subjective culture (e.g., Triandis, 1972). One influential modern statement of "cultural psychology" emerged in the 1990s, when cultural psychology was defined in a much-cited chapter by Richard Shweder (1995). Shweder defined the emerging field in this way:

> Cultural psychology is the study of the way cultural traditions and social practices regulate, express, and transform the human psyche, resulting less in psychic unity for humankind than in ethnic divergences in mind, self, and emotion. Cultural psychology is the study of the ways subject and object, self and other, psyche and culture, person and context, figure and ground, practitioner and practice, live together, require each other, and dynamically, dialectically, and jointly make each other up. (p. 73)

The key assumption of cultural psychology, according to Shweder, is that culturally diverse and specific meaning systems, cultural products, languages, and norms—what he calls "intentional worlds"—shape people's cognition, emotion, and identity. In turn, culturally shaped people dynamically re-establish, reinforce, and recreate the culturally diverse, content-specific intentional worlds that surround them. Cultural psychologists have often summarized his 1989 chapter with the phrase, "culture and psyche make each other up." Cultural psychologists argue that

the tangible and intangible traces of culture, whether in markets, norms, schoolrooms, books, nurseries, or dinner tables, shape how people think, feel, and behave. Cultural content matters. As Shweder wrote, "You can't take the stuff out of the psyche or the psyche out of the stuff" (p. 97).

Shweder cited cognitive research on expertise to make the case that prolonged engagement with specific content significantly shapes human cognitive processing. Abacus users (Stigler, 1984) and expert chess players (Ericsson & Smith, 1991), for example, solve math problems and spatial memory tasks differently from non–abacus users and novice chess players. Cultural psychologists argue that cultural expertise affects human psychology not just in isolated instances of abacus computations and chess, but also in all areas of human cognitive, emotional, social, and motivational functioning.

Although some readers might assume that cultural psychologists are focused only on the "nurture" side of the nature–nurture equation, modern evolutionary research emphasizes the key role of culture in human brain development over both ontogeny and phylogeny. Evolutionary theorists have argued that humans are "cultural animals" who evolved in cooperative social environments (Tomasello, 2014*a*, 2014*b*) and who require learned cultural content in order to be fully human. Geertz (1973) remarked that humans evolved to be like computer hardware—endowed with sophisticated equipment (in the form of large brains) that requires the installation of software (in the form of culturally specific content). Gene–culture co-evolution theory (Henrich, Boyd, & Richerson, 2008; Richerson & Boyd, 2005) provides an interpretation of human evolution in which humans, more than any other primate species, evolved to be flexible, quick learners of cultural content. Because humans are excellent imitators, cultural tools and tricks are socially transmitted while preserving key features of the tools. Rapid learning of cultural knowledge allows humans to adapt to virtually any world habitat. And cultural content itself evolves, adapting more quickly to changing environments than biological evolution can.

In sum, cultural psychology explains that humans evolved to use specific cultural content and meanings. This content shapes the psychological

features we as humans will develop around the world. When it comes to perceived control research, a cultural psychological perspective means we must consider implicit cultural assumptions that might permeate control theories. In fact, if we glance through the vast literature on perceived control, it becomes immediately obvious that the vast majority of traditional or "mainstream" perceived control research has taken place in contemporary, middle-class, Western contexts such as the United States, Western Europe, and Australia. Perceived control research samples are usually college-educated and Western, and the studies themselves have largely been conceived, planned, and interpreted by Western minds. To what extent does this matter?

One perspective, of course, is that culture does not matter or that it matters very little. According to some evidence, perceived control is a biologically based motivation, universal to all humans (and to many other animals); as such, it should not matter in which culture we study it. Such a perspective is supported by Robert White's (1959) influential paper in which he described competence, a need to "deal with the environment" (p. 318) as a behavior that is innate in humans and many other animals. Many species, from rats to primates, will explore the environment as a reward for other behaviors; they engage in physical activity or solving puzzles that have no drive-reduction purpose. Humans, too, show early drives for effectance. Three-month-old human infants, Piaget famously documented, show delight at being able to explore and effect changes in the toys in their environment. Some researchers argue that the desire for control is innate (Kay & Sullivan, 2013; Leotti, Iyengar, & Ochsner, 2010). For these reasons, we might assume that cultural influences on perceived control measures are simply superficial changes to some "pure," "universal" biological core motive. In this view, cultural differences are like clothing—they might make people *look* different, but culture won't shape the control motive "deep down inside."

Cultural psychologists would disagree, or would at least challenge the assumption that culture is superficial. Infants are not (yet) complete human beings, and nonhuman animals cannot compare to humans in their extreme reliance on cultural content. Cultural psychologists

acknowledge evolved biological preparedness (especially the fantastic ability of the human infant to learn its culture's language and practices) but they also ask how this same infant, given a lifetime of culturally specific training and content expertise, will experience and express its motivation for competence as a future adult interacting with its culture's specific products and functioning in social contexts with adults who share a system of meanings and understandings. In this chapter, I take on this perspective and trace a historical trajectory of how cultural psychology has been incorporated into perceived control research.

Before proceeding, I will note that a cultural view of control is likely to perturb tidier theories of control motivation whose categories and hypotheses "make sense" to individualistic Western minds—perhaps even to the minds of this volume's readers. The most heretical cultural psychological position considers all psychological theorizing as specific cultural histories (Gergen, 1973) and the content of middle-class, Western-centric psychological journals to be indigenous folk-theories of behavior rather than universal truth. Although this chapter does not endorse this extreme approach, it does include stories and evidence of control that has not always fit tidily into the "perceived control" category. Therefore, the present review will include some research not only on perceived control by that precise name, but also on agency, choice, and decision-making that have been developed specifically to describe non-Western perspectives on how people act in their worlds. Although more careful theorists might prefer to see a clear definition of control that is used throughout the chapter, my category of control research has broad and fuzzy boundaries.

I believe such untidiness is justified because it probably reflects how humans actually enact their motivations for control. Specifically, research has demonstrated that when control is threatened through experiences of repeated failure, causal uncertainty, or perceived chaos, humans compensate through multiple, substitutable routes. These include not only reasserting personal control (Brehm, 2000), but also affirming social systems (Jost, Banaji, & Nosek, 2004), seeing patterns in randomness (Kay & Sullivan, 2013; Whitson & Galinsky, 2008), adjusting the self (Tobin & Raymundo, 2010), or substituting external control (e.g., believing God

is in control; Kay & Sullivan, 2013). Indeed, Kay and Sullivan (2013) argue that personal control is a culturally specific form of achieving a higher level universal motive: to see the world as orderly and nonrandom. Clearly, control motivation, as enacted in real people, is not particularly fussy about observing the theoretical boundaries sometimes set upon it by research psychologists.

The rest of this chapter first traces how the cultural perspective began to be infused into research on perceived control. Then it reviews contemporary work on how culture shapes the experience of control. Finally, the chapter suggests a few implications for a cultural perspective on control.

THEORIES OF PRIMARY AND SECONDARY CONTROL

Two major papers, co-authored by John Weisz and Fred Rothbaum and their collaborators, Samuel Snyder and Thomas Blackburn, set the early foundation for a cultural look at control. The first paper (Rothbaum, Weisz, & Snyder, 1982) did not concern culture at all, but the second (Weisz, Rothbaum, & Blackburn, 1984) analyzed control practices through the specific lens of Japanese cultural contexts.

In the 1982 paper, Rothbaum et al. introduced a distinction between "primary control" and "secondary control." More broadly, their goal was to argue that inward behaviors (such as "passivity, withdrawal, and submissiveness," p. 5), although normally equated with the abandonment of perceived control, may in fact be attempts by people to feel in control. In their model, primary control is defined as the attempt to change the world to fit the self's needs (p. 8). Secondary control is defined as the attempt to fit in with the world and flow with the current (p. 8). They argued that primary control may result in both great successes and great failures (because the world either complies with or defies people's attempts at change). In contrast, secondary control is a path with less emotional volatility. The terms they chose, "primary" and "secondary," were used for three reasons: because primary control typically gets more research attention, because in primary control the self is primary (rather than

other forces outside the self), and because secondary control, they hypothesized, probably comes *after* primary control attempts have failed.

This 1982 paper suggested four potential forms of secondary control. All four, the authors argued, can be engaged persistently by people, and this persistence highlights that such "inward behaviors" are motivated, rather than simply a resigned response to failed primary control. First, people may adjust their expectations, and, when lowered expectations are fulfilled, they argued, a sense of control can result. Second, people can align themselves with fate, luck, or chance and can engage in superstitious behaviors to feel more in control. Third, they may associate with powerful others who have control, experiencing their control vicariously. And finally, people may interpret low-control situations in such a way as to derive meaning from them.

At the time, the authors were trying to broaden people's view of perceived control research, stating that perceived control is so fundamental that even when people cannot control the environment through their actions, they nevertheless can retain a feeling of perceived control by predicting outcomes, aligning themselves with chance and powerful others, and finding meaning in disappointment. By asking researchers to reconsider their views of "inward behaviors," Rothbaum et al. exposed the assumptions and implicit value and meaning systems that they thought were embedded in perceived control theories.

One legacy of Rothbaum et al.'s initial work was its adoption and refinement by researchers interested in how people manage their goal motivation over long periods of time (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996) or how people from European and other Western cultures maintain well-being in low-control circumstances, such as advancing age (Chipperfield & Perry, 2006; Chipperfield, Perry, Bailis, Ruthig, & Loring, 2007; Thompson, Collins, Newcomb, & Hunt, 1998), academic challenge (Hall, Chipperfield, Perry, Ruthig, & Goetz, 2006; Hall, Perry, Chipperfield, Clifton, & Haynes, 2006), illness (Thompson & Kyle, 2000; Thompson, Nanni, & Levine, 1994), or imprisonment (Thompson et al., 1996). This body of research has benefited from Rothbaum et al.'s expanded definition of control and has continued one central thread of

their paper, which argued that the need for control is so fundamental that people find ways to achieve it even in objectively low-control situations.

Another legacy of their article, in my view, was that by exposing some implicit assumptions and values of perceived control research of the time, the authors were also engaged in a type of cultural psychology. Two years later, they made the cultural analysis explicit (Weisz et al., 1984). In this article, the authors argued that people and societies emphasize primary and secondary control to different degrees. They compared two cultures, the United States and Japan, whose cultural practices tip the balance toward primary control (in the case of the United States) or secondary control (in the case of Japan). They focused on historical, anecdotal, and ethnographic evidence because, at the time of writing, very little psychological science had accumulated on the topic. By introducing a cultural perspective on perceived control in general, and on their constructs of primary and secondary control in particular, Weisz, Rothbaum, and Blackburn took a big step forward—one that reverberated over the next three decades and still influences cultural and control research in the present day. In my view, a key feature of their approach was to explain how cultural practices in the homes, schools, and workplaces of these two cultures shape the control practices there. Importantly, they did not attempt to sample multiple cultures around the world and simply rank them on some presumed "core" dimension. That approach would have presumed psychological universals, rather than the constitutive power of cultural content. Instead, the authors explored in depth how specific practices in these two cultures shape psychological experience. I see their analysis as an early prototype of the scientific practice of cultural psychology that Shweder articulated a few years later.

A few examples from Weisz et al.'s article help illustrate its contribution. For example, they describe how, in childrearing, Japanese mothers foster "skinship" with infants through traditional co-sleeping and co-bathing practices. (In contrast, American practices traditionally involve separation at bedtime and bathtime.) Weisz et al. argued that the Japanese practices "require that infants adjust themselves to effect a close alignment with persons other than self" (p. 959). Such close alignment constitutes a

form of secondary control—aligning oneself with external social contingencies. Even among older children, traditional Japanese home discipline threatens the child with unwanted separation (sending the child out of the house), whereas traditional American discipline threatens the child with unwanted connection (through the practice of grounding the child inside the house). Weisz et al. argued that, in Japan, "realignment with home and family signifies the end of punishment . . . hence realignment provides control" (p. 959). In contrast, in the United States, restoring the child's autonomy to conduct his or her affairs—separate from one's family—restores control.

The authors found rich examples in religious practices as well. Religious practices, in general, emphasize aligning with or submitting to a higher power—practices that Weisz et al. deem more "secondary control" in nature. Even so, Christianity, the dominant religion in the United States, has a primary control flavor, from the violent conversion of the Crusades of the 11th to 14th centuries, to modern proselytizing campaigns aimed at changing others' minds, to Christian prayer and activism to make the world better. In contrast, Zen Buddhism, a sect that is culturally influential in Japan, teaches people to control "not realities as such but rather their perspective on those realities" (p. 962). By emphasizing adjustment to the world and active alignment with "the tides of fate," Weisz et al. argued, Zen Buddhism teaches secondary control.

A final set of examples came from traditional employment settings. Work, to some extent, is the opposite of religious experience: it is a setting that foregrounds influence and primary control. Nevertheless, within traditional work settings in these two cultures, Weisz et al. found examples of an especially primary-controlling work environment (in the United States) and a relatively secondary-controlling set of practices (in Japan). Whereas American workers, they argue, approach the workplace aggressively, taking and leaving jobs in order to move up in the world, Japanese workers have traditionally worked in guaranteed jobs at a single company for life (although this is much less common now, producing a change that has challenged Japanese youth; see Norasakkunkit, Uchida, & Toivonen, 2012). Loyal alignment with one's company and a focus on group, more

than individual, success means that Japanese workers experience control through adjusting to the norms and expectations of others. In addition, the *ringi* system of decision-making in businesses, according to Weisz et al., means that no one person makes or takes sole credit for a decision. Instead, a proposal is cautiously introduced to all stakeholders before being approved. In contrast, American workers are advised to be more loyal to their own careers than to their teams at work. Americans who fail to "lean in" and promote their own ideas may find themselves undervalued and underpaid. These examples are only a few of the ones that Weisz et al. used to illustrate the different cultural practices that emphasize primary and secondary control in these two cultures. In addition to these examples from childrearing, religion, and work, their article also includes examples from moral socialization, psychotherapy, and philosophy.

Impact of These Two Papers: Two Directions for Secondary Control

The two articles by Weisz, Rothbaum, and their students attempted to peel back the Western cultural assumptions that had so far gone unexamined in perceived control research. They attempted to show that when we conceive of perceived control in terms of an individual agent whose goal is to influence the environment, we may pathologize inward-directed adjusting behaviors. And by viewing control through a cultural lens, they introduced us to the cultural functionality of some "inward behaviors" and argued that individual perceived control may not be universally foregrounded.

In my view, the downside to the two papers is in using the term "secondary" to refer to the process of accepting one's circumstances and adjusting the self. This label, although selected for sound reasons, perpetuates assumptions it was designed to correct. Among them is the implication that the type of control emphasized in non-Western cultures is "lesser" than the one emphasized in the United States and Europe. To correct this problem, some cultural psychology researchers have used the terms "influence" and "adjustment" instead of "primary control" and

"secondary control" because they avoid value-implied labels. Other researchers have tested and used construct labels of "disjoint agency" and "conjoint agency" (Stephens, Fryberg, & Markus, 2011). These alternative terms are used later in this chapter when such research is reviewed.

Since Rothbaum et al.'s (1982) paper, definitions of secondary control have taken one of two forms. One is a well-established line of work on goal motivation, which defines secondary control strictly in terms of its support of primary or perceived control (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). In this research, secondary control assists people in controlling their environment or compensates for lost primary control—it keeps primary control (the main motive) always in mind. Heckhausen and Schulz's work has been generative and productive, but it has not adopted a cultural perspective, and their data are almost exclusively on participants from European or European-American cultures.

Other research, mostly in the cultural psychological tradition, emphasizes secondary control in its own right, not simply as an assistant to primary control. In a major review, we (Morling & Evered, 2006) called the culturally inspired construct "fit-focused secondary control," defining it as two co-occurring processes: *accepting* the environment as it is and *adjusting* the self to fit in with the environment. We argued that primary control and fit-focused secondary control may each serve as primary motives depending on the cultural context and the situation. For example, we suspected that socially interdependent situations require more secondary control finesse; therefore, people acting in cultures that provide more situations of this type will practice, as a "primary" skill, adjustment more than influence. Later, Skinner (2007) proposed that fit-focused secondary control may not be control at all, but instead a process of accommodation that serves autonomy motives (cf. Morling & Evered, 2007). In this chapter, I focus primarily on the culturally inspired work on fit-focused secondary control.

Weisz, Rothbaum, and Blackburn's cultural review on control, although steadily influential, was published several years before cultural psychology started to take off as a discipline. Cultural psychology, as it is often practiced today, gathered its momentum in the late 1980s and early

1990s. Those years witnessed the publication of at least three influential works: Shweder's (1995) definition of the field (*Cultural Psychology: What Is It?*), Jerome Bruner's book, *Acts of Meaning: Four Lectures on Mind and Culture* (1990), and, perhaps most famously, Markus and Kitayama's paper "Culture and the Self" (Markus & Kitayama, 1991, 2010), which has been cited more than 8,000 times to date according to PsycINFO. Subsequent scholarship on the cultural psychology of perceived control (reviewed next) stems from Weisz et al.'s paper as well as from these early definitions and influences on the field.

EMPIRICAL RESEARCH ON CULTURAL DIFFERENCES IN CONTROL

Several studies have empirically tested the hypothesis that culture shapes how control is perceived and enacted. Some of these studies were designed specifically to document the cultural differences predicted by Weisz et al. (1984). Other studies may not have been conducted as explicit tests of their hypotheses but nonetheless support the view that culture shapes the extent to which people perceive control, practice effectance, construe choices, experience agency, and accommodate or adjust to others. I review a broad range of studies, hoping to illustrate both familiar and unfamiliar "cultural logics" of perceived control.

At times in this review, I will discuss influence and adjustment cultural practices by describing how they are meaningful within a larger umbrella of cultural syndromes commonly labeled as individualism and collectivism, or independence and interdependence. "Collectivistic" and "interdependent" are descriptors for a family of related cultural practices that include attunement to others, interdependence in a system, and a value on social harmony. In such practices, there is a focus on the demands and expectations of other people and on meeting one's social roles. Many cultural writers have suggested that the psychological practice of adjustment or secondary control is privileged, rewarded, and strategic in such contexts. In contrast, "independence" or "individualism" describe cultural

systems in which people are seen as autonomous, separate from others and from contexts. People see themselves as the center of the story. They are trained to broadcast their own points of view, their own agency and assertiveness, and their own preferences. The psychological practice of influence, or "primary" control, is often privileged, rewarded, and strategic in such contexts. Relatedly, cultural analyses have pointed out that European-American contexts emphasize the fixedness and stability of the self and the malleability of the world. In contrast, East Asian contexts emphasize the malleability of the self and fixedness of the world (Rothbaum & Wang, 2011; Zhou, He, Yang, Lao, & Baumeister, 2012). People tend to see fixed entities as more likely to be agents of influence, so primary control makes sense when the self is fixed, and secondary control makes sense when the environment is fixed. In general, cultural research has usually studied control processes as inherently embedded in one of these two broad matrices of meanings and practices. It is important to see control as embedded in such meanings because when we try to pull out a "pure" form of control that is culture-free, we distort it. The form of control that we, as researchers, think is the most "pure" looks a lot like the one embedded and privileged in our own culture.

Data from Self-Report Scales

Some early studies administered self-report scales such as Rotter's Locus of Control Scale to samples of Japanese and Americans (Bond & Tornatzky, 1973; Evans, 1981; McGinnies, Nordholm, Ward, & Bhanthumnavin, 1974; Parsons & Schneider, 1974). These studies mostly found that Japanese university students endorse more external loci of control when compared to American university students. Another investigation (Lam & Zane, 2004) tested primary and secondary control beliefs using a scenario-based measure (Seginer, 1998). Lam and Zane (2004) found that Asian Americans in California were more likely than European American counterparts to endorse secondary control solutions ("I'd accommodate to my parents' beliefs") over the primary solutions

("I'd try to convince them that she's okay"). Furthermore, they found that self-reported individual differences in self-concept as independent versus interdependent (as measured by Singelis, 1994) statistically mediated these cultural differences.

Rather than comparing two cultures' means on questionnaires, a recent meta-analysis (Cheng, Cheung, Chio, & Chan, 2013) reviewed the *relationship* between internal versus external locus of control (LOC) orientations and mental health. They found that whereas external LOC was associated with both depression (mean $r = .30$) and anxiety (mean $r = .30$), the relationship between external LOC and anxiety was moderated by culture. In collectivistic societies, where less emphasis is placed on agentic change of the environment, the relationship between external LOC and anxiety was significantly weaker. The authors proposed that people in interdependent cultural contexts may feel freer to endorse external control beliefs and do not suffer as much from holding such beliefs.

Questionnaire studies have also shown cultural differences in phenomena related to perceived control, such as personal values and the perception of choice. For example, one study analyzed certain items on the Circumplex Scale of Interpersonal Values, finding that European Americans more strongly endorsed goals of asserting the self and changing others (e.g., "I appear confident" or "I have an impact on them"), whereas Hong Kong Chinese more strongly endorsed suppressing the self and conforming to others ("I keep my thoughts and feelings to myself" and "I go along with what they want" (Tsai, Miao, Seppala, Fung, & Yeung, 2007). Another study (Savani, Markus, Naidu, Kumar, & Berlia, 2010) documented that in American cultural contexts, people tend to construe the same set of situations (such as buying a gift or signing up for a class) as choices, compared to people in Indian cultural contexts (Savani et al., 2010). For example, Americans listed more examples of choices they made yesterday compared to a sample of Indians. And, given a set of options in a laboratory such as completing a questionnaire, eating candy, or reading a magazine, Americans were more likely to conceive of such behaviors as choices, compared to Indians. Choice is related to perceived control because choice has been one way to operationalize control (or lack

thereof) in research (e.g., Brehm, 2000). Choices are a way for an individual to enact change on the environment, influencing it according to internal, personal wishes; such a model seems more prevalent in North American cultural settings.

Not only do cultures differ in the extent to which individuals construe their actions as choices; they also differ in people's reactions to having choices taken away. After making a choice, Americans, but not Japanese, engaged in self-justifying spreading of alternatives (Heine & Lehman, 1997). Japanese participants showed such dissonance-reduction activities only when they made choices for other people who were close to them (Hoshino-Browne et al., 2005). European American children performed best when they (but not Mom) got to choose the colors and features of their game characters. In contrast, Asian American children performed just as well when their mothers selected key features of games for them as when they made their own choices. Such behavioral research provides even more evidence that American cultural contexts elaborate on psychological control and its behavioral accompaniments and that other cultural contexts, such as India and Japan, may be motivated by other processes, such as adjusting to others and accepting the circumstances.

Other questionnaire measures have extended the study of primary and secondary control differences to other cultures, such as cultural subgroups within Israel. One study (Kurman & Dan, 2007) found that traditional subgroups (Israelis of Ethiopian origin) endorsed more secondary than primary control beliefs, and these beliefs also explained culturally different responses to an initiation. Another study (Seginer, Trommsdorff, & Essau, 1993) measured control preferences among North American, German, Malaysian, and Japanese students. Culture-level mean scores showed that Malaysians were highest on secondary control, followed by Japanese, North Americans, and Germans. After a failure, Malaysians reported a preference for secondary control followed by primary, whereas the three other cultures reported a preference for primary control first.

Results like these fit the prediction that people acting in different cultural contexts differ in their self-reported personal control beliefs. However, researchers often acknowledge that self-report scales, especially

those developed in Western cultural contexts, are not the best tool for studying cultural psychology. For one, self-report scales assume that cultural differences reside within the heads of individuals, when a more accurate picture of culture represents cultural differences both inside and outside the head, for example in social practices, texts, lyrics, physical structures, and so on (Morling & Lamoreaux, 2008). Studies should strive to capture more than simply self-reports of psychological phenomena. In addition, self-report measures have methodological shortcomings as measures of cultural difference. For one, when people complete self-report value measures, they may endorse values that they aspire to rather than values that they actually practice, something called a *deprivation effect* (Peng, Nisbett, & Wong, 1997). Another empirically demonstrated shortcoming of self-report scales is the *reference-group effect:* the tendency of people to use local reference groups when describing their self-reported values (Heine, Lehman, Peng, & Greenholtz, 2002). When asked to rate perceptions of control, for example, Japanese university students compare themselves to other Japanese, and American students compare themselves to other Americans. The reference group effect can lead a questionnaire study to observe no overall mean differences between cultures or even differences in the opposite direction of that documented by scholarly experts in each culture.

Behavioral Evidence

Because of the problems with simple self-report measures, more convincing evidence of the cultural shaping of perceived control goes beyond the administration of simple self-report questionnaires, using behavioral measures and other measures of a culture's shared settings, values, and norms.

Culturally Different Situation-Scapes: America and Japan

In one such study (Morling, Kitayama, & Miyamoto, 2002), Japanese and American college students recalled and recorded as many examples as

they could think of in which they "influenced or changed the surrounding people, events, or objects according to your own wishes" (for primary control, or influence). Other groups recalled and recorded examples of situations in which "you have adjusted yourself to these surrounding people, events, or objects" (secondary control, or adjustment). The study found that Americans could recall more influence than adjustment situations in a 20-minute time period, whereas Japanese could recall more adjustment than influence situations. In addition, influence situations were relatively more recent for Americans, and adjustment situations were relatively recent than influence situations. The pattern of results is consistent with the argument that American culture provides more situations that afford influence, and Japanese culture provides more situations that afford adjustment.

In a second stage of data collection, Morling et al. (2002) randomly sampled from the situations written in the first stage and translated them, resulting in a set of four types of situations: US influence situations, US adjustment situations, Japanese influence situations, and Japanese adjustment situations. Then they asked new members of US and Japanese culture to rate each situation on two key psychological dimensions: efficacy, competence, or power (to get at the presumed psychological outcome of influence, as studied in the perceived control literature), and closeness or interdependence (to get at the presumed psychological outcome of adjustment). The two-stage technique they used has been called "situation sampling" and is able to give a rich picture of the situation-scape in different cultures. They found that although influence situations were rated (by both Americans and Japanese) as higher in efficacy/competence, the American-authored influence situations were especially high, suggesting that American culture contains a situation-scape of influence situations that evoke more potent feelings of perceived control. And although adjustment situations made people feel relatively related to others, Japanese-authored adjustment situations did so especially well, suggesting that Japanese culture contains a situation-scape of adjustment situations that evoke more potent feelings of closeness and interdependence. This study provided some of the first evidence in support of Weisz, Rothbaum, and

Blackburn's hypothesis that American and Japanese culture emphasize primary and secondary control, respectively. Furthermore, this study used a method that was able to transcend some of the problematic issues with self-report attitude measures of control differences.

Recently, other studies have replicated this cultural difference in social support situations and emotional situations. One showed culturally different affordances of influence and adjustment in situations of received social support. When Americans and Japanese rated instances of received social support that had been described by others in each culture, they rated American social support as having a stronger sense of efficacy and control than the Japanese social support situations did (Morling, Uchida, & Frentrup,2015). Therefore, socially supportive situations also seem to carry a sense of perceived control in the United States, and this affordance is detected by Japanese and Americans alike. In another study on emotional action styles (the type of actions people use when dealing with emotions), Asian Americans reported a more adjusting action style in emotional situations (measured using experience sampling methods) compared to European Americans (Boiger, Mesquita, Tsai, & Markus, 2012). Asian Americans reported influencing action styles just as much as European Americans did, something the authors attributed to their participation in European American cultural contexts.

Culturally Different Situation-Scapes: America and India

These cultural differences appear to extend beyond East Asia to other cultures that have been said to foster interdependence or collectivism. For example, researchers have found that influence situations in the United States differ from Indian cultural contexts (Savani, Morris, Naidu, Kumar, & Berlia, 2011). This study collected situations in which people received the influence of others and then showed a sample of these situations to new participants. When people were asked to read the situations written by Indians, they reported being more likely to go along with the influence (i.e., to accommodate), compared to those written by Americans. Furthermore, although Americans were less likely to accommodate than Indians at first, after reading 100 Indian situations, Americans became

more likely to accommodate to others' influence. In other words, situations that require adjustment or accommodation (another possible term for secondary control) are apparently framed more positively in India than America.

Indian and American influence situations had different cultural flavors as well. Savani et al.'s (2011) study also asked people to describe situations in which they influenced other people. Indians reported that, in such situations, they had been much more likely to influence others *out of a concern for them*, whereas Americans reported being more concerned with *their own freedom*. In turn, influence situations from India were coded as being more likely to strengthen relationships compared to American influence situations. This study demonstrated that "primary control" situations are socially embedded and other-focused in Indian cultural contexts—it shows that even primary control can be enacted to strengthen personal bonds. It also documents that influence and interpersonal adjustment or accommodation may not be separate motives (as has been proposed; Skinner, 2007) but that, in Indian cultural contexts, one person's influence attempt is likely to be complemented by (and, indeed, fosters) voluntary accommodation by the other. The accommodation of a partner to another's influence attempt is positive and adaptive in this cultural context.

Cultural Products Emphasize Different Types of Control

Cultural psychology is the study of how culture and psyche "make each other up," and it has been argued that the study of cultural differences should not be focused only on capturing psychological differences carried "inside the head," but also on cultural products (Morling & Lamoreaux, 2008). Cultural products consist of tangible, public, and shared material such as documents, advertisements, texts, or traces of behavior. One study showed how culturally different types of control (in this study, conceived of as "agency" because this label may be more universally accessible) may be reflected in television sportscasts (Markus, Uchida, Omoregie, Townsend, & Kitayama, 2006). These authors coded television coverage from the 2000 and 2002 Olympics that was carried

in Japan and the United States, finding that American sportscasters emphasized the personal attributes, determination, choices, and influence of the athletes ("His steady, almost robotic stride is unorthodox, but apparently effective"; "she's a private person. . ."). In contrast, Japanese sports coverage tended to emphasize the athletic background and training and the role of other people ("She started judo in elementary school and has been hoping to go to the Olympics since"; "His coach said, 'just do your best' ").

Consistent with Shweder's idea that "culture and psyche make each other up," some research has shown that people tend to recreate or reinforce cultural products that are consistent with their acquired psychological processes. For example, a second study in Markus et al.'s (2006) article demonstrated that when Americans and Japanese were asked to write their own sports stories about a fictitious athlete, Americans tended to write stories that emphasized the personal uniqueness and attributes of the athletes, whereas Japanese tended to write stories that emphasized an athlete's coach, team, and motivation.

Another study showed that people use cultural products in psychologically different ways. When Americans and Singaporeans were primed with a lack of control, Americans (but not Singaporeans) were more likely to believe horoscopes that described their *personal* traits (presumably because such information would help them restore primary control; Wang, Whitson, & Menon, 2012). In contrast, control-deprived Singaporeans became more likely to believe horoscopes that described their *friends*' traits (presumably because this information would help them restore secondary control and enhance interpersonal adjustment).

Because this research illustrates how people create and interact with tangible manifestations of culture, it is situated squarely in Shweder's model of cultural psychology. Cultures shape people's models of, preferences for, and expressions of control. Culturally shaped people, in turn, recreate these cultural contexts by endorsing certain products and recreating others. It would be helpful to see even more studies that measure cultural differences in perceived control and adjustment that are "outside the head" (Morling & Lamoreaux, 2008).

Control and Coping with Health Events

Perceived control has been studied as a factor in how people cope with stressful events and life transitions (e.g., Affleck, Tennen, Croog, & Levine, 1987; Thompson, Sobolew-Shubin, Galbraith, Schwankovsky, & Cruzen, 1993). Does this relationship depend on culture and upon the nature of the health event? At least one cultural study has investigated control-related strategies in a health situation, studying influence and adjustment among pregnant women in the United States and Japan (Morling, Kitayama, & Miyamoto, 2003). Compared to past work, which has studied serious conditions such as heart disease, AIDS, and rheumatoid arthritis, normal pregnancy is unusual because although it provides stressors and anxieties for most women, it usually has a positive outcome in modern societies. Morling et al. (2003) studied three coping strategies with common stressors of pregnancy: Personal influence (primary control), acceptance of the situation (a personal form of secondary control), and social assurance (a social form of secondary control). They found that, in normal pregnancy, personal influence did not predict psychological outcomes of pregnancy except in one domain—coping with labor pain. In contrast, American women benefited from secondary control in the form of acceptance (it predicted less distress, better prenatal care, and less weight gain), and Japanese women benefitted from social assurance (it predicted a more positive newborn relationship). Interestingly, a study of Christian religiosity in the United States and Korea (Sasaki & Kim, 2011) showed a parallel pattern, with Americans experiencing their religion in terms of its secondary control affordances (spiritual growth and acceptance) and Koreans experiencing religion in terms of its relationship affordances (social affiliation and building social ties with other religious people). These studies show that even in some American cultural contexts, which overall tend to elaborate and afford personal influence, there are still situations that foster forms of control that, in the past, have been marked as unhealthy inward behaviors (Rothbaum et al., 1982).

Downstream Consequence of Cultural Situation-Scapes: Affect Valuation

The foregoing studies demonstrate culturally different patterns of influence and adjustment, at least between Japan and India on the one hand, and the United States on the other. Some other research has illustrated how these culturally different situation-scapes are part of a broader cultural system. One proposed correlate of influence and adjustment is "ideal affect"—"the affective states that people value and would ideally like to feel" (Tsai et al., 2007, p. 1102). Ideal affect does not represent how people actually do feel, but rather the affective states that people value and strive for. As goal states, affect valuations may be powerful drivers of behavior; they set up norms for what emotions people want to feel (Tsai, 2007). Tsai and her colleagues have found that European Americans value high-arousal positive states such as excitement, whereas people from collectivistic cultural contexts, Hong Kong Chinese adults and Chinese Americans, report valuing low-arousal positive states such as being calm and peaceful (Tsai, Knutson, & Fung, 2006). More germane to the discussion here, Tsai argues that ideal affect valuation is acquired through engaging in culturally dominant tasks. Specifically, Tsai et al. (2007) linked cultural differences in affect valuation to culturally different goals for influence and adjustment. People whose goal is to exert influence, they proposed, are poised for action, leading them to desire emotional states that are higher in arousal. In contrast, people whose goal is to adjust to others must restrain their personal thoughts and preferences, resulting in a preference for low-intensity affect.

To test these hypotheses, Tsai et al. randomly assigned pairs of participants to different roles in dyads: one was an "influencer" and one was an "adjuster." The influencer (a role that emphasized personal control) was assigned a role of Leader and was instructed to put a set of tangram cards in order and then to communicate that order to the Matcher (the partner in the adjuster, or "secondary control" condition). In the middle of the task, they asked participants to indicate their ideal feeling states—what they would ideally like to feel "right now." The results supported

the hypothesis that influence goals caused people to value high-intensity affective states, and adjustment goals caused people value low-intensity states, and this held for both American and Hong Kong Chinese samples. Tsai and her colleagues' research provides additional support for the argument that cultures afford different opportunities to practice influence (primary control) versus adjustment (secondary control). In addition, their research illustrates how control strategies are embedded in a matrix of cultural meaning systems, including values about the emotions people want to feel. The approach represents a sophisticated view of culture in which cultural systems of meaning and value have multiple consequences for people's behavior and emotions.

More broadly, culturally dominant types of situations shape the type of positive emotions people experience, with Americans reporting that they felt happiest when experiencing emotions marked by disengagement from others and being in control of what they are doing (like "feeling on top of the world" or "superior"). In contrast, Japanese felt good when experiencing emotions marked by engagement with others (such as "feeling like being babied" (Kitayama, Markus, & Kurokawa, 2000). Emotional situations are also associated with culturally different action styles, as Boiger et al. (2012) demonstrated in a sample of European Americans and Asian Americans. In describing daily positive emotional situations and mixed positive-negative emotional situations, Asian Americans reported a more adjusting action style ("I adjusted to other people's expectations about me") compared to European Americans. These studies suggest that culturally different situation-scapes, emphasizing either influence or adjustment, shape people's emotional experiences.

Culturally Shaped Strategies for Situation-scapes: Holistic and Analytic Cognition

People's styles of attention appear to be related to their motives for control (Whitson & Galinsky, 2008), but these relationships are shaped by culture. One example comes from the study on lack of control and illusory

pattern perception (Wang et al., 2012) in which people were motivated to find patterns in the horoscopes of themselves versus others depending on whether they or their cultures were more primary-control–focused or secondary-control–focused.

Other work has demonstrated how cultural patterns of influence and adjustment goals shape holistic and analytic cognition. In holistic cognition, people attend to contexts and explain things based on relationships between focal objects and their contexts—they are field-dependent (Miyamoto, 2013). In analytic cognition, people attend to focal objects separate from their context and explain things based on individual actors or objects and their internal attributes—they are field-independent (Miyamoto, 2013). Research has demonstrated that analytic cognition is privileged by North American cultural contexts and developed more in European Americans, whereas holistic cognition is privileged by East Asian cultural contexts and developed more in East Asians (for a review, see Miyamoto, 2013). Such cognitive differences manifest in attention, memory, explanation, categorization, and social inference. For example, in a modified rod-and-frame test (a measure of field dependence), Americans tend to make more errors at drawing a bar that is the correct proportion for its frame (a relative task requiring holistic attention), whereas Japanese tend to make more errors drawing a bar that is the correct absolute length, ignoring its frame (an absolute task requiring analytic attention; (Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009). Holistic thinkers may categorize objects based on family resemblance or relationships, whereas analytic thinkers categorize objects solely on individual attributes. People spend different amounts of time fixating on foreground objects versus backgrounds in visual scenes, with analytic (and Western) thinkers focusing more on objects than on backgrounds (Masuda & Nisbett, 2001; Zhou et al., 2012).

Miyamoto and Wilken (2010) demonstrated that Americans use analytic cognition to support influence goals. Americans who reported being more interpersonally influencing were better at the absolute line task, and Americans who were assigned to the role of influencer (using the same Leader and Matcher task of Tsai et al., 2007) showed a more analytic

perceptual style than when assigned to the role of adjuster. Miyamoto and Wilken suggested that Americans use an analytic perceptual style to influence others. In contrast, Japanese may equally adopt holistic and analytic cognition to support their influence goals. A holistic perceptual style may help people be successful influencers in Japanese cultural contexts, perhaps by attuning people to the contextual forces acting on others.

Cooperative vocations such as farming and fishing, which require people to adjust their actions to others and coordinate the use of common resources, may support a more holistic cognitive style (Uskul, Kitayama, & Nisbett, 2008). In contrast, independent vocations such as herding, in which people must exert greater autonomy and assert influence in order to protect their resources, may support a more analytic cognitive style. Supporting this view, Uskul et al. (2008) found that farmers and fishermen in Turkey (who differed in occupation but shared a common language, nationality, religion, and social class) showed relatively holistic tendencies in a variety of simple holistic-analytic tasks, whereas herders showed more pronounced analytic tendencies.

Similarly, Zhou et al. (2012) proposed that cultural differences in control orientations could be one explanation for why Asian cultures typically display holistic patterns of cognition. When they put both Asian and Western participants in short-term situations that deprived them of primary control, all groups shifted to a more analytic style of cognition in attention, categorization, or evaluation. However, when participants were in longer term control-deprivation conditions (through prolonged, noncontingent feedback), Chinese students shifted to more holistic styles of attention and categorization. The authors proposed that cultural patterns of thinking are flexible adaptations to situational constraints. They argued that in East Asian cultures, prolonged exposure to situations that are perceived to be intractable require people to adjust to the situation, and such adjustment promotes more attention to contexts and relationships (Zhou et al., 2012). Taken together, all the work reviewed in this section suggests that culturally shaped patterns that emphasize personal control, agency, or influence (vs. adjustment and accommodation) have downstream consequences for cognition.

WITHIN-CULTURE DIFFERENCES: CONTROL AND AGENCY IN MIDDLE- AND WORKING-CLASS CULTURES

Whereas much cultural psychology research has studied differences between nations, we can see examples of cultural influences even *within* a nation such as the United States. A set of studies has documented that psychology's traditional focus on perceived control, including personal choice, internal locus of control, and agency that originates in the individual best describes a model of the individual that is dominant in middle-class contexts, such as those of college students in the United States. For example, "the assumption that choice is a universally powerful, individually liberating action permeates the ideas, practices, and institutions of mainstream American contexts" (Stephens et al., 2011, p. 33). Such "disjoint agency," as these researchers label it, construes agency as originating in the self. The "best" and most "healthy" agency is that which reflects people's choices and preferences (Stephens, Hamedani, Markus, Bergsieker, & Eloul, 2009). These collaborators, however, have articulated alternative models of agency that may be dominant in working-class contexts in the United States. They claim that whereas working-class Americans share many of the same cultural values, religious beliefs, and models of the self as mainstream Americans do, they also face fewer opportunities for social mobility and economic security. Working-class Americans are also socialized to focus on other people before themselves (Lareau, 2011). Therefore, opportunities for expressing one's self through choices is more limited, and choice behavior may be construed as unrealistic or selfish in working-class contexts. In such contexts, "conjoint agency" may be a dominant model. Such agency responds and adjusts to circumstances, expectations, or roles; the "best" or most "healthy" agency is that which enables people to be connected to others (Stephens et al., 2009). (Agency, defined by Stephens and her colleagues as "a way to act in and respond to the world" [p. 879] is, arguably, a broader and more culturally inclusive label for the psychological construct of perceived control.)

For example, when middle-class Americans find their choices reduced, they experience reactance and may even want a restricted item

more (Brehm, 2000). But working-class Americans do not show the same tendencies; they are more accepting of the resources that are available (Snibbe & Markus, 2005). In working-class contexts, choices are limited, and there is more emphasis on accepting one's circumstances. For example, lyrics for songs popular among working-class populations extol maintaining individual integrity and self-management ("you can't always get what you want;" "let it be"), whereas lyrics popular among middle-class samples emphasize uniqueness and self-expansion ("your time has come to shine" and "He ain't wrong, he's just different"; Snibbe & Markus, 2005). In a behavioral study, working-class adults were more likely to simply accept a gift (a pen) from an experimenter, whereas middle-class adults wanted to choose which gift they received (Stephens et al., 2011). (This effect of social class was partially mediated by people's experiences with choice in their workplace.) In the same report, working-class participants preferred a shirt that another person had accepted as a gift from someone else, whereas middle-class participants preferred a shirt that another person had chosen for herself. Once again, experience in a specific cultural context shapes whether or not people seek control through personal choice and shapes how they respond to losses of that choice.

Cultural experience also shapes how people perceive their own and others' choices. In a set of interviews with people who survived or helped with Hurricane Katrina in New Orleans, in 2005, researchers found that people—even relief workers—perceived those who evacuated as being more agentic and sensible, compared to those who stayed in the city because they did not have adequate resources to leave. Observers derogated the personal agency of people who stayed behind, characterizing them as "lazy" and "passive" (Stephens et al., 2009). What about people who actually did leave or stay behind—how did they construe their own actions? Stephens et al.'s interviews with "stayers" showed that they appropriated the broader, more interdependent conjoint model of agency. Stayers explained their actions in terms of being strong, connecting to others, and having faith in God. Stephens et al. argued that people who stayed behind were usually of low socioeconomic status (SES) and had few resources to evacuate—they could not

have acted in a "disjoint agency" way even if they had wanted to. In contrast, "leavers," who had the resources to evacuate, explained their own actions in terms of the independent, disjoint model of agency, indicating their own choice to do so in the face of risk.

Taken together, this research reminds us that the disjoint model of agency, which has dominated research on perceived control, is not necessarily maintained or endorsed in cultural contexts where people's life circumstances provide few resources and options. In such situations, people seem to construe their agency using a conjoint model, where agency is experienced interdependently through adjusting to others and acting in a community.

A NOTE ON CONTROL TAXONOMIES

Earlier, I acknowledged how this chapter has lumped together a broad range of control constructs, combining research on "perceived control" with research on choice, agency, and related constructs. Interested readers may wish to review more cleanly organized presentations of control constructs. One such attempt is Skinner and her colleagues' work (Skinner, 1996; Skinner, Edge, Altman, & Sherwood, 2003), which not only defined constructs of control (1996), but also situated primary control and secondary control in different domains of self-determination theory (competence and autonomy, respectively). Another reorganization of control, situated in a cultural context, was presented by Yamaguchi and colleagues (Sawaumi, Yamaguchi, Park, & Robinson, 2015; Yamaguchi, 2001), who explain how primary control can be enacted indirectly or via proxy so that people in collectivistic cultural contexts can achieve desired outcomes without disrupting harmony. Other authors (Takemura & Naka, 2012) have suggested ways to separate the many different interpretations of secondary control that are used in the literature. Some writers have proposed alternative avenues for primary control in interdependent contexts, such as control via self-improvement (Kurman, Hui, & Dan, 2012) and control via collective action (Hernandez & Iyengar, 2001).

WHAT DOES A CULTURAL PERSPECTIVE CONTRIBUTE?

Overall, what does the cultural psychological perspective contribute to perceived control research? The traditional study of control, exemplified by Rotter's (1966) original "internal locus of control" theory, suggests that psychologically healthy people believe they can manipulate the environment according to individually held preferences or desires. However, the present chapter has demonstrated that this model of control feels less familiar in certain cultural situations and contexts. Sometimes, as in secondary control, it is the environment that is fixed and the person who is malleable. In some cultural settings, people experience agency not in terms of their own preferences and desires, but as a process of coordinating with others. Anecdotally, in certain cultural contexts, personal control is viewed as selfish because it promotes one's own agenda and disrupts social harmony. Therefore, a cultural model of control reminds us that agency and control, although undoubtedly important for all humans, is nonetheless shaped by people's engagement with specific cultural worlds.

The cultural perspective as outlined in this chapter can impact future research on control in both practical and theoretical ways. For one, a cultural perspective reminds us that theorists and their audiences are members of a specific cultural context. Hypotheses about perceived control that "make sense" in one culture might not be logical, feasible, applicable, or important in another. Relatedly, if we claim to be studying human nature, we shouldn't simply recruit participants who are middle-class European North Americans. Nor is it advisable to simply translate measures developed in one culture and drop them into use in another cultural context. Instead, we should observe the way dominant social situations are constructed in other cultural contexts and use these observations to inform what psychological processes are privileged, valued, and developed by a culture's participants. In sum, as researchers, we should adopt a skeptical attitude toward our own "common sense" and use ethnography and international collaboration to become less biased toward our own cultural perspectives.

Second, a cultural perspective requires us to measure not only people's psychological motivations, actions, or emotions, but also the culturally specific products, discourse, or social situations with which people regularly engage (e.g., Morling & Lamoreaux, 2008). So far, there is limited research on how control philosophies are carried in cultural products, so the field is ripe for such work. It will be helpful to understand more about the specific cultural contexts that support perceived control and adjustment.

Third, Shweder recommends that cultural psychologists engage in an interpretive process called "thinking through cultures." One part of thinking through cultures is when, in the process of learning about some other cultural context, we recognize hidden aspects of our own psychology. Without "thinking through" other cultures, researchers might assume that secondary control only serves to support primary control, or that accommodation to the environment is a form of helplessness or resignation. In contrast, I hope that by reading about perceived control from a cultural perspective, researchers might come to appreciate how processes like secondary control and conjoint agency can be positive, intentional, and meaningful. These processes make sense in cultural contexts of interdependence or limited material resources. By thinking through how these processes make sense, North American researchers might notice how they are at work in their own culture as well. We might even study these "foreign" concepts in our own cultures (e.g., Morling et al., 2003; Sasaki & Kim, 2011).

By thinking through a variety of cultural meaning systems, our research can become more inclusive and diverse. As an example of the benefits of thinking through multiple cultural models, we might consider the example of mindfulness. Mindfulness (a deliberate, nonjudgmental awareness of the present moment) is a technique whose roots are in the Buddhist practice of meditation. Mindfulness training improves emotion regulation, social interaction, and cognitive performance, and mindfulness techniques have been added to cognitive-behavioral therapy, leading to what has been dubbed a "third wave" of psychotherapy (Hayes, Follette, & Linehan, 2005). The idea began to enter Western psychology

because some psychologists open-mindedly embraced and translated perspectives that were originally nonscientific and culturally foreign (for an example in the field of emotion, see Ekman, Davidson, Ricard, & Wallace, 2005). Just like mindfulness, secondary control and other alternatives to personal control (such as conjoint agency, accommodation, or fit-focused secondary control) may at first seem nonscientific or foreign to researchers steeped in middle-class, European practices. However, in some future form of perceived control research, the context might be "primary" and the individual might be "secondary." In the future, "perceived control" might not be limited to an individual person acting only in response to internal preferences. A cultural perspective on perceived control shows us that people engage with the world and perceive order in the universe in a variety of culturally situated ways.

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5

An Autobiography of Rotter's Social Learning Theory Modified for Health

KENNETH WALLSTON ■

In September, 1964, I arrived at the University of Connecticut in Storrs to begin my graduate studies in clinical psychology. My academic advisor was Julian (Jules) Rotter, who had come to UConn from Ohio State University in 1963 to be the Director of the Clinical Psychology Program. Rotter was the advisor for *all* of the first year students in clinical, and he also taught the course in measurement. I vividly remember him perched on the corner of a desk in front of the class, smoking his pipe, and valiantly trying to get us to understand the subtle nuances of construct validity. Yes, this was back in the days when professors were allowed to smoke in class, and we used to watch in fascination as Rotter went through match after match in order to keep his pipe lit. I even remember some fellow classmate trying to make book on how many matches Professor Rotter would go through each class period.

Rotter didn't remain my advisor for long. At the end of my first semester, he called me into his office and told me that I had managed to alienate

a number of the clinical faculty who didn't appreciate my tendency to argue with them when I thought they were wrong and I was right. They had labeled me "defensive" and felt that I didn't have the makings of a clinical psychologist. Rotter told me I had two choices: I could either drastically alter my personality—in which case the faculty might change their opinion of me and allow me to stay in the clinical program—or I could transfer to some other program within the department. That was the day I decided to become a social psychologist.

A couple of years later, Rotter's 1966 monograph on internal versus external (IE) locus of control orientation was published along with the IE Scale. I had had an introduction to the locus of control construct and the scale that Rotter had developed to measure the construct back when I took his course, but I didn't have the opportunity to do much with either the construct or the measure during my graduate student days, nor did I think much about it during my first faculty position at the University of Wisconsin–Madison in the late 1960s. It wasn't until my second year as an assistant professor in the School of Nursing at Vanderbilt University in Nashville, Tennessee, that I had reason to turn my focus to locus.

In early 1973, a nursing faculty colleague who specialized in diabetes asked if I would help her evaluate the impact of a series of five classes that she and Dr. Alan Graber, an endocrinologist at Vanderbilt, gave to newly diagnosed diabetes patients and their caregivers. The classes met for 90 minutes each day for a week, and each day a different member of the health care team would lead the discussion. My nurse colleague had a particular interest in assessing how much knowledge the patients gained from the classes, and she invited me to sit in on the classes so I could get a sense of what information was presented. I agreed and asked if my wife, Barbara Strudler Wallston, who at the time was my research associate, could also attend.

The following Monday, Barbara and I attended our first diabetes education class. Dr. Graber, the physician, taught that first class. At the outset of his remarks, Dr. Graber said, "the most important thing that I am going to tell you today is that, contrary to popular opinion, I, as the doctor, am not in charge of whether or not your diabetes gets under control. You, the

patient, are the captain of the health care team. It is what you, yourself, do that will determine what happens to your diabetes." He then went on to talk about the medical aspects of diabetes and to answer questions for the rest of the session.

My nursing colleague led Tuesday's class, during which she discussed all of the self-care activities that patients with diabetes need to do in order to manage the condition. She reiterated Dr. Graber's theme that it was what the patient did, or did not do, that made all the difference in how the disease progressed. In walking back to the School of Nursing after that second class, I turned to my wife and said, "You know what this reminds me of? What they are saying is the same thing that Jules Rotter was talking about with his locus of control construct. Patients with a condition such as diabetes need to adopt an internal locus of control orientation if they are going to get better."

The remaining three classes that week, led by a dietician, a pharmacist, and a social worker, all reinforced Dr. Graber's message: the patient is the most important person on the team, and what the patient does is critical. The rest of the healthcare team can provide support, but the patient needs to play the central role. When the week was over and I met with my nursing colleague to give her our observations, I told her that I'd help her assess patients' knowledge, if she wished, but I thought it might be more important to assess their locus of control orientation. She was thrilled with the idea, but when she told Dr. Graber about it, he was less enthusiastic and told her to stick to her original idea of assessing patient knowledge.

A couple of weeks later, my wife, who had recently joined the American Public Health Association (APHA), mentioned to me that she had just received a call for proposals for the APHA meeting to be held in San Francisco later that year. We both wanted to attend that meeting, but we didn't have any data to present. Instead, we thought about what we had learned during that week of diabetes classes and decided to put together an abstract entitled, "Health Care Education Programs: Training Patient Internality." When the abstract was accepted for a podium presentation, we momentarily panicked because, other than having what we thought

was an insightful idea, we had done no research on the topic and were faced with coming up with a 10-minute presentation based on that single observation. But the meeting was still months away, and we had never been to San Francisco, so we forged ahead.

Once we started looking at the literature, we soon realized that we were not the first to think that locus of control was relevant to the behavior of patients with medical conditions. For example, A. P. MacDonald (1971, 1972) had published papers in which he argued that Rotter's construct of IE locus of control is relevant to individuals rehabilitating from physical and emotional disorders. Also, Bonnie Strickland gave a paper at the 1973 American Psychological Association (APA) meeting in Montreal that we attended in which she discussed the "important emergent area" relating internal locus of control beliefs to physical health and well-being. So, although our idea wasn't original, our thinking was validated by the fact that other people were thinking along similar lines. As part of the paper we put together for the upcoming meeting in San Francisco, we casually mentioned that it might be a good idea to have a health-specific version of Rotter's IE Scale.

Barbara Wallston and I shared the duties for our APHA presentation; she gave the talk and I handled the questions. The last question, from the back of the audience, was, "How can I get a copy of your scale?" I had to sheepishly tell the questioner that there was no scale; it was just something we thought somebody ought to develop. On the plane ride back to Nashville, however, Barbara and I agreed that maybe we should be the ones to do it, so, the following week, during a research team meeting, we asked our two graduate research assistants, Gordon Kaplan and Shirley Maides, if they would like to help us. That was how the original Health Locus of Control (HLC) scale (B. S. Wallston, Wallston, Kaplan, & Maides, 1976) got developed.

The original HLC scale consisted of 11 items, five of which were worded in the internal direction—that is, agreement with those items meant that respondents believed their health was determined by their own actions. The other six items were worded in the external direction; agreement on those items signified belief that factors outside of the individual's own

control, such as fate, luck, chance, or the behavior of other people determined the person's health status. Following Rotter's example with his IE Scale, we scored the HLC Scale so that high scores stood for an external health orientation and low scores stood for an internal health orientation. Respondents whose HLC scores were above the median were classified as "health externals," and those scoring below the median were labeled "health internals."

MODIFIED SOCIAL LEARNING THEORY: BABY STEPS

Right from the beginning, we wanted to make sure that the HLC Scale was grounded in a theoretical framework, so we turned to Rotter's social learning theory (SLT; Rotter, 1954) since that was the framework that had spawned his IE Scale. One of the main tenets of Rotter's SLT was that behavior potential (BP; the likelihood that a given behavior would occur in a given situation) is a function of two things: (1) an expectancy (E) that the behavior would lead to a given reinforcement in that situation, and (2) the reinforcement value (RV) of that outcome in that situation. In order to do a behavior, the person had to believe that the behavior would result in a favorable outcome. As an example, the probability that Barbara Wallston and I would write and then submit an abstract to the 1973 APHA meeting was a function of how much we expected that submitting that abstract would lead to a trip to San Francisco and how important (i.e., reinforcing) going to San Francisco would be to us at that time in our lives.

Rotter's SLT operates at two levels—one that is behavior- and situation-specific and another that is generalized across behaviors and situations. Locus of control is an example of a generalized expectancy—the belief that, regardless of the situation, reinforcements are either under the control of the individual actor (i.e., internally controlled) or under the control of forces external to the actor. When an actor has lots of experience in a given situation, it is situational expectancies that influence his or her actions, but when an actor is confronted with a novel situation, generalized expectancies are what determine whether or not the behavior

occurs. The more experience an actor has with a situation, the more the behavior is determined by situation-specific expectancies (Strickland, 1978), but only if the person believed that doing the behavior would lead to valued outcomes. In the previous example, although Barbara and I were novices when it came to writing and submitting abstracts, we were both relatively new PhDs who had experienced a fair amount of academic success and were naïve enough to expect that any abstract we submitted would be accepted. Not only were we internally oriented with respect to our professional capabilities, we very much wanted to travel to San Francisco to attend the APHA meeting, so the RV for that outcome was very high.

VERSION 1 OF MODIFIED SLT APPLIED TO HEALTH

After we and our students had developed the initial HLC Scale (B. S. Wallston et al., 1976), we set out to validate it using as a guide Rotter's SLT that stipulated that behavior is a joint function of expectancy and RV. Behavior potential (BP) was conceptualized as the likelihood that a given health behavior (e.g., dieting by restricting one's daily caloric intake) or set of functionally related health behaviors (such as managing one's weight through a combination of diet and exercise) is a joint function of an internal locus of control orientation regarding one's health status *and* a high value placed on good health. We recognized right off the bat that we needed to take a firm stand on what we meant by the conjunction "*and*" in the previous sentence. Were we positing an additive model or a multiplicative model? We interpreted Rotter's SLT as calling for a multiplicative model; even if an individual was highly internally oriented regarding his or her health, unless that person also highly valued health as an outcome, behavioral potential would be low. Thus, by positing a multiplicative function between expectancy and RV, we were adamant that in order to test our version of modified social learning theory (MSLT) it would be necessary to look for interactions between the measures of expectancy and RV: $BP = E \times RV$.

Our very first study, which turned out to be Shirley Maides's master's thesis, tested the proposition that subjects who held internal locus of control beliefs and who also highly valued health would choose to expose themselves to more information about a given health condition—hypertension, in that instance—than internals who place a lower value on health or externals regardless of the value they placed on health. Following Rotter's example with the IE Scale, we dichotomized scores on the HLC Scale into "health internals" versus "health externals" and also dichotomized scores on a health value (HV) measure that we adapted from Rokeach's (1973) Value Survey into "high" versus "low" HV. We also gave Rotter's IE Scale to the subjects in hopes that we could show that using our new health-specific measure of locus of control would produce "better" (i.e., more theoretically consistent) findings than using the more generalized IE Scale.

Although that first test of Rotter's SLT modified for health did not quite produce statistically significant results for the two-way interaction between HLC and HV ($p = 0.08$), we did a planned comparison pitting the health internals who were also high in HV against the other three cells in our 2×2 design and discovered that they chose more hypertension-related information than the other subjects ($p = 0.04$). We also found that using the HLC Scale to classify subjects as internals or externals led to a more theoretically consistent result than when we classified them according to their IE Scale scores. That was enough encouragement to get us to do a replication study with a slightly larger sample where we did, in fact, obtain the theoretically consistent two-way interaction using the HLC Scale, but not when we used the IE Scale (Wallston, Maides, & Wallston, 1976).

Another study from that era testing our hypothesis that health behavior was a joint function of health locus of control beliefs and HV was done with participants in a smoking cessation program offered at the University of Cincinnati. As predicted from our modification of Rotter's SLT (MSLT), individuals who both valued health highly and expressed internally oriented health locus of control beliefs were more successful in reducing smoking by the end of a 15-week treatment program and demonstrated much better maintenance of behavior change over a three- to

five-month follow-up period than all other subjects (Kaplan & Cowles, 1978). In particular, the high health-value health internals differed significantly from the low HV health internals at the end of the follow-up period.

FLIES IN THE OINTMENT

Having developed and published the HLC Scale based on Rotter's contention that locus of control is a bipolar, unidimensional construct with internals on one end of the continuum and externals on the opposite end, we soon began to realize that, empirically, there was more than one dimension underlying the 11 items on the HLC Scale. Others, such as Barry Collins (1974), were saying the same thing about Rotter's IE Scale. One day, based on a finding cited by MacDonald (1973) that a factor analysis of a Likert-format locus of control scale had produced a first factor consisting almost entirely of externally worded items, I took a number of datasets where the HLC scale had been administered and scored the five internal HLC items separately from the six external items; I found that the two subscales were orthogonal (uncorrelated) with one another. At about that same time, we became aware of a new set of generalized locus of control scales developed as a multidimensional alternative to Rotter's IE Scale. Hannah Levenson's I, P, and C Scales treated internality (I) as a separate dimension, independent from externality, and, within the external dimension, she had separate subscales for chance externality (C) versus powerful others (P) externality (Levenson, 1973).

Using Levenson's I, P, and C Scales as a template, we set out to develop what became known as the Multidimensional Health Locus of Control (MHLC) scales (Wallston, Wallston, & DeVellis, 1978). Initially, there were two equivalent versions of the MHLC Scale—Forms A and B—each consisting of three more-or-less independent subscales: internal health locus of control (IHLC); powerful others health locus of control (PHLC); and chance health locus of control (CHLC). We withdrew our support for the unidimensional HLC Scale and advised health researchers to use

the MHLC scales instead when they wanted to assess health locus of control. Just as Rotter's IE Scale became one of the most administered psychometric measures in the decade after its publication (Rotter, 1975), the same thing happened with the MHLC scales among health researchers (Wallston, 1992).

However, going from a unidimensional to a multidimensional assessment of HLC beliefs introduced a level of complexity that made it difficult to test our MSLT. For one thing, researchers could no longer easily classify people as health "internals" or "externals." There were now three expectancy measures (IHLC, PHLC, CHLC), not just one. Because the three subscales were uncorrelated (or, in the case of PHLC and CHLC, only modestly correlated), being internal (high) on IHLC did not necessarily mean that the person would score below the median on either or both of the external subscales. We even went so far as to develop a multidimensional typology of health locus of control types consisting of eight different classifications of individuals based upon their responses to the MHLC Scale (Wallston & Wallston, 1982), but this typographical approach necessitated large sample sizes and never quite caught on.

Another problem had to do with operationalizing RV simply by measuring the value of health. Not only are there difficulties with ceiling effects in measuring the value of health, especially among patients whose health is compromised by illness (see Smith & Wallston, 1992), but it also turns out that achieving good health isn't always the most salient or important reinforcement for engaging in what are typically thought of as "health behaviors." Many so-called "health" behaviors are probably reinforced by a combination of health-related and other factors. For example, dieting in order to lose weight may be more highly motivated by wanting to look more attractive to other people than a wish to become healthier, or, alternatively, the motivation to cut down on calories might be driven by a desire to fit into one's clothes, not to become healthy. If someone tried to test MSLT by only assessing HV, they might be way off the mark, yet it was difficult enough to persuade researchers to pay attention to the construct of RV by at least assessing the value of health as opposed to only measuring health locus of control beliefs; expecting them to assess

the value of each possible behavioral outcome and then to construct interaction terms involving a whole set of RVs seemed highly impractical. Because of this, the vast amount of research done with the MHLC scales either ignored measuring RV entirely or, if HV was assessed, not all researchers bothered to examine the interaction between HLC beliefs and HV when attempting to predict health behavior.

Yet another issue that arose with testing MSLT had to do with operationalizing the dependent variable: health behavior. Because neither the health locus of control measures nor the measure of RV (e.g., the value of health) were specific to any one health behavior (e.g., exercising, abstaining from tobacco, or taking one's prescribed medications), the most appropriate dependent variable with which to test MSLT should be an index of health behaviors, not simply a single behavior or even a set of functionally related behaviors (such as adopting weight management strategies). Few psychometrically sound indices of multiple health behaviors existed or, if they were available, they were not frequently used.

SHIFTING THE FOCUS OFF OF LOCUS

Another problem that we and other users of the MHLC scales were running into was that even among people who indicated that they highly valued their health, the three MHLC subscales did not correlate very highly with measures of health behavior—even when the dependent variable was an index of health behaviors as opposed to a measure of a single behavior. Given an adequate sample size, it was usually the case that the internal subscale (IHLC) was significantly positively related to health behavior and the external chance subscale (CHLC) was significantly negatively related to health behavior, but when the measure of health behavior was regressed onto the three MHLC subscales (including the PHLC) it was a rare study that ended up accounting for much more than 10% of the variance in the behavioral measure. This was in contrast to what we and others were finding in the late 1980s, when we correlated a measure of a related construct, self-efficacy (Bandura, 1977), with the same measure of health behavior

and found much stronger relationships between self-efficacy and health behavior than we were finding with health locus of control.

As serendipity would have it, right at the same time I was contemplating writing an article about how self-efficacy was more strongly predictive of health behavior than health locus of control, my friend Tim Smith was soliciting articles for a special issue of *Cognitive Therapy and Research* that he was editing related to theoretical approaches in health psychology. I contacted Tim and said that if he would let me title such an article, "Hocus-Pocus, the Focus Isn't Strictly on Locus: Rotter's Social Learning Theory Modified for Health," I would be glad to contribute an article to the special issue. Thus was the genesis of what, to this day, remains what I think of as the most important contribution I have made to the health psychology literature.

In that "Hocus-Pocus" paper, I argued that Rotter missed the boat when he chose locus of control as his expectancy construct in 1966. I wrote (Wallston, 1992, p. 184):

> It is noteworthy that Rotter chose locus of control as his first (and major) generalized expectancy construct. Given his proposition that expectancies linked actions to outcomes, he could just as easily have developed and/or advocated some other cognitive expectancy construct such as self-efficacy, mastery, or competence. There is nothing inherent in his basic SLT proposition that necessitated locus of control as opposed to perception of control to be the major generalized expectancy in SLT.

I then went on to discuss a secondary data analysis project that I and my colleagues at Vanderbilt had initiated where we invited other researchers who had utilized the MHLC scale in relatively large samples to share their data with us in the hope that we might find something in their datasets that they had not yet uncovered. However, after reviewing a number of those datasets from that project, I concluded that the results only confirmed our initial pessimistic impression that the MHLC scales did a relatively poor job of predicting behavior even when the dependent variable

was an index of several health behaviors and only subjects who highly valued health were examined.

My review of these other studies singled out a paper by Nola Pender (Pender, Walker, Sechrist, & Frank-Stromberg, 1990) where, among other things, Pender and her colleagues investigated the relationship between MHLC beliefs and the likelihood of engaging in health promoting behaviors of 589 Midwestern workers who were participating in health promotion programs conducted by their employers. The dependent variable, which was administered at baseline and at a three-month follow-up, was the Health-Promoting Lifestyle Profile (HPLP; Walker, Sechrist, & Pender, 1987), a 48-item instrument of health behavior, which, perhaps even to this date, is the most comprehensive measure of health behavior available for studies of this kind.

Pender et al. (1990) found that IHLC correlated 0.24 ($p < 0.001$) with the HPLP index at baseline and 0.24 ($p < 0.001$) three months later. They also assessed HV in that study using the same ranking procedure we had used and found that HV was uncorrelated with HPLP scores. Unfortunately, Pender and her colleagues did not examine the interaction of IHLC and HV, so this was not a true test of our MSLT. However, what was a greater predictor of health behavior than health locus of control in the Pender et al. study was another measure that I had also developed to assess generalized self-efficacy—a measure Pender et al. referred to as "personal competence"—that explained about twice as much variance in HPLP scores than did the MHLC scales. As I wrote in my "Hocus-Pocus" article (p. 194), "It [was] the kind of a measure that Rotter could have developed but did not."

VERSION 2 OF MSLT APPLIED TO HEALTH

The final section of my "Hocus-Pocus" article put forth a modification of our earlier version of MSLT in which I simply substituted *perceived control* for *locus of control* as the expectancy construct:

> The health-related version of modified SLT states that the potential for an individual's engaging in a set of health-promoting behaviors is a function of the interaction of HV and perceived control over health. People must value health as an outcome, believe that their health actions influence their health status, and concurrently believe that they are capable of carrying out the necessary behaviors in order to have a high likelihood of engaging in a health-directed action. (Wallston, 1992, p. 195)

By putting the focus on the expectancy (or perception) of control, rather than on where that control resided, I was downplaying the construct of *locus* of control and focusing more on self-efficacy—control over the behavior as well as over the outcome of that behavior. I was reluctant to eliminate locus of control entirely from MSLT; instead, I relegated it to the status of a moderator of efficacy beliefs, a status similar to HV. As if the theory wasn't already complex enough, I went on to write:

> Furthermore, at any one point in time, individuals are faced with deciding among multiple potential behaviors, including not engaging in health-directed behavior. Depending on the expected outcomes for these other behaviors, and the value of these other outcomes, the behavior potential for an alternative behavior may be stronger than for the health-promoting behavior. (p. 195)

This latter statement opened the way for MSLT to be applied to behaviors other than what have traditionally been thought of as "health behaviors," including simply avoiding health behaviors in order to do something more rewarding. It also implied that values other than the value of health might be explored as moderators when testing MSLT. But the most significant alteration of the theory was to shift the focus off of locus and onto self-efficacy as the major predictor of behavior. I also suggested that a measure of generalized health self-efficacy, such as our Perceived Health Competence Scale (PHCS; Smith, Wallston, and Smith, 1995), might be a

good choice to use along with an internal HLC scale when using MSLT to predict health behavior.

TESTING MSLT IN PATIENTS WITH TYPE 2 DIABETES

Although for many reasons it might be better to test the ability of MSLT to predict health-promoting behaviors among relatively healthy individuals, it is not all that surprising that health researchers gravitate to a condition such as type 2 diabetes mellitus (T2DM) in order to test the theory. For one thing, T2DM unfortunately is a very common condition and its prevalence is increasing rapidly. Additionally, patients with T2DM are expected to carry out a number of self-management behaviors, involving dietary restrictions, exercising, self-testing of blood glucose levels, adhering to a medication regimen, checking one's feet regularly, and quitting smoking (if applicable), so that it is not all that difficult to construct an index of diabetes self-care activities that can serve as the dependent variable in a research study.

I am aware of three studies of patients with T2DM that have been conducted explicitly to see if interactions among the constructs of MSLT (i.e., health locus of control and self efficacy beliefs along with HV) are more predictive of behavior than any of the constructs individually. The first such study was conducted by Anise Man Sze Wu with support from two of her professors at the Chinese University of Hong Kong (Wu, Tang, & Kwok, 2004). Wu studied 191 elderly Hong Kong Chinese with T2DM. She operationalized health locus of control beliefs with two of the subscales from Form C of the MHLC scale (Wallston, Stein, & Smith, 1994): internal (IHLC) and doctors (DHLC). Form C allows the researcher to make the wording of the items specific to a given medical condition (in this case diabetes) rather than health in general. For Form C, the DHLC is a separate measure of the PHLC, distinct from control of one's health by laypersons such as family members or friends. Wu measured self-efficacy (SE) with a six-item Likert scale relative to "health habits" and measured HV with a four-item Likert scale developed by Lau et al. (1986). Wu's

dependent variable was an 11-item subscale of "diabetes-related habits." In addition, she also assessed physical functioning (PF) with the Hong Kong Chinese version of the SF-36. Physical functioning is not formally a construct in MSLT, but Wu used it as a control variable in her hierarchical regression analyses.

In unadjusted bivariate analyses, Wu found that all of her measures were significantly associated with her index of diabetes-related behaviors, ranging from a low of .16 for PF ($p < .05$) to .49 for HV ($p < .01$) (Wu et al., 2004). Testing MSLT, however, calls for multivariate (i.e., adjusted) regression analyses that are usually performed hierarchically with main effects entered on earlier steps followed by two- and three-way interactions among the predictors on later steps. When Wu entered the main effects as a block in Model 2, she found that only HV, SE, and DHLC (control of diabetes by doctors) uniquely explained a significant amount of the variance in her behavioral index. Disappointingly for MSLT, none of the two- or three-way interaction effects was significant when they were allowed to enter the equation in subsequent models. In their discussion of the results, Wu et al. (2004, p. 737) claim that the fact that self-efficacy was a significant main effect predictor is "in line with modified social learning theory (Wallston, 1992)," but, in truth, the absence of any significant interaction effect means that this study's finding did not support my theory.

A later study of 109 T2DM patients predominantly from an African American as well as a disadvantaged background, conducted by Erin O'Hea and colleagues at Louisiana State University (O'Hea et al., 2009), found that a significant three-way interaction among internal health locus of control, self-efficacy, and outcome expectations explained glycosylated hemoglobin (HbA1c) levels, which were used as a proxy for diabetes self-care behaviors over the past several months. Specifically, this study (on which I was graciously invited to be a co-author) found that patients who were low on both self-efficacy, measured with a subscale from the Multidimensional Diabetes Questionnaire (MDQ; Talbot, Nouwen, Gingras, Gosselin, & Audet, 1997), and outcome expectancies (i.e., patients' perceptions of the effect of diabetes self-care activities on

metabolic control and the prevention of diabetic complications—also assessed with the MDQ) were those who benefited the most from having an internal diabetes locus of control orientation. In contrast, patients who were low on self-efficacy but were high on both internal diabetes locus of control and outcome expectancies had poor HbA1c results. The strongest unadjusted correlation among the variables was between self-efficacy and HbA1c (–.44; $p < .01$). However, this study did not include a measure of HV, so, technically, it, too, could not really be construed as a test of MSLT as I had formulated it back in 1992, even though it included more than one measure of perceived control and a significant three-way interaction effect was predicted and found.

The most recent test of MSLT that I am aware of was conducted by Linda Nugent for her 2014 doctoral thesis in nursing at the University of Edinburgh. Nugent's sample consisted of 107 patients with T2DM, all of whom were taking insulin for their condition. As did the other two investigators, Nugent assessed internal diabetes locus of control with Form C of the MHLC scales and, like Wu et al., assessed HV with the scale developed by Lau et al. (Lau, Hartman, & Ware, 1986). Diabetes self-efficacy was measured using the Perceived Diabetes Self-Management Scale (Wallston, Rothman, & Charrington, 2007), a condition-specific version of our Perceived Health Competence Scale (Smith et al., 1995). Finally, an index comprising five subscales from the Summary of Diabetes Self-Care Activities (SDSCA; Toobert, Hampson, & Glascow, 2000) constituted the dependent variable for Nugent's study. The only MSLT construct to correlate with the index of diabetes self-care activities in unadjusted analyses was diabetes self-efficacy (DSE; $r = .29$; $p < .01$), but in her adjusted multivariate hierarchical analysis, Nugent found a significant two-way interaction between internal diabetes locus of control and HV as well as a significant three-way interaction among IDLC, DSE, and HV.

This story would have a happy ending if I could tell you that the significant three-way interaction that Nugent found looked exactly like what I would have predicted from MSLT, but that was not the case. Instead of the patients who scored highest on IDLC, DSE, and HV reporting the

greatest amount of diabetes self-care activities, it turned out that their SDSCA scores were indistinguishable from the patients who scored low on all three MSLT constructs. The reason Nugent found a significant three-way interaction was due to the fact that the patients who valued health highly but were low in perceived control (both IDLC and SE) stood out as having the *lowest* scores on the behavioral index, whereas no group stood out as having the highest behavioral scores. That is certainly not what MSLT would have predicted.

SO, WHERE DOES THAT LEAVE US?

Two things are quite clear when looking at the three diabetes studies I just reviewed: (1) so far, there is little if any support for the prediction from version 2 of MSLT that the highest behavioral scores belong to those persons who *simultaneously* believe that (a) they are personally responsible for their health outcomes, (b) they are capable of doing the behaviors to achieve those outcomes, and (c) the RV of the outcome in question is very high; and (2) if you want to predict who will actually do (or report doing) health-promoting activities, it might be sufficient just to assess individuals' self-efficacy beliefs. What isn't entirely clear is whether we ought to consign my 1992 version of Rotter's SLT to the scrap heap that is filled with other well reasoned but little supported theoretical frameworks, or whether we should continue tinkering with the theory and testing it until we get it right.

WHAT IS NEXT FOR MSLT?

If we were to tinker with MSLT, what changes might we make? Part of me wants to simply let go of internal locus of control as a necessary theoretical construct, since in none of the diabetes studies I just reviewed did the measure of internal locus of diabetes control behave as predicted. To do so, however, feels a little like throwing the baby out with the bath

water. Perhaps a better approach might be to add one or more measures of external locus of control to the model, much like Wu et al. (2004) did by including doctors' locus of diabetes control along with ILDC. What Wu et al. didn't do, however, is look for interactions that involved both ILDC and DLDC. Had they done so, they might have reached a different conclusion regarding the viability of MSLT. In O'Hea et al.'s (2009) discussion section, they referred to an earlier paper by O'Hea and her colleagues that demonstrated that by looking at the interaction among several health locus of control beliefs a more meaningful picture of the relationship between such beliefs and health-related outcomes could be seen (O'Hea et al. 2005). Therefore, it may be a good idea, when testing MSLT, to emulate both Wu et al. (2004) and O'Hea et al. (2009) and include interactions involving multiple dimensions of locus of control instead of just the internal dimension.

Another approach might be to incorporate outcome expectancies (also referred to in the motivation literature as *perceived instrumentality*) into the mix, much in the way that O'Hea et al. (2009) did, but to also retain HV as part of the equation, which was not the case in the 2009 O'Hea et al. study. Clearly, if a person does not endorse the importance of doing the health behavior as a means of obtaining a desired outcome, there is little motivation to actually engage in the behavior. However, if HV is to remain as a key construct in the model, more work needs to be done to design a better measure of the value construct. Both Wu et al. (2004) and Nugent (2014) used the same four-item Likert scale to measure the value of health; Wu et al. found it highly predictive of diabetes self-care activities, whereas Nugent found no correlation whatsoever. We don't know if the problem is with the measurement of the construct, or if HV works quite differently in a sample of elderly Chinese in Hong Kong than it does with Scotsmen in Edinburgh. Adding outcome expectancies (or perceived instrumentality) to the model without dropping RV would make the model less parsimonious, but also might make it perform better.

As I hinted at earlier, it might also be the case that MSLT has never been adequately tested in the right population, one consisting of basically healthy human beings who are free from chronic medical conditions.

Such a population might contain a higher proportion of individuals for whom good health is not the most important thing in their lives. Pender et al. (1990) had the right population (healthy workers) and measured most of the necessary constructs, but because they tested an additive (i.e., strictly main effects) model and didn't look for interactions among the constructs, we will never know whether their data would have supported MSLT. It might pay to test MSLT in a large, basically healthy sample, examining interactions among the various locus of control dimensions, self-efficacy, outcome expectancies, and the value of health as well as the value of alternative outcomes, using a broad measure of health behaviors such as the Health-Promoting Lifestyle Profile (Walker et al., 1987). If a study such as that fails to find interaction effects consistent with MSLT, then maybe it is time to throw in the towel and admit that perhaps the action is *not* in the interaction, after all, and a simple additive model is sufficient to explain variability in health behavior.

CONCLUSION

To date, the evidence that my modification of Rotter's SLT explains and predicts health behavior better than other theories is not impressive. The construct of health locus of control—which motivated my attempt at theorizing in the first place—has been eclipsed by self-efficacy. As long as self-efficacy is assessed, a significant amount of variance in health behavior will be explained; the addition of health locus of control beliefs is superfluous. Also, it does not appear necessary to create interaction terms among the theoretical constructs (especially interactions involving HV) in order to account for variance in the degree to which individuals engage in health behaviors.

Yet every autobiography is a story without an ending; the storyteller lives on, and the future is somewhat uncertain. Will I finally abandon the health locus of control construct altogether in favor of an exclusive emphasis on self-efficacy? Will I valiantly cling to the notion that "the action is in the interaction" (Wallston & Smith, 1994) and continue to look for

ways to support MSLT? Also, there is no reason why MSLT needs to be confined to the study of *health* behavior. Just as Barbara Strudler Wallston and I took Rotter's more general SLT and tried to adapt it to understanding health behavior, others might take our framework and apply it to different domains of individuals' lives such as work, leisure time activities, or interpersonal relationships. Both locus of control and self-efficacy are constructs that can rightfully be subsumed under the more general rubric of perceived control, which is what this volume is all about. And control-related perceptions and beliefs are at the heart of almost everything that interests psychologists and other contemporary social scientists.

In times like this, I ask myself, "WWJD?" What would Jules do? Remembering Jules Rotter sitting in the front of our classroom in the mid-1960s, I bet he would probably just put this in his pipe and smoke it.

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6

Perceived Control and Mindfulness

Controlling the Impossibility of Controllability

SAYYED MOHSEN FATEMI AND ELLEN J. LANGER ■

Perceived control has been examined from a wide variety of perspectives. Some have discussed it in the context of experiencing good mental and physical health. Perceived control generally includes one's belief that one is able to determine one's internal state and is also able to influence the environment and make some positive changes or make some differences in dealing with a negative situation.

PERCEIVED CONTROL: BASIC FINDINGS AND RELATIONSHIPS

Perceived control has often been translated as a belief that can have significant external implications; namely, a belief that can give rise to external influential manifestations. This influence has been examined in terms of positive or negative outcomes (see Burger, 1992; Lachman, 2006; Skinner, 1995; Thompson, 1981, Thompson, & Heinberg, 1999).

In line with this, studies indicate that students reporting higher levels of perceived control of their academic performance displayed less anxiety, stress, boredom, and depression and gave rise to better grades than those with less perceived control (Perry, 2003; Perry, Hladkyj, Pekrun, & Pelletier, 2001; Ruthig, Hayness, Stupinsky, & Petty, 2009).

Perceived control has also sometimes been studied with a focus on health care processes (e.g., Smith, Wallston, Wallston, Forsberg, & King, 1984) or health behaviors or outcomes (e.g., Wallston & Wallston, 1981, 1982, 1984).

For example, victims of rape with perceived control over the outcomes in their lives reported less depression with fewer symptoms of post-traumatic stress six month or more after the event (Regehr, Cadell, & Jansen, 1999). Others have focused on perceived control and its clinical psychological implications (e.g., Kanfer, 1970; Rehm, 1977). People with a high degree of perceived control are able to challenge their automatic self-talk and choose proactive and positive self-talk. With an increase of perceived control, people learn how to create a new style of living, how to increase their choices, and how to come up with creative instead of automatic responses.

Some researchers on perceived control have conducted their inquiry within a correlational design, whereas others have focused on an experimental design. The former has not substantiated causal relationships with perceived control, whereas the latter has corroborated the possibility of a cause-and-effect relationship between control and the produced effect.

Other studies have found the presence of some third variable in contributing to feeling of control and good health (Johnson & Krueger, 2005). The confounding variables operating here may include ecological, environmental, familial, and external factors that may facilitate the process of attaining a feeling of control. For instance, people who are exposed to social support are able to deal with calamity and adversity in a more effective manner.

Perceived control suggests the possibility of the ability to influence one's psychological state, one's behavior, one's environment, and the outcomes and/or processes of some object of control. Loss of control is often

associated with depression, anxiety, and death. There are some research findings that demonstrate an almost cause-and-effect relationship between perceived control and physical and emotional well-being. Elderly people with a belief in their good health were more likely to display perceived control over their lives; they reported more controlling approaches in their lives in general (Menec, Chipperfield, & Perry, 1999). A very early field experiment in examining the relationship between perceived control and well-being goes back to 1976, in a nursing home in Connecticut. Those residents who displayed significant signs of disengagement from life and experienced the abyss of depression and helplessness received a message that made not only a big difference in their lives but also a message that opened a new horizon on what was later known as mindfulness.

Langer and Rodin (1976) instructed the director of a nursing home to convey a radically transformative message to its residents. Instead of focusing on what they could not do and what they were deprived of, the residents were encouraged to think about what they were able to do. Langer and Rodin selected two groups: an experimental group and a comparison group. For the experimental group, the residents were exposed to messages that underscored their power of control, their ability to do things, and their sense of empowerment. Their scope of power was highlighted, and they were invited to undertake action within the sphere of their delineated possibilities: their responsibilities and their accountability were accented.

Addressing the experimental group of residents, the director conveyed the following message:

> Take a minute to think of the decisions you can and should be making. For example, you have the responsibility of caring for yourselves, of deciding whether or not you want to make this a home you can be proud of and happy in. You should be deciding how you want your rooms to be arranged—whether you want it to be as it is or whether you want the staff to help you rearrange the furniture. You should be deciding how you want to spend your time . . . if you are unsatisfied with anything here, you have the influence to change it. . . . These are just a few of the things you could and should be

> deciding and thinking about now and from time to time every day. (Langer & Rodin, 1976)

The control-inducing factors were explicated by the director, then he reiterated that there would be a movie shown the following week on two different nights and that the residents should decide on which night they want to attend. He also provided opportunities for each resident to select a plant and indicated that the responsibility of taking care of the plant was theirs.

For the comparison group, the director presented a different scenario. He delivered a similarly structured message to the comparison group but did not make any reference to their power of control, their ability to make a decision, or their responsibility. Although informing the residents of the movie to be shown the following week, he did not give the residents' an ability to choose the night on which to watch the movie. Instead, he mentioned that they would be assigned a night on which to watch the movie. As for the plants, he gave all the residents a plant as a gift but told them that the nurses would take care of the plants.

Residents in the induced-control group displayed signs of higher happiness and higher activity in comparison with the control group. The intervention for the experimental group also made a surprising difference: it had a striking effect on the residents' health, and it tended to influence their mortality. In a second study, Rodin and Langer (1977) found that the group exposed to the empowering message lived 18 months longer than those who did not receive the message: 30% of residents in the comparison condition died, whereas the death rate was only 15% in the experimental group (Rodin & Langer, 1977).

Shortly after Langer and Rodin's experiment, a similar study was conducted in North Carolina. Richard Schulz (1976) designed an experiment for a nursing home involving undergraduate students who visited its residents. The residents randomly assigned to the experimental group were instructed to decide when and how long they wanted to visit with the students. Residents assigned to the comparison group were not given any

choice; in contrast with the experimental group, the students decided the time and frequency of the visits. Assessment of the outcome of these experiences showed that the experimental group displayed signs of higher happiness and higher activity and that they turned out to be healthier and did not take as much as medication as the comparison group.

Like Langer and Rodin, Schulz was also interested in assessing the range and scope of his intervention over a longer period of time, so he revisited the nursing home 24, 30, and 42 months after his initial intervention to inquire about the status of the participants' mortality rates. Shockingly, the experimental group in Schulz's design turned out to be in worse health and demonstrated signs of heath deterioration. Their mortality rate was higher than the comparison group (Schulz & Hanusa, 1978).

The difference in the results may be of great significance in understanding the underpinning constituents of perceived control in both experiments. In Langer and Rodin's study, residents in the experimental group experienced an enduring and sustainable sense of control, whereas in the Schulz's induced-control group, the residents experience a transient, ephemeral sense of control that ceased to operate after the students stopped visiting their assigned residents.

On one level, perceived control may be examined in the framework of attribution theory (Harvey & Weary, 1984; Kelley & Michela, 1980) or social learning theory (Bandura, 1977*a*; Bandura, 1977b; Rotter, 1954). The first focuses on events in the past and the analytical aspects of their experiences, and the second targets their expectancies and the future. Along with examining future- and past-related perceived control, self-efficacy and locus of control have also been employed to assess the relationship between perceived control and outcomes.

On another level, perceived control research and theory may open up a new horizon on the existential and phenomenological understanding of control. A wide variety of studies demonstrate that there are significant physiological, behavioral cognitive, and emotional changes attributable to the presence or lack of control.

THE PHENOMENOLOGICAL APPROACH

The phenomenological aspect of control may explain why and how Langer and Rodin's induced-control group, who received a message based on an enduring sense of control, acted differently than the Schulz's group, for whom the sense of control was temporary. Phenomenology discusses lived experience and its psychological implications. In a phenomenological analysis of an experience, we need to examine the subjective world of the actor and scrutinize how the subjective world is interpreted through experiences. Here, language is of great significance. We experience our experiences and we put our experiences into language. Understanding an experience provides a level of understanding that is distinct from the level of knowing. Understanding an experience is linked to the ontological psychology of the experience, whereas knowing about an experience occurs at an epistemological level. Knowing about choices is a far cry from understanding choices in the process of an action.

Choice-making is the exercise of control. To acknowledge control suggests the acknowledgment of having choices. If control is perceived to be dependent on a nonsustainable source, the phenomenological experience of control ultimately stands in contrast with the implication of control. Taking away control would impose detrimental and harmful consequences (Rodin, 1986).

Langer's further studies on control provided a relationship between perceived control and the exploration of possibilities (2005, 2009). A phenomenological analysis of perceived control may underpin the process of Langer's further research on mindfulness and its implications for perceived control. Langer focuses on mindfulness as the key to having choices. She defines mindfulness as "a flexible state of mind in which we are actively engaged in the present, noticing new things and sensitive to context" (2000, p. 220).

A note of caution needs to be made here in distinguishing between two major perspectives on mindfulness. One is associated with Eastern philosophy and Buddhism, where meditation appears to be the main tool

of mindfulness. The work by Kabat-Zinn moves in line with this perspective (see Kabat-Zinn, 1994). The other version of mindfulness, known as Langerian mindfulness, is associated with an experimental psychological approach with a continuous focus on creating and restructuring mindsets and perspectives along with flexibility, openness, and a proactive phenomenological presence in the moment.

Discussing the distinction between these two versions of mindfulness, Crum and Lyddy (2014) indicate that "Eastern mindfulness shines a clear light of unbiased and unattached awareness on existing mindsets whereas Langerian mindfulness involves a continual process or restructuring and creating mindsets anew" (p. 954).

The remainder of this chapter is on Langerian mindfulness and its implications for control and choice-making. Mindfulness begins with an active state of mind. In experiencing mindfulness, our passive, reactive, and automatic state of mind changes into an active and proactive state. This state is characterized through noticing new things, exploring novelty, and looking at the unfamiliar. It is creational. We create while we are mindful. In addition, mindfulness fosters an awareness of the context. As mindfulness expands, we become more sensitive of context. The past does not overdetermine the present. We pay attention to the rules, but we are not governed by them. The rules can be guiding but are not paralyzing. Mindfulness activates the experiential and phenomenological connectedness to the present moment. When mindful, we live in the moment: we experience a full engagement in the moment. Our presence is consummated through mindfulness (Langer, 2005, 2009).

Mindfulness has an influence on one's way of being, one's existential and ontological mode (Langer, 2000, 2005). Mindfulness provides the possibility of bridging the gap between the inner and outer worlds, where one ascertains the possibility of influencing both realms.

Langerian mindfulness as an approach proposes that control goes away when one is mindlessly disconnected from him- or herself. When mindless, one is constricted in an inflexible state of mind where one is steeped in an emotional, cognitive, and behavioral paralysis. This paralysis limits

the power of control and imposes helplessness and desperation as the only functional parameters of being.

Mindfulness entails an experiential acknowledgment of one's empowerment in the creative process of reshaping one's cognitive, emotional, and behavioral options. It is tied to the phenomenological engagement of understanding possibilities beyond the pre-established patterns of identification. Langerian mindfulness argues that, as soon as one is able to notice novelty in his or her status quo, he or she will be able to discern the possibility of disengagement from the status quo. For instance, if a person is solely defined in his professional role as a Chairperson and is so fully immersed in his being nothing but a Chair, this definition will impose an entrenchment of being nothing except a Chair. If the Chairship is taken away for any reason, the person perceives himself as doomed to failure since the source of his self-definition has been degraded.

CONTROL AND MINDFULNESS: CONTRASTING AND COMPARING THEIR LOGICAL AND EMPIRICAL STATUS

The foundational experiments of Langer and Rodin and the contrast analysis found in the studies of Schulz demonstrate a number of substantive points within Langerian mindfulness:

1. Langerian mindfulness focuses on agency as the main component of mindfulness in that the actor relies on his or her own agency as the initiator of the action; thus, the initiation takes place from an inward source. In Langer and Rodin's study, the residents in the nursing home realized that the action was theirs and that they needed to take it upon themselves to proceed with that. In Schulz's experiment, the residents were exposed to the contingency of agency: they were dependent on the initiation of action from outside, from the student aides who determined the timing of their social interactions. The residents had to wait for external factors to manifest themselves in the body of agency.

2. Langerian mindfulness with a focus on agency highlights the possibility of the implementation of agency through expanding the horizons of action: the actor discerns that the mindset of impossibility lies as one perspective out of many; a change of perspective opens up the possibility of exploring possible alternative modes of action. The change happens through activating one's power of agency to explore new horizons of possibility. The actor does not succumb to the fixation of the apparent impossibility. The residents in the nursing home in Langer and Rodin's experiment came to realize that mindset can be changed. The mindset of hopelessness and helplessness was simply a choice, and they could experience a shift of mindset through celebrating multiple perspectives. The possibility of the shift was induced through underscoring the significance of a change from the perspective of passivity to the perspective of responsibility. The ability to respond through one's own agency stood at the top of the initiation. In Schulz's experiment, the residents experienced the possibility of change through the action of others, so the agency was other-oriented: it was dependent on the initiation of others' agency.
3. Langerian mindfulness gives rise to proactivity in decision-making through initiating inner agency. The residents in Langer and Rodin's experiment experienced empowerment through their own novel power of decision-making, which substantiated the sustainability of the power due to its own operative functionality. The residents experienced an enduring sense of control. In Schulz's experiment, however, the residents came to see their empowerment as being at the mercy of an unenduring external and ephemeral factor.
4. Langerian mindfulness elaborates on the relationship between "ought" and "is" in the psychological proposition of discernment of control. The proposition declaring the possibility of ability and the practicality of change engages the propensity for initiating the action. The declarative statement of "is" in a mindful state of

being, Langerian mindfulness argues, broadens the perspective of a search within sundry existential modes of being. The expansive acknowledgment of multiple perspectives elucidates the intrinsic possibility of existential choices. The declarative "is" thus carries a functional "ought" within its range of creative possibility (see, e.g., Langer, 2009, 2005).

THE ROLE OF CONTROL

An in-depth analysis of control may suggest that control is associated with the ability to influence. Langerian mindfulness argues that the ability to influence or the ability to respond lies in the intrinsic state of inner mindfulness in that the stimulus–response model may no longer be able to explain the possibility of having an action. Mindlessness can trigger a response merely because of a stimulus.

In mindfulness, however, the stimulus does not impede alternative modes of action and control since the actor does not perceive the stimulus as mindlessly controlling his or her own action. Langerian mindfulness argues that understanding the controllability of uncontrollable stimulus is activated through a perceptive understanding of the view of the actor. If the actor's view is constricted through the mindless mindset of having no control over the stimulus, the response would merely be subsumed under the impossibility of any action except the stimulus-driven one. If the actor's mindfulness is activated, he or she goes beyond the constriction of mindlessly shaped uncontrollability to understanding the multiple possibilities of the view toward the stimulus.

Langerian mindfulness focuses on choices, the heart of mindfulness. When mindful, the actor realizes the range of choices in the sequential or parallel forms of actions. Choices give rise to controllability. Let us say that one has a high level of anxiety and is mindlessly entrapped in a sense of helplessness. In some of the best-known psychological methods, a person is asked to make a list of anxieties and worries. The list may number 20, 30, or more, arrayed from the most intense levels of

anxiety-inducing incidents to the least intensive items. The person is later asked to rate the level of the anxiety-inducing factors from 1 to 10, with 1 being the lowest and 10 the highest anxiety-inducing. Not all items are in the range of 10. The majority of items fall between 5 and 8. The person is then asked to find which items in the ranking are controllable and which seem to be uncontrollable.

If an item is decided to be controllable, then a reduction of anxiety seems also to be controllable. For instance, if one is anxious about being late for his work, then the control lies in leaving home earlier. This facilitates the process of reducing the effect of the anxiety-inducing factor from, let's say, 7 to 6 or 5. If an item is seen as uncontrollable, the person is asked to consider that, although the item may seem to be uncontrollable, his or her view of the seemingly uncontrollable is controllable. In other words, the way he or she explains and interprets the seemingly uncontrollable item can be controlled. A person may equate the uncontrollability of external intrinsic factors with the uncontrollability of his or her own mode of action until he or she actively looks into the possibility of different forms of actions through a shift in his or her perception of the event.

In Langerian mindfulness, attention to variability facilitates the process of anxiety and stress management. Attention to variability suggests that contexts are constantly created, and contexts are not the same. If someone is suffering from asthma, she can be asked to reflect on situations that intensify her asthma: when exposed to specific people or specific circumstances, her asthma might be exacerbated. Conversely, other situations may not give rise to her asthma. The question here is, what circumstances instigate her asthma? If she is exposed to situation A and her asthma is activated, and when she is exposed to situation B her asthma is not activated, then she is asked to avoid situation A and explore what it is about situation B that does not trigger her asthma. Attention to variability helps one implement the power of choice-making.

If one is on the way to a very important business meeting and the car breaks down, there may be different ways of approaching this event. The external event (i.e., the broken car) is uncontrollable. There is no control over that as a materialized event. The approach to the external event,

however, can be mindless or mindful. From a mindless perspective, Langerian mindfulness argues, the person considers the uncontrollability of the event tantamount to his or her own impossibility of action: he or she has no control. From a mindful perspective, the person looks into options in a wide variety of possibilities. There are huge practical differences of action. In the mindless scenario, the person is emotionally compelled through his or her mindlessness to be stuck in the inability of action; thus, there is no ability to respond in novel ways. In the mindful scenario, the person goes beyond this mindset and explores the possibility of implementing possible modes of controlling and influencing the situation.

Langerian mindfulness argues that, in mindless forms of induced uncontrollability, the notion of having no control comes out of the certitude of a mindset that indicates the impossibility of having control. Mindlessness operates in the heart of certainty (see Langer, 2009). When mindfulness arrives, certainty is questioned. The mindset is put under investigation. Langerian mindfulness proposes the possibility of revisiting the paralyzing paradigm of impossibility (see Fatemi, 2014).

Mindlessness is induced through the pervasiveness, repetition, and monolithic compartmentalization of conceptual and practical engagements. Mindlessness, Langer argues, gives rise to a submissive obedience to the so-called long-standing rules. The rules are embedded within the pre-established plethora of assumptions that are mostly oblivious to human functionality outside their prescriptive modes. Thus, rule-oriented modes of action allow the implementation of any influence and control as long as the control is endorsed within the paradigmatic analysis of the sets of previously defined compartmentalization.

When emotions are highly involved, the person's ability to respond in ways other than what the mindlessly established emotions suggest is null and void; thus, the person's perceived control is merely defined within the boundaries of the compelling emotions. Langerian mindfulness encourages an active, proactive state of mind where one can search for the unnoticed complexities in the status quo. When mindless, people are oblivious to exploring anything except the already materialized appearance of the status quo.

The mere concentration of the actuality of the event is embedded within the position of knowing. When taking the position of knowing, one is mindlessly assured of one's domain and power of knowing. With a position of knowing, one does not stretch one's scope of seeing what might be out there, outside the realm of knowing. Knowing is essentially embedded within a reliance on past cognitive commitments due to repetition, pervasiveness, and maximization of one single perspective (see Langer, 1989).

In a mindless state of mind, one's knowing is circumscribed, constricted, and contained within limiting borders of possibility and therefore having an influence or control is not prescribed outside the constricting path of possibilities within the mindless context. So the person is bound by the context and is condemned through the parochialism of the context.

In a mindful state of mind, the person's reference points from which to view the status quo are explored through it but are not limited by its deterministic configuration. Mindfulness encourages a search within the inner world, with its infinite possibilities. The power to influence is therefore actively induced through the possibility of embracing expansive modes of actions. In mindfulness, the person creates the context. In mindlessness, the person is created through the context.

The subtlety of mindfulness-empowering states unfolds its power to activate a nonjudgmental, challenging, and flexible experiential and phenomenological connectedness to one's inner resources. Reactance theory and other earlier studies, including those by Glass and Singer (1972), indicated the power of the subjective interpretation of control and its implications. If you happen to live in New York and you are told that you can't leave the Big Apple for about a year, your being banned from leaving the city immediately develops discomfort, anxiety, and inner perturbability. The ban fights the inner flow of freedom. On the other hand, you may have lived in New York City for 10 years without ever voluntarily leaving it. In this situation, you might never feel any sense of discomfort, in comparison with the banning situation. Here, you are not forced to question your power of choice.

Langerian mindfulness emphasizes the awakening role of the experiential and phenomenological belief in having choices. When mindless, people abide by the automatic behaviors that they have emotionally and cognitively inherited from the past. Mindfulness facilitates the process of one's liberation from the self-defeating mindsets that control the impossibility of controllability.

FUTURE DIRECTIONS IN MINDFULNESS THEORY AND RESEARCH

As far as the future direction is concerned, we suggest that the psychology of possibility within Langerian mindfulness can open up novel horizons of action. Langerian mindfulness suggests that we have far more control over our health than people now realize.

Langerian mindfulness suggests that, with an increase of mindfulness, people experience higher degrees of intersubjectivity and attunement. Intersubjectivity happens when people are simultaneously in the same cognitive mode, and attunement occurs when people are concurrently in the same emotional mode.

With an increase of mindfulness, people can embrace a mind where peace is prevalent in both cognitive and emotional as well as behavioral domains. Mindlessly driven control emanates from anxiety, whereas mindfully driven control (in a Langerian version) stems from proactivity.

Langerian mindfulness proposes that, with an increase of global mindfulness, mindlessly driven control is replaced by a proactive sense of togetherness, synergy, and sensitivity to the possibility of multiple perspectives. Mindlessly driven control engenders anxiety and instills protectiveness to defend one from the anxiety. Mindfully driven management (and not control in its pervasive sense) promotes understanding, empathy, and openness to celebrating the sensibility and plausibility of perspectives that may not make sense in the context of controlling mindlessness.

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7

Foundations of Locus of Control

Looking Back over a Half-Century of Research in Locus of Control of Reinforcement

STEPHEN NOWICKI AND MARSHALL P. DUKE ■

During the 50 years since the concept of locus of control was first introduced by Julian Rotter, so much has been written about this construct and its variants that it may be easy to forget where it originally came from and how it was initially defined and measured. To be sure, one of the main reasons for the publication of this book is to celebrate the 50th anniversary of Rotter's article presenting the concept of locus of control of reinforcement (LOC-R). It seems fitting, at this moment in time, to look back at what has happened theoretically and empirically during the lifetime of this concept. We are thankful that we have been involved for so long in what has turned out to be such a popular and useful psychological construct. Having been occupied with locus of control research since its early years, we are also pleased to be given this opportunity to pause and give our personal views on what has transpired over the past four decades.

Our goal in this chapter is multifold. First, we will continue the narrative begun in Chapter 2 of this volume by our life-long friend and

colleague Bonnie Ruth Strickland. Second, we will briefly revisit Rotter's original theory and the measure it produced to set the groundwork to show how, over the years, the concept of locus of control of reinforcement may have become untethered from its original social learning theoretical roots but failed to be re-tethered to a larger body of theory that could provide context and direction for its future study and application. Third, we will look at the "word" problem caused by the proliferation of similar-sounding terms for what Rotter called "locus of control of reinforcement" and wonder aloud which additional terms refer to Rotter's construct or to something different. Fourth, as part of our retrospective view, we want to pick out and highlight some examples of research that we think have been especially helpful in clarifying how locus of control of reinforcement develops, operates, and maintains its central role in psychology. Fifth, we describe the problems presented by the daunting number of locus of control-like measures that have been introduced over the years—some psychometrically well-developed, some not—that make it exceedingly difficult to compare findings across studies and/or to summarize what is and is not known about LOC-R. Finally, we want to revisit and re-evaluate the recommendations and conclusions we made in our 1982 chapter in the light of the research that followed.

CONTINUING THE NARRATIVE: THE ROOTS OF LOCUS OF CONTROL OF REINFORCEMENT

We first met Bonnie Ruth Strickland at Emory University in the late 1960s. She introduced us two young professors to the writings of Julian Rotter and his social learning theory (SLT), just as she introduced him and his theory earlier to the readers of this book. Although the three of us were together for a relatively brief period of time before Bonnie left Emory to take a professorship at the University of Massachusetts, we were able to complete a number of studies and develop measures that have stood the test of time and have been used in well over 2,000 studies (Nowicki, 2015). When we developed our scales, we believed then—as we still do

now—that it was crucially important for our test construction to be guided by (1) Rotter's definition of the LOC-R as a generalized expectancy concept functioning within his SLT; (2) a commitment to consistency with his adult unidimensional test, but with an easier reading level, and (3) a desire to develop comparable forms of our LOC-R measure to allow for testing across the life span from young children through older adults.

Consistent with these assumptions, we constructed tests for preschool and primary age children (the Preschool and Primary Nowicki Strickland Internal External scale [PPNSIE], Nowicki & Duke, 1974*a*), for children (the Children's Nowicki-Strickland Internal-External scale [CNSIE], Nowicki & Strickland, 1973), for adults (the Adult Nowicki Strickland Internal-External scale [ANSIE]; Nowicki & Duke, 1974*b*), and for geriatric adults (GNSIE; Duke, Shaheen, & Nowicki 1974). The life span scales allow researchers to gather information from participants from 5 years of age through advanced age. Comparable measures across age make it possible to study the growth or decline of control expectancies over time, information necessary for informing those who wish to develop programs to change LOC-R.

Bonnie Strickland's chapter described Rotter's work leading up to the publication of his LOC-R measure in 1966 and our early work at Emory. In 1982, we updated and summarized the research that had been completed over the previous decade with the Nowicki Strickland Internal External (NSIE) measures in the second volume of a classic series of books on locus of control edited by Herbert Lefcourt (Lefcourt, 1981–83). These three volumes sought to describe the state of a field of study whose origins could be traced back to the publication of Julian Rotter's 1966 article. Rotter himself (1990) noted that his article set off a tidal wave of research that continues to the present day with more than 500,000 "hits" on the term on a search of Google Scholar. However, what once was a clearly defined, global, generalized expectancy construct that functioned as a major component of Rotter's SLT (1954) appears to have morphed into a complex array of concepts that sometimes appear to be only tangentially related to the original LOC-R concept introduced by Rotter. Even in the 1980s, we could sense that Lefcourt's three volumes were straining to

contain all that was going on in the field loosely encompassed by Rotter's original locus of control definition and its measurement. Reflected by the fact that, some 20 years later, Ellen Skinner (1996) was able to find more than 100 different definitions of locus of control in the literature suggests that attempts to accurately capture and define the LOC-R concept have yet to be totally successful.

A BRIEF REVISIT OF ROTTER AND HIS SLT

The LOC-R is not an isolated atheoretical construct that Rotter discovered but is instead a concept that developed through reasoning within Rotter's (1954) SLT, a theory that was published some 12 years before his article introducing LOC-R. Briefly, for Rotter, behavior didn't occur as a simple reflexive reaction to objective stimuli; rather, it was a result of a complex interaction among factors such as people's histories of learning, life experiences, and stimuli experienced both inside and outside of awareness. Rotter (1954) and Lefcourt (1976) provide descriptions of the four theoretical components of SLT: *behavior potential* (BP, the likelihood that a behavior will occur), *expectancy* (E, subjective belief in the likelihood that a behavior will lead to a specific outcome), *reinforcement value* (RV, subjective positive/negative valence of a given outcome), and *psychological situation* (RS, subjective interpretation of the situation). These components are represented by the formula: BP = f(E & RV), which reflects that, in a particular situation, the potential for a behavior to occur is a function of the subjective value of the outcome and the subjective expectancy that, if the behavior is performed, it will successfully lead to the desired outcome. To better understand where locus of control fits into Rotter's SLT, it helps to know that SLT includes *a number* of both general and specific concepts (Rotter, 1954). Generalized expectancies (GEs) are assumed to best predict broad ranges of outcomes across many situations; specific expectancies (SEs) best predict narrow outcomes.

Generalized expectancies are not traits; they vary with experience across and within situations. As a GE, LOC-R is assumed to have its maximum

impact on behavior when individuals' have little or no experience in the situation or when the situation is ambiguous, amorphous, or fluid. As specific experience is gained from being in a particular situation, the ability of a GE such as LOC-R to affect behavior should diminish, and specific expectancies learned from being experienced in the situation should take its place. However, should a situation change and therefore become "new" again (as, e.g., when a company is going through a management transition or when a child faces a change in teachers in school), then GEs may once again become important predictors of behavior. In fact, it is when people find themselves in situations that may suddenly or unpredictably change that LOC-R may determine different behavioral reactions to the change.

Rotter pointed out in his original article (1966) and later (Rotter 1975, 1990) that his unidimensional original scale was most appropriate for predicting broad-based behavioral outcomes. Rotter often pointed out that he preferred a scale that would provide LOC-Rs for each of the six basic needs described in his SLT, but his early attempts failed. One could also surmise that the popularity of his unidimensional measure may have had something to do with Rotter's lack of attempt to create more specific content measures. Or, perhaps he realized that he didn't need to because almost immediately after the publication of his locus of control scale in 1966 others began to try their hands at constructing all sorts of more specific content and multidimensional scales varying in types of externality.

THE PROLIFERATION OF TERMS TO REFER TO WHAT ROTTER INTRODUCED AS LOC-R

Thirty years after Rotter placed LOC-R on the conceptual table of individual difference research, Ellen Skinner (1996) provided a glimpse of what had happened to the notion that had spawned thousands of articles and research reports over this time period. According to Skinner, LOC-R had often been shortened simply to "control," and the number of terms that were being used to describe it—or things clearly like it or derived from it—had grown in number to more than 100! Astonishingly, Rotter

was not even mentioned in the opening paragraph of Skinner's "Guide to Constructs of Control," with Herb Lefcourt (1981–83) being cited as representative of the concept. With regard to the 100-plus concepts/terms, Skinner noted: "Even a cursory consideration of the area reveals a large number of terms, which, although different, nevertheless seem to be interrelated and partially overlapping" (1996, p. 549). She goes on to state that, "within the total set of terms, some appear to be different labels for the same construct" and "Probably most confusing are cases in which the same term is used to refer to different constructs." Exemplifying the latter is the term, "perceived control" which, in addition to being the title of this very volume, appears to have emerged, now 20 years on from Skinner's pause in the proceedings and 50 years after Rotter (1966), as the prevailing replacement for LOC-R itself.

The increasing number of LOC-R terms and the resulting theoretical and empirical confusion surrounding them evoke a caution typically credited to Kelley (1927) in his warnings about *jingle and jangle fallacies*. The "jingle fallacy" refers to the use of a single term to describe a multiplicity of quite different things. For example, we cannot be sure that the word "control" in "perceived *control*" means the same as the same word in locus of *control* of reinforcement. In contrast, the "jangle fallacy" occurs when identical or almost identical things are thought to be different because they are labeled differently. Our problem here is that we cannot be sure whether different uses of "control" terms actually are different from one another or perhaps simply are other ways of referring to the original LOC-R introduced by Rotter. Some help was given by Peterson and Stunkard (1992), who made a clear differentiation among the concepts of locus of control, self-efficacy, and attribution.

EXAMPLES OF CONCEPTUAL WRITINGS IMPORTANT TO UNDERSTANDING LOC-R

In the midst of the confusion produced by the proliferation of definitions and terms, we want to highlight examples of writers who have made

important contributions to our understanding of the ways in which "control" beliefs guide people's behaviors in a wide variety of circumstances. There has been a remarkable amount of study over the past 50 years and especially more recently. To be sure, with a search of PsychInfo resulting in 17,812 articles with a keyword "locus of control" as of summer 2015 and with 6,600 of these appearing after 1996 (1,425 between 2010 and 2015), "locus of control" has sustained itself as a concept for psychological study. However, it cannot be ignored that separate studies of "perceived control" now number 7,718, with their upward slope clearly seen in there having been only 2,211 studies of the concept between 1966 and 1996 but 2,130 between 2010 and 2015. One could conclude that, at this juncture, studies of locus of control and perceived control are being published at a similarly high rate. The question is, are they truly different constructs? If not, and they are referring to a similar construct, then the number is astonishing. If they are different, then each has produced its own impressive amount of research.

How to deal with this amazing, cumbersome, inconsistent, and confusing literature is a challenging conceptual problem. We want to highlight some studies that we believe have helped to clarify the conceptual haze surrounding LOC-R.

DEFINING "CONTROL": SKINNER

We have already referred to Skinner's (1996) courageous attempt to develop "an integrative framework, designed to organize the heterogeneous constructs related to 'control'" (p. 549). In identifying the more than 100 different terms presented for what appears to be the same or very similar notions, Skinner helped researchers to focus on two of the major problems that have characterized the study of personal control since its very inception: definition and measurement. Skinner's helpful "advance" was to remind investigators that:

> both objective control and subjective control require that two conditions be met: There must be at least one means that is effective in

> producing a desired outcome or in preventing . . . an undesired one, and the individual must have access to that means. In other words, a sense of control includes a view of the self as competent and efficacious and a view of the world as structured and responsive. (1996, p. 559)

Combined with her remarkable listing of 111 "different" conceptualizations and terms for "control," Skinner's "Guide to Constructs of Control" reminds us all of the complexities implicit in what can sometimes be mistakenly seen as a simple concept.

DIFFERENTIATING BETWEEN PRIMARY AND SECONDARY CONTROL: ROTHBAUM, WEISZ, AND SNYDER

Predating Skinner but similar in pointing us to useful ways we should think about personal control is the work of Rothbaum, Weisz, and Snyder (1982). They are important for several reasons. First, their work represents one of the earliest theoretical explications of "perceived control." Second is the remarkable fact that they proposed their model of perceived control without any reference to Rotter's work or the by-then already copious body of literature dealing with the relationship between SLT and people's sense of control over what happens to them. Third, they appeared to have set aside the "of reinforcement" aspect of the original concept of LOC-R offered by Rotter. Perceived control was simply that—a need for control, with no mention of "control of what?" To be fair and accurate, Rothbaum et al. did not set aside locus of control totally; instead, they separated it from its connection to the originating SLT theoretical context. In place of that context, they proposed a differentiation between primary and secondary control.

> People attempt to gain control not only by bringing the environment into line with their wishes (primary control) but also by bringing themselves into line with environmental forces (secondary control). (Rothbaum et al., 1982, p. 5)

With their notion that "control" can be exercised on both the "inside" as well as on "outside environments," Rothbaum et al. expanded the concept of locus of control by introducing the option that people can try to control not only what happens to them but also how they respond to what happens to them. To be sure, the authors acknowledge that their idea has its historical roots in the earlier theorizing of Viktor Frankl (2006), but they updated it and showed how it might be applied to help us understand the behavior of internally and externally controlled individuals.

CONTROL AT DIFFERENT AGES OF LIFE: J. HECKHAUSEN AND SCHULZ

J. Heckhausen and Schulz applied the concepts of primary and secondary control (Rothbaum et al., 1982) to developmental life stages (Heckhausen & Schulz, 1995). Building on the earlier work of H. Heckhausen (1977), they proposed that there were "life-course developmental changes" in the degree to which people depended on or activated different manifestations of control over what happens to them and/or how they responded to what happened to them. Although they emphasized that primary control—the effort to alter the environment—is our preferred mode of exercising internal locus of control (our term):

> secondary control strategies can foster development and enhance primary control by contributing to the selection of action alternatives throughout the life course; and when primary control is threatened or lost, secondary control strategies can help maintain or minimize losses in primary control. (1995, p. 286)

Heckhausen and Schulz's life span view thus proposes that "internally controlled" people have two choices: *change the environment or change themselves,* cognitively and/or emotionally. In either case, control can be both perceived and exercised. They further assumed that as people aged

and became less able to alter the external world, they would likely fall back on alteration/adaptation of their internal states (secondary control). In our view, the addition of a life span perspective represents an important theoretical emphasis in how to think about locus of control, especially in regards to studying elderly and chronically ill populations (e.g., Claassens et al., 2014).

TEMPORAL ASPECTS OF "CONTROL": PATRICIA FRAZIER AND COLLEAGUES

Rather than focusing on time across a life span, Frazier and her colleagues (Frazier et al., 2011; Frazier et al., 2012) emphasized the role of past experiences and future expectations in determining present behavior. More specifically, Frazier et al. (2012) proposed that "different temporal aspects of control (i.e., past, present, and future) have markedly different relations with adjustment and needed to be clearly differentiated from each other" (p. 623).

Although their primary interest was in understanding and treating post-traumatic stress disorder, embedded in Frazier's work was a locus of control model that not only relates personal perception of what happens to people in terms of internal versus external forces but also connects this belief system to the development of pathological versus nonpathological outcomes. Thus, for example, perceived internal locus of control regarding past events can lead to negative outcomes and create feelings of guilt, remorse, or depression. On the other hand, perceived internal control for future events has the capacity to invoke hope that things will get better rather than anxiety. Beyond the theoretical contribution (Frazier et al. 2011), Frazier et al. (2012) also summarized the support for their temporal model in the following way:

> [P]ast (internal) control was consistently related to more distress, despite the assumption in the literature that controllable events are less distressing. Future (internal) control was generally unrelated to

> distress. . . . In contrast, present (internal) control was consistently related to less distress as well as greater life satisfaction and physical health. (p. 628)

It must be noted that Frazier et al.'s conclusion regarding "present control" is essentially consistent with the massive available literature showing the relationship between internal locus of control and adaptive and maladaptive functioning. In addition, their emphasis on what has happened in the past appears very similar to what Rotter called "reinforcement history" in his original SLT, a welcome and significant convergence of theoretical approaches.

A COMMON CORE?: JUDGE, EREZ, BONO, AND THORESEN

Whereas the previous studies we have described have been largely concerned with differentiating among aspects of the control concept, the last study we want to call to your attention seeks not only to bring the disparate areas of control together, but to also actually include them under an even larger conceptual umbrella. Judge, Erez, Bono, and Thoresen (2002) raised the possibility that there might be a "common core construct" that resolves all of the jingle and jangle problems we alluded to earlier. The authors suggested that there were theoretical and conceptual similarities among four popularly studied personality characteristics: *self-esteem, neuroticism, locus of control,* and *generalized self-efficacy.* The four constructs had been the focus of more than 53,000 studies by 2002.

Based on a series of psychometric studies to establish reliability and an extensive set of meta-analyses to explore whether the constructs were truly different from one another, Judge et al. determined that the measures of the four constructs were strongly related to one another and displayed "relatively poor discriminant validity." They concluded that "in light of these results, [we] suggest that measures purporting to assess self-esteem, locus of control, neuroticism and generalized self-efficacy may be markers of the same higher order construct" (p. 693). They then

went on to propose a number of possible options for what these results meant for each of the four constructs. One clear possibility is that the common core they found actually reflects the central SLT notions of expectancy, reinforcement history, and belief in one's ability to control outcomes.

Whether our supposition is correct or there may be some other higher order construct involved, we believe the results of this study help to highlight a second major problem endemic to the personal control area: the failure to fully develop construct-valid measures of LOC-R that include convincing evidence of discriminative and convergent validity, a topic we discuss next.

PROBLEMS MEASURING LOCUS OF CONTROL

Not only is there a major problem in agreeing on a common definition of locus of control, but there also are substantial difficulties in constructing acceptable measuring instruments for each definition offered. The lack of an agreed-upon definition coupled with measurement shortcomings make it difficult to compare results across studies and draw useful insights and conclusions. In light of this, it is truly remarkable that so many findings have been replicated in so many populations.

It is difficult to know to what "locus of control" in the title of an article refers. Does it denote content-specific, unidimensional, multi-sources of externality, or perhaps not even locus of control but related constructs of self-efficacy and/or attribution? Regardless of what "type" of locus of control is being conceptualized, readers may also encounter "tests" with unknown psychometric characteristics either because they do not exist or exist but are not reported or else the authors have come up with their own face-valid set of questions or taken a few items from a longer construct-valid test to use as their measure with the assumption that their briefer scale will be as construct-valid as the original test.

One especially knotty problem is the construct-validity relationship requirements for generalized and specific expectancy measures. Furnham

and Steele (1993) were especially critical of authors of specific expectancy tests for failing to provide evidence that their scales predict "incrementally" better than the generalized scales. At times, authors have just presented evidence that their content-specific expectancy tests were related to relevant content outcomes without showing that these associations were significantly better than those obtained by generalized expectancy measures.

Some reviews have shown, for example (Kalechstein & Nowicki, 1997), that the locus of control and academic achievement association in children and adolescents is similar for both specific content and generalized expectancy tests. This was also found to be true in the case of work generalized locus of control expectancy measures (Spector, 1988; Ng, Sorensen, & Eby, 2006), although the Ng et al. results of this review have been challenged by the authors of another study that focuses on work situation outcomes (Wang, Bowling, & Eschleman, 2010).

It seems important that authors of specific content expectancy tests be aware of the need to evaluate the assumption that their tests incrementally predict relevant outcomes better than generalized measures. One example of a correct way to accomplish this psychometric task can be found in the Perceived Control over Anxiety-Related Events (POARE) scale (Rapee, Craske, Brown, & Barlow, 1996). When the scale was originally introduced, it offered no support for incremental validity. However, some seven years later, Weems, Silverman, Rapee, and Pina (2003) completed a study in which they compared the abilities of the POARE and a generalized expectancy scale (Children's Nowicki-Strickland Internal External scale). Although both were significantly associated with relevant anxiety-related outcome measures, the POARE associations were incrementally higher.

THE NSIE SCALES AND CONSTRUCT VALIDITY SUPPORT

One of the major goals of this chapter was to update the conclusions we had reached in our 1982 chapter for the NSIE scales. The following

three decades have seen a quadrupling of the 400 studies that were completed by 1982 (Nowicki, 2015). In the next section, we briefly take each of our earlier conclusions and recommendations and evaluate them in light of the past 34 years of research results. We begin with academic achievement.

NSIE and Academic Achievement

With regards to the locus of control/academic achievement association, we had concluded in 1982 that there was a relatively modest but significant relationship between internality and higher academic achievement that was consistent with what was found in the groundbreaking Coleman Report of 1966 (Coleman, Campbell, Hobson, McPartland, Mood, Weinfield, & York, 1966). We reasoned then, as we still do now, that this relationship is expected because of the tendency of internality to be associated with persistence and tenacity in gathering information that would be of help to succeed academically.

Research since 1982 has confirmed the internality/higher academic performance association. Kalechstein and Nowicki (1997) completed a review of the locus of control–achievement literature and found that both generalized and content-specific expectancy measures were equally significant in predicting academic success in children and adolescents. There also is evidence that internality is related to higher academic achievement in college-aged students as well. Gifford, Briceño-Perriott, and Mianzo (2006) administered the Adult NSIE scale to 3,000 students entering the University of Louisville and found that internality was significantly associated with higher GPAs by the end of the first year (as well as being associated with a greater likelihood of staying in college). They also found that the internality–greater academic achievement association was maintained in students who stayed in college for their sophomore year.

Although most all of the studies done during the past 30 years were cross-sectional in design, there is some evidence from at least one prospective study that locus of control in childhood predicts academic

attainment in adulthood. Using data on 1,326 men and 2,033 women from the 1970 British Cohort Study (Flouri, 2006), it was found that internality as measured by an Anglicized Children' Nowicki-Strickland scale at age 10 predicted educational attainment as indicated by school degrees obtained 16 years later.

We "wondered" in 1982 whether internality "caused" higher academic achievement. Although results from longitudinal studies would be most helpful in determining causal direction, other findings suggest that internality may cause higher academic achievement. Stipek (1980) examined first-grade children over a seven-month period and used cross-lagged panel and path analyses to track the internality–academic achievement association and found that internality appeared to "cause" higher academic achievement. Certainly, more research is needed to support this possibility especially using methodological designs that could reveal whether becoming more internal would translate into greater academic achievement.

NSIE and Abnormal Behavior

We concluded in our 1982 chapter that "the results obtained using the NS scales lead us to conclude that externality is more like to be associated with behavioral disorders while internality seems to be associated with positive social behaviors " (Nowicki & Duke, 1982, p. 34). Research using the NSIE scales since then has provided convincing support for this conclusion for an even wider collection of disordered behaviors than in 1982, ranging from eating disorders (Fouts & Vaughan, 2002) and firesetting (Gannon et al., 2013), to anticipatory anxiety (Li & Chung, 2009) and something that did not exist in 1982: Internet overuse (Rotsztein, 2003).

Although most of the studies are cross-sectional in design, results from prospective studies support the possibility that externality earlier in life is associated with negative behavioral outcomes later in life. Thompson, Sullivan, Lewis et al. (2011) found that the Anglicized Children's NS scale scores of 6,455 children at age 8 predicted a greater number of psychotic

symptoms at age 12.9 as measured by a semi-structured clinical interview. "The observed relationship between the measures of psychotic symptoms and LOC was not substantially attenuated when adjusting for a number of potential confounders including socio-demographic factors, family adversity, IQ and previous psychiatric illness" (p. 396).

Another large-scale prospective study associates externality at age 16 with the occurrence of greater depression at age 18 in 8,803 participants from the Avon Longitudinal Study of Parents and Children (ALSPAC) based in Bristol, England (Culpin, Araya, Joinson et al. 2015). Structural equation modeling revealed that 34% of the total estimated association between early adversity and depression was explained by externality as measured by the Anglicized NS children's scale at age 16.

It appears that generalized externality as measured by the NS scales continues to show itself to be significantly associated with a wide variety of behavior and emotional difficulties. Although there is not yet substantiation for a clear causal role of LOC-R in disorders, results from two large-scale prospective studies suggest that possibility.

NSIE and Physical Health

There was some suggestion from the research surveyed in our 1982 chapter that externality was associated with a variety of unhealthy physical behaviors. It is clear that this assumption has garnered an impressive amount of support from research completed by those using the health locus of control scales developed by the Wallstons (e.g., Wallston, Wallston, & DeVillis 1978). Although admittedly fewer studies have used the NS measures, their results also support the assumption that externality and unhealthy physical behaviors go together. Externality as measured by the NSIE scales is associated with higher blood pressure and less likelihood to comply with health instructions (Plawecki & Mallory, 1987); less effective ways of reacting to cancer diagnoses (Thompson & Collins 1995); a greater likelihood to resume smoking after a myocardial infarction (Lewengrab, 1984); greater vulnerability and risk for

developing eating disorders (Leon, Fulkerson, Perry, & Cudeck, 1993); engaging in less physical activity in those with and without diabetes (Gregg, Narayan, Kriska, & Knowler, 1996); less likelihood to engage in dental hygiene (Odman, Lange, & Bakdash, 1984); greater likelihood of engaging in risky sexual behaviors leading to pregnancy (Gerrard & Luus, 1995); less success in weight loss programs (Adolffson, Andersson, Elofsson, Rossner, & Unden, 2005); greater perceived levels of stress, lower job satisfaction, and poorer general physical health (Kirkcaldy, Shephard, & Furnham, 2002); reduced success in substance abuse rehabilitation (Tajalli & Kheiri, 2010); increased frequency of eating disorders (Scoffier, Paquet, & d'Arippe-Longueville, 2010); and an increased likelihood of taking up smoking (Chassin, Presson, Pitts et al., 2000).

In one of the few prospective studies using the NSIE scales to evaluate physical health, 7,551 individuals participating in the British Cohort Study (Gale, Batty, & Deary, 2008) were analyzed. It was found that externality as measured by the Anglicized Children's NS scale at age 10 was associated with higher obesity and blood pressure at age 30.

It appears that the initial evidence gathered in 1982 showing that externality as measured by the NSIE scales was involved with the development and treatment of physical difficulties and disease has been broadly supported. What still remains is to untangle the cause and effect of this association and to see how generalized and specific expectancies and types of externality relate to one another and to the outcomes they are predicting. Longitudinal studies using a combination of generalized and specific scales may have the potential to shed light on the way each is associated with physical health and illness. A fine example of such a study is that of Infurna, Gerstorf, and Zarit (2011) who reported levels of "perceived control" predict changes in health over time in old age (but, interestingly, not in midlife).

NSIE and Antecedents of and Attempts to Change LOC-R

In light of the incredible range of outcomes that have been shown to be related to the NSIE and other measures of locus of control, perhaps the most

important research areas to date are those regarding what we know about how locus of control expectancies develop and change throughout the life span and how to modify generalized expectancies that already exist. These goals have become even more important in light of the findings of Twenge, Zhang, and Im (2004). They completed two meta-analyses, one for 97 samples of college students who had taken Rotter's LOC-R scale (n = 18,310) and one for children aged 9–14 who had taken the Children's NSIE measure (n = 6,554). They found that "Americans increasingly believe their lives are controlled by outside forces rather than their own efforts" (p. 308). Over the 30-year span of the meta-analyses, the average college student and child of 2002 had become significantly more external (.80 standard deviation).

Although the importance of clearly knowing the antecedents of LOC-R cannot be denied, research focusing on it has attracted relatively little attention. Using Rotter's SLT as a starting point, Lefcourt (1976) emphasized the family as the primary source of learning control expectancies. We agreed and pointed out in 1982, and do so again now, that children learn to be appropriately internal in families where parents are warmer, more nurturing, more encouraging of independence, and less critical. Such associations were also found by Carton and Nowicki (1994) in their review of studies of antecedents of individual differences in LOC-R. In addition, they suggested that parental consistency and children's learning of contingencies between behavior and outcomes were also significantly involved.

Carton and Nowicki also noted the need for more longitudinal and observational studies of children's behaviors rather than relying on cross-sectional studies using self-report or parent-report of parenting factors. Unfortunately, not much has changed in this regard in the years since this review, but there are exceptions. Carton and Carton (1998), in an observational study, for example, found that mothers of internally controlled children displayed more positive touch and looked longer at their children than did externally controlled peers, whereas internally controlled children themselves smiled more often and stayed on task better. In addition, in another observational study on a puzzle-solving task, Carton,

Nowicki, and Balser (1996) found that mothers of internally controlled boys were more likely to respond to their sons' difficulties with encouragement, but were less likely to attempt to take over the task than were mothers of externals; in addition, mothers of internals were also rated as warmer and less controlling. There are studies that have used measures of LOC-R other than the NSIE scales and have found similar associations between parental behavior and attitudes and children's control expectancies (e.g., Rudolph, Kurlakowsky, & Conley, 2001). However, much more needs to be known about the mechanisms of how parental warmth and/or nurturance get translated into children's internality. As we recommended in 1982, we do so again in 2016: we need more longitudinal and observational studies to explicate the antecedents of control expectancies not only of parents, but of teachers, peers, and other important individuals in the lives of children.

The lack of certainty regarding the identification of antecedents of control expectancies has hampered the development of programs to modify LOC-R orientation. In 1982, a variety of attempts were made to change control expectancies ranging from camp experiences to behavioral management, but few were theoretically based. After reviewing them, we concluded that the most successful behavioral interventions are those that are long term and broad-based. The best example at that time was a three-year study completed by Roueche and Mink (1976) in which they used a variety of experiences to "counsel for internality."

There have been few attempts made to apply long-term, broad-based intervention programs to change locus of control as measured by the NS scales. One school-based example (Nowicki et al. 2004) found that using a social learning–based intervention over a three-year period led to significant movement toward internality, an increase in academic achievement, and a significant drop in students leaving school. In another school-based program (Trip, McMahon, Bora, & Chipea, 2010), a rational emotive and behavioral dysfunction education program changed children's orientations toward internality but not so that they were significantly different from the comparison groups. One additional study used control-specific measures of internal, chance, and powerful others and focused on using

cognitive training to modify locus of control in older adults (Wolinsky, Vander Weg, Martin, & Willis, 2010). They evaluated the effect of cognitive training among 1,534 participants over a five-year period and found that "cognitive training that targets reasoning and speed of processing can improve the cognitive-specific sense of personal control over one's life in older adults." It is interesting that the program did not impact on the chance or powerful others dimensions, but only on the personal control measure that is similar to what would be found in the NSIE scales.

CONCLUSION

We have enjoyed this opportunity to look back over the past decades of research and both update what our measures have found and offer our opinions about where the future of LOC-R lies. We have found causes for both encouragement and concern. We are encouraged by the depth and breadth of interest in people's beliefs in the degree to which they have control over what happens to them. We are also heartened by the numbers of excellent writings, both theoretical and empirical, that have moved our understanding forward. Nonetheless, we are also concerned about the proliferation of terms for what appears to be "plain old LOC-R," by the untethering of many of these terms and concepts from established bodies of theory and by the absence of standardized measures which would allow for cross comparisons and compilations of findings in which we can feel confident. One thing we are as sure of as we were back in 1982: if the future is anything like the past 50 years, it is going to be a very interesting journey!

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8

Three Generations of Research on Perceived Control

PATRICIA FRAZIER, HOWARD TENNEN, AND LIZA MEREDITH ■

Contributors to this volume were asked to describe their research on control and the consequences of that work for later work and for current and future science and practice. Howard Tennen was asked to contribute based on his research on control and adjustment to illness. Howard asked Pat Frazier, who had been influenced by his work and with whom he had collaborated on research assessing the validity of self-reported post-traumatic growth (e.g., Frazier et al., 2009) long after she had read his work on control. Pat, in turn, asked Liza Meredith, who represents the future of this research, to join in preparing this chapter.

We decided to approach this task by taking a somewhat more personal approach than is typical. Although we describe what we have learned about the role of perceived control in adjusting to stressful life events, we also try to convey our doubts and failures as well as our successes. Howard begins the historical account by revisiting his experimental

studies of perceived control and exposure to uncontrollable outcomes in the 1970s and his transition to field research on the role of control in adjusting to health challenges. Pat continues the story with her research in the 1990s on the role of attributions in adjustment to rape and then to the development and testing of a temporal model of control that drew on Howard's field research and that links research on perceived control over specific events to research on control as a personality trait (locus of control). Liza, a current graduate student, describes the translational work she has done with Pat on developing and testing interventions to increase a sense of personal control, including our ongoing and future research on control over health challenges, which cycles back to Howard's earlier work. Each section is written in the author's voice.

GENERATION 1: PERCEIVED CONTROL FROM THE LAB TO THE FIELD (HOWARD'S ACCOUNT)

The mid-1970s to early 1980s was the heyday of human learned helplessness research, social psychological studies guided by attribution theory, and experimental and provocative field studies of perceived control. This time also marked the formal inclusion of health psychology into the American Psychological Association (Matarazzo, 1980). My interest in all four areas guided my dissertation (mentored by Bonnie Strickland, one of Julian Rotter's protégés) and, subsequently, my studies of perceived control at the University at Albany–SUNY.

My students at SUNY–Albany (its name at the time) and I were surprised to find that individuals with an external locus of control were just as likely as their counterparts with an internal locus to demonstrate the illusion of control in the laboratory, suggesting that externals might shed their tendency toward perceiving response–outcome independence in the very circumstances in which that tendency might serve as a resource (Tennen & Sharp, 1983). We discovered that laboratory-induced learned helplessness could be mitigated and even reversed with certain attributional mindsets (Tennen & Eller, 1977; Tennen & Gillen, 1979) and that

when research participants repeatedly escaped an aversive stimulus in the lab without personally controlling their escape, they demonstrated subsequent performance deficits similar to the deficits observed among participants exposed to inescapable aversive stimuli (Tennen, Gillen, & Drum, 1982). When our findings failed to support the cognitive mechanisms proposed by the learned helplessness model to explain why exposure to repeated uncontrollable laboratory stimuli leads to subsequent performance deficits (Tennen, 1982), we began to think about the myriad of ways, other than falling into a state of helplessness, that people might respond to waning or lost personal control in their lives—ways not easily captured in the lab.

During this time, two provocative and now widely known studies of perceived control in the real world changed the direction of my research. One study, by Ellen Langer and Judith Rodin (1976), evaluated the effects of an intervention designed to increase a sense of personal choice (a form of control) as a way to enhance life quality among nursing home residents. In a subsequent analysis, these investigators (Rodin & Langer, 1977) reported that residents in the intervention group were less likely to have died during the 18-month follow-up period compared to residents in the treatment-as-usual comparison group. In the other study, Janoff-Bulman and Wortman (1977) interviewed individuals who had been paralyzed in serious accidents and obtained adjustment ratings from nurses and social workers involved in their care. Following Kelley (1971), they reasoned that self-blame attributions may reflect the belief that the accident could have been avoided and that such life events are controllable. They found that participants who blamed themselves for the accident leading to their paralysis received more positive adjustment ratings.

By today's standards, both studies were compromised. Langer and Rodin's (1976; Rodin & Langer, 1977) sample was small: the analysis predicting mortality was based on 7 deaths in the intervention group and 13 deaths in the comparison group. Participants were not randomized to the intervention and comparison conditions, and mortality was not the primary study outcome. (In a subsequent erratum, Rodin and Langer [1978] clarified that the mortality difference between the intervention

and control groups was not statistically significant). Janoff-Bulman and Wortman's (1977) sample was even smaller, surely compromised in terms of statistical power, and raters were not trained to criterion as they would be if such a study was conducted today. Despite their nontrivial shortcomings (overlooked in many review articles and textbooks), these studies were important because they captured the promise of investigating perceived control in settings beyond the psychology laboratory. Soon thereafter, Rothbaum, Weisz, and Snyder (1982) introduced a two-process model of perceived control by distinguishing primary from secondary control and suggesting that, when faced with a challenge to personal control in their lives, rather than trying to reassert control over the environment, people might change themselves and the way they viewed their situation, such as by finding benefits in the situation to make it less—or not at all—threatening.

Poised to study perceived control in the real world, and now at the University of Connecticut, I had the incredibly good fortune to begin a three-decade collaboration and friendship with Glenn Affleck that changed the way I think about psychological science. Our first venture into primary and secondary control was a small study of children with diabetes (Tennen, Affleck, Allen, McGrade, & Ratzan, 1984), in which we found that, echoing Janoff-Bulman and Wortman's (1977) findings, children who believed that their illness was due to their own behavior—*retrospective control* in the language of Rothbaum and colleagues' (1982) two-process model—were judged by their physicians as adapting more effectively and having the disease under better control than children who did not view their illness as caused by their previous behavior.

In the first of several studies of parents of infants in neonatal intensive care (NICU; Affleck, Tennen, & Gershman, 1985), perceived current control over the infant's recovery and expected control over the infant's future developmental trajectory and over the prevention of similar problems in future deliveries were related in *different* ways to mood, intrusive thoughts, and efforts to avoid disturbing thoughts about their infant's hospitalization. Perceived control over the infant's recovery was related to fewer intrusive thoughts, but was unrelated to mood or efforts to avoid

intrusive thoughts. Future control over the child's developmental trajectory was associated with fewer intrusive thoughts and less intense efforts to avoid such unbidden thoughts, yet it was unrelated to mood. Perceived control over the prevention of similar problems in future deliveries was associated with more positive mood, but was unrelated to both intrusion and avoidance. This pattern of findings underscored both the complexity of perceived control and the importance of selecting appropriate indicators of adaptational outcomes. In a subsequent report on the same group of mothers (Tennen, Affleck, & Gershman, 1986), behavioral self-blame predicted mothers' better emotional adaptation, and this relationship was mediated by perceived control over a recurrence in future pregnancies. Together, these studies suggested that perceived present control and future control had different adaptational consequences and that behavioral self-blame might be both an indicator of retrospective control and expected future control.

Although the relation between perceived control and psychological adjustment is important both theoretically and in guiding clinical practice, we were also interested in whether control appraisals predicted physical health outcomes. Although we had found that children with diabetes who engaged in retrospective control had the disease under better control (Affleck et al., 1985), this association was cross-sectional. Glenn and I were fortunate to collaborate with Syd Croog and Sol Levine, who had followed for eight years nearly 300 men who had experienced a first heart attack (Affleck, Tennen, Croog, & Levine, 1987). The data for this study were collected long before the emergence of Rothbaum and colleagues' (1982) concept of secondary control, but within the larger dataset was an indicator of secondary (cognitive) control: the belief that some benefit or gain came from the heart attack experience. We found that, independently of sociodemographic characteristics and initial prognosis, patients who engaged in cognitive control seven weeks after their heart attack were less likely to have another attack and had lower levels of morbidity eight years later.

This study, although using a long-term longitudinal design and employing a large and well-characterized sample and an objective outcome,

was not without fault. Most importantly, the study relied on secondary analyses of data collected for other purposes. Although the prediction of heart attack recurrence was a primary study aim, secondary control, which had not appeared in the literature at the start of the study, was not an a priori predictor variable. Moreover, this indicator was dichotomous. Equally troubling for us was that the link between secondary control and subsequent health outcomes lacked clear biological plausibility, which is required to draw a causal inference (Hill, 1965). Yet this study, like Rodin and Langer's (1977) perceived choice intervention study and Janoff-Bulman and Wortman's (1977) study of behavioral self-blame in paralyzed accident victims, offered the promise that psychological control played an important role in adaptation to threatening health encounters.

Our longitudinal study of the parents of medically fragile infants in NICU (Affleck, Tennen, & Rowe, 1991) offered another opportunity to evaluate the prospective significance of secondary control on health outcomes. Most of the parents in this study had no warning of a premature or hazardous delivery. Their expectations were abruptly violated, as were their cherished beliefs and positive illusions (Janoff-Bulman, 1992; Taylor, 1983). A unique feature of this study was our attempt to predict infants' 18-month developmental outcomes from their mothers' ability to find benefits in having her newborn facing a health crisis 18 months earlier. At the time her infant was to be discharged from the NICU, participating mothers took part in a semi-structured interview that included an assessment of perceived benefits from the crisis and expectancies for the child's developmental outcomes. We also created an index of the severity of the child's medical problems before NICU discharge (e.g., length of hospital stay, time on a ventilator). Eighteen months after hospital discharge, the infant's development was assessed with standard observational methods, and mothers were interviewed about their child's communication, daily living, socialization, and motor skills. A final indicator of developmental outcome was the presence or absence of a significant motor disability observed by the examiner or documented by other health professionals. We found that, controlling for the severity of the infant's medical problems, a mother's ability to find benefits in the crisis—secondary control—and to

hold positive outcome expectancies at the time of NICU discharge independently predicted her child's developmental outcome 18 months later. Although provocative and promising, the observed temporal association between mothers' secondary control and their infants' subsequent developmental status lacked clear biological plausibility, echoing our concern regarding our heart attack study findings.

Rothbaum and colleagues (1982) had been ambivalent about whether secondary control strategies reflected the relinquishment of primary control and attempts to accommodate to existing realities or whether these strategies were efforts to re-establish a sense of personal control (see also Morling & Evered, 2006). Reid (1984) and Taylor (1983) soon after offered rejoinders to the position that there are adaptation advantages to surrendering personal control in seemingly uncontrollable circumstances. Instead, they asserted, people search for opportunities to control the more controllable aspects of their adverse situations.

Reid (1984) had suggested that one area in which chronically ill individuals might realistically exercise personal control, even in the face of an uncontrollable illness, is treatment decision-making. We reasoned that another potential target of control was daily symptoms. Rheumatoid arthritis, a progressive illness, offered a unique opportunity to investigate how people who have little influence over the progression of their disease may exert control over the severity of their everyday symptoms and over treatment decisions. Indeed, the rheumatoid arthritis patients in our study (Affleck, Tennen, Pfeiffer, & Fifield, 1987) reported more personal (primary) control over their symptoms than over the course of their disease. Perceiving greater personal control over treatment was associated with positive mood and treatment providers' assessments of overall psychosocial adjustment. Patients who had more severe disease and experienced greater personal control over its course reported greater mood disturbance and were judged as being less well-adjusted to the illness. However, patients who had more severe daily symptoms and expressed greater personal control over their symptoms reported more positive mood. These findings supported the hypothesis that, in the face of an uncontrollable illness, individuals can enhance their well-being by

shifting the target of control to aspects of the illness most likely to respond to personal influence efforts. More recently, Skinner and Zimmer-Gembeck (2011; see also Thompson, 1981) formally distinguished two forms of secondary control. The first form, *compensatory secondary control*, is a fallback position when primary control efforts fail. The second form of secondary control involves shifting the targets of control from the primary target to other targets more amenable to control.

Although the overall pattern of our findings across studies was consistent with extant and emerging models of personal control, few studies had examined perceived control prior to a threatening encounter to determine whether perceived loss or lack of control made people more vulnerable to distress after the event. Even fewer studies had examined pre-event perceived control along with other theory-relevant factors to determine the unique contribution of perceived control. Because a fairly large proportion of men and women undergoing in vitro fertilization (IVF) consider infertility the most upsetting experience of their lives, and retrospective questionnaire studies had identified loss of control as the most threatening aspect of infertility, Glenn Affleck and I joined Mark Litt and Susan Klock in a study designed to examine prospectively the unique contribution of pre-IVF perceived loss of control as the result of infertility on emotional adjustment following IVF failure. We found that pre-IVF feelings of lost control predicted post-IVF distress even after controlling for five other significant predictors: pre-IVF distress, dispositional optimism, perceived personal contribution to the infertility and IVF failure, and the use of escape as a coping strategy (Litt, Tennen, Affleck, & Klock, 1992).

By the late 1980s, Glenn Affleck and I were immersed in the use of intensive micro-longitudinal (diary) methods as a way of understanding the experience of chronic illness and the dynamics of stress, coping, and health. Although this shift to diary methods led to a shift away from investigations of perceived control, we maintained a keen interest in the relationship between primary and secondary control, and that interest kept us involved in our two final studies of perceived control. One study tested the "fallback hypothesis" (Rothbaum et al., 1982; Skinner &

Zimmer-Gembeck, 2011), which predicts that, as primary control wanes over time, secondary control efforts should increase. The other study used diary methods to prospectively evaluate in the context of a chronic illness whether primary and secondary control relate to well-being in overlapping or unique ways.

To test the fallback hypothesis, we followed over 14 months a group of men and women who had sought infertility treatment (McLaney, Tennen, Affleck, & Fitzgerald, 1995). We reasoned, based on the hypothesized dynamic relationship between primary and secondary control, that these men and women would experience a decline in primary control over fertility outcomes after repeated failures to achieve a desired pregnancy. The fallback hypothesis predicted that this decline in primary control should be linked to a compensatory increase in perceived benefits (secondary control) from their impaired fertility. As predicted, perceived primary control diminished over time. But changes in perceived benefits were unrelated to changes in primary control. Anticipated benefits, however, were inversely related to changes in outcome expectancies, so that increases in anticipated benefits were linked to more pessimistic pregnancy expectancies over time. Unfortunately, we never followed-up on this unexpected temporal association between outcome expectancies and secondary control strategies.

The second study (Tennen, Affleck, Urrows, Higgins, & Mendola, 1992), which used diary methods to prospectively examine how primary and secondary control relate to well-being among individuals living with chronic pain from rheumatoid arthritis, was unique in being prospective and in collecting daily reports of pain intensity, mood, and activity limitations for 75 days. By today's standards, the diary portion of the study was crude, using paper diaries "time-stamped" with postmarks rather than electronically verified in real time. The analysis of the diary data was also rather crude, limited to aggregated daily reports. Yet repeated daily reports, relatively free of recall error and bias, had been reported rarely in the literature and never before in studies of primary and secondary control. As in our previous studies, we focused on benefit-finding as a secondary control strategy.

We found that perceived primary control over arthritis pain and deriving benefits from the pain (both measured at the start of the study) predicted daily well-being over the subsequent 75 days, albeit in different ways. Individuals reporting greater primary control at the start of the study reported less daily pain over time. But among those participants who experienced more severe pain, greater perceived control was associated with more emotional distress. Finding benefits in the illness, on the other hand, predicted the number of days on which pain interfered with daily activities. This relation was also influenced by pain intensity, but in the opposite direction than that observed for primary control: participants who derived more benefits at the start of the study and who experienced more severe pain over the 75 days reported fewer activity limitations due to pain over the 75 days. This was the first prospective study documenting the unique adaptational consequences of primary and secondary control. It was also a troubling reminder of Thomas Huxley's admonition that beautiful hypotheses are often slain by ugly facts.

During the decade after we completed our last study of primary and secondary control, we prepared a review article and several review chapters focusing on benefit-finding (Affleck & Tennen, 1996; Tennen & Affleck, 1999, 2002). In these reviews, we lamented that benefit-finding had not found a widely accepted conceptual home, and we offered many possibilities, including benefit-finding as a form of secondary control, a selective evaluation, a coping strategy, a personality characteristic, a temporal comparison, a reflection of people's implicit theories of consistency and change, and a manifestation of actual positive change. We also attempted to distinguish benefit-finding from the coping strategy of benefit-reminding. Now, decades later, theorists and investigators have still not reached a consensus on these issues.

After 20 years of investigating perceived control in the laboratory and in the field, many questions remained unanswered. Glenn Affleck and I had attempted to push the envelope by conducting longitudinal, intensive micro-longitudinal and prospective studies of perceived control, and we put forth our best effort to test existing theory in examining the

temporally dynamic association between primary and secondary control. We had worked to include "hard" outcomes in our studies and to limit reliance on retrospective self-reports. Our reward was being able to demonstrate a series of theoretically meaningful links between perceived primary and secondary control and various psychological and physical health outcomes. But quite a few of our findings were not consistent with theory and sometimes not consistent with each other. When no one was listening to our conversations, we also acknowledged that the most interesting findings from our best investigations lacked biological plausibility and that they begged for more fine-grained models of perceived control. Over the years, benefit-finding, originally framed as a secondary control strategy, had been hijacked by positive psychology and fused with the concept of post-traumatic growth. Glenn and I regret that on more than one occasion we mindlessly went along with this unfortunate fusion, which has obfuscated much needed theoretical distinctions. We also regret that because we did not view ourselves as theorists, we never developed our own model of perceived control, and because we had been conservative in our approach to psychological research, we had always been reluctant to develop evidence-based interventions lest they be premature. We moved into the study of daily life with the hope that the unanswered questions would be taken up by the next generation of perceived control investigators who would develop models and interventions based at least in part on our findings. Pat Frazier has developed such a model and, with her students, has designed and tested control-enhancing interventions.

GENERATION 2: FOCUSING ON WHAT YOU CAN CONTROL (PAT'S ACCOUNT)

Howard's account illustrates the difficulties of conducting field research on a construct as complex as perceived control. Unaware of the perils that lay ahead of me, I began my research on the role of perceived control in adjustment to life events during graduate school at the University of Minnesota in the mid-1980s. For my dissertation research, I wanted to

combine my training in counseling psychology and social psychology, my earlier research on rape trauma syndrome (Frazier & Borgida, 1992), my interest in violence against women as a feminist issue, and (like Howard) my interest in attributions. I found the perfect topic.

A few years earlier, Janoff-Bulman (1979) had published a very influential article asserting that there are two types of self-blame in which victims engage, one of which is helpful and one of which is not. Specifically, she claimed that *behavioral self-blame*, which involves blaming the rape on specific controllable behaviors ("I shouldn't have gone home with that guy"), can be adaptive because it is likely to be associated with the belief that future rapes can be avoided, which should, in turn, facilitate adjustment. In contrast, *characterological self-blame* involves blaming the rape on an aspect of the self that is not controllable ("I'm just the victim type") and fosters not a sense of control but of personal deservingness. This theory, developed by a social psychologist, had clear counseling implications but flew in the face of the central tenet of rape crisis counseling—the victim is not to blame. I was also very interested in testing this theory because, although Janoff-Bulman's article reported that rape crisis counselors believe that behavioral self-blame is more common than characterological self-blame, the relations between the two types of self-blame and adjustment were not assessed in a sample of rape victims (although the study is often cited as if it did).

At the time I was planning my dissertation, no studies had tested this theory in samples of rape victims, although, while I was collecting my data, Shelley Taylor and one of her graduate students (Meyer & Taylor, 1986) reported a very similar study. I collected my data at a hospital-based rape crisis center from women who came to the ER for an exam after having been sexually assaulted. They completed measures related to Janoff-Bulman's (1979) model; other types of attributions (e.g., blaming the rapist); the internal, stable, and global dimensions from the reformulated learned helplessness model of depression (Abramson, Seligman, & Teasdale, 1978), which was also very influential at the time; how often they thought about "why" the rape occurred; and the extent to which future rapes could be avoided (Frazier, 1990).

The results did not support Janoff-Bulman's (1979) theory. Both behavioral and characterological self-blame were associated with more depression (and were highly correlated with each other), and behavioral self-blame was not associated with the belief that future rapes could be avoided (which was a key tenet of the model). Moreover, all types of attributions were associated with more depression, as was more often thinking about why the rape occurred. The only factor related to less depression was the belief that future rapes were avoidable. This study had several problems and probably would not be published in a top-tier journal today: the sample was small and not representative of most victims (who do not go to the ER), most of the attribution measures were single items, and all of the data were collected at one time point very soon (3 days) after the assault.

I conducted two more studies to try to address these limitations and replicate the findings. The first was with a sample of undergraduate women who had been raped several years previously, rather than a help-seeking sample (Frazier & Schauben, 1994). The second was a longitudinal study at the same rape crisis center where I did my dissertation research (Frazier, 2000). Both studies replicated the key findings of my dissertation research. All kinds of attributions (i.e., both kinds of self-blame and blaming external factors) were associated with various indicators of poorer adjustment, as was more often thinking about "why" the rape occurred. Measures of self-blame and past control were not related to measures of future control, although future control (variously defined) was generally associated with less distress.

In the study with undergraduate women (Frazier & Schauben, 1994), I also began to look at attributions and control beliefs following other threatening events. The relations between self-blame and adjustment may be different for sexual assault for various reasons (e.g., the tendency of others to blame rape victims). For example, drawing on Janoff-Bulman and Wortman's (1997) work, Howard and his colleagues (Tennen et al., 1984) had found that children who believed that their illness was due to their own behavior were judged as adapting more effectively than those who did not blame their own behavior. I gathered data from students

who had experienced one of two events that were both very common and very distressing—bereavement and relationship loss—but that differed in terms of objective controllability. Across both events, both behavioral and characterological self-blame were associated with poorer adjustment. More often thinking about "why" was strongly related to poorer adjustment following relationship loss but not following bereavement (which was puzzling). In the sample who had experienced bereavement (the less controllable event), both past and future control were *positively* related to distress. We had predicted that perceptions of future control would be more adaptive for more controllable events but did not at the time predict a *positive* association between future control and distress among the students who had experienced bereavement, although this is consistent with some of Howard's earlier findings (e.g., Tennen et al., 1992).

From these three studies, I learned, first, that focusing on the past and why something happened does not appear to be helpful, consistent with other work (see, e.g., Tennen & Affleck's, 1990, review of research on blaming others). So, I stopped trying to find specific attributions that might be associated with better adjustment. Second, I learned that trying to figure out why something happened in the past does not necessarily translate into the belief that you will be able to prevent it in the future (i.e., past control does not necessarily lead to future control). Although that may seem counterintuitive, and is counter to the findings of one of Howard's studies (Tennen et al., 1986), it is consistent with Brickman et al.'s (1982) model of helping and coping that distinguishes between responsibility for problems and responsibility for solutions. Finally, I learned that investigators should not generalize across events and that the relations, especially between future control and adjustment, may differ for events that differ in terms of objective controllability.

During 2001, my students and I wrote a review paper related to control and coping with trauma (Frazier, Berman, & Steward, 2002). This was a great opportunity to immerse ourselves in the broader literature on control, beyond the research on attributions with which I was more familiar. For example, theories about the role of control in the development of post-traumatic stress disorder (PTSD), developed on the basis of

animal research, stressed that events that are perceived as uncontrollable are more likely to lead to PTSD than are events perceived to be controllable (e.g., Foa, Zinbarg, & Rothbaum, 1992). But if something terrible happens to you (e.g., your child dies), will you really be less distressed if you perceive that loss as controllable or preventable? This did not square with the findings of my previous three studies that perceptions of past control and self-blame were associated with more (rather than less) distress. This made me reconsider what we mean by the term "control." It is interesting that, early on, Howard also questioned that applicability of laboratory research on control to real-life settings.

In writing our review paper, we were strongly influenced by an article by Ellen Skinner (1996) in which she reviewed more than 100 control-related constructs in the psychological literature that differed along various dimensions. In our paper, we focused on the temporal dimension because it stood out as potentially helpful in determining what types of control are and are not helpful. The temporal dimension, although mentioned by Skinner, had not been a focus of most control research. It was, however, implicit in other theories (e.g., Taylor's 1983 theory of cognitive adaptation). We also reviewed research on both personal and vicarious control (another dimension noted by Skinner).

Probably the biggest "aha" for me in writing this chapter was that some aspects of control were consistently related to less distress, and they all seemed to measure things that actually were controllable in the present. These included control over symptoms, control over treatment, and control over the recovery process (e.g., Tennen et al., 1986). In fact, several studies showed that control over symptoms was more strongly related to adjustment than were other forms of control, including control over disease progression (e.g., Thompson et al., 1993). Although there previously had been no consistent terminology to refer to these types of control, we referred to all of them as involving "present control." Like Howard, we concluded that one way to deal with low-control situations was to find something about the situation that can be controlled, and current symptoms are often more controllable than the cause of the event or whether it will recur.

This broader review of the literature also revealed, consistent with our previous research, that despite the truism "control is good," measures of past control (including behavioral self-blame) were generally either not associated with distress or associated with more distress. The lack of association between past control and distress may be because most people do not perceive stressful and traumatic events as under their control. If they were controllable, they would not have happened! Thus, part of the lack of association may simply be due to restriction in range on measures of past control. Past control may be related to more distress because it is not accurate to perceive control over events that are not in fact controllable, a point also stressed by Folkman (1984).

One of the main conclusions we derived about future control was that it was difficult to generalize across studies because of differences in how future control had been measured. In particular, some studies assessed control over future outcomes such as disease progression or event recurrence, and other studies assessed the likelihood of an event happening again (and some combined the two, including one of my own). However, whether an event will recur is not the same as having control over recurrence (e.g., a tornado may be likely in Kansas, but Dorothy can't control it). In general, perceptions regarding whether an event will happen again were more related to adjustment than were perceptions regarding future control over event recurrence.

Our review also revealed various methodological issues with control research at the time. As mentioned, one of the biggest issues was lack of consistency across studies in how control was measured. Many studies used 1-item measures (including some of my own) and many were event-specific and thus could not be used to compare across events. Another issue concerned the samples used in the studies. Many studies at the time focused on control in the context of medical conditions. This is not a problem per se, but the relations between control and adjustment may differ for ongoing medical conditions than for other events, particularly discrete past events like an assault or bereavement. Samples were also typically small, and designs were cross-sectional. Reviewers were more forgiving in those days.

The next step in my research was to explicitly test this model of the differential relations between past, present, and future control and distress. With funding from the National Institute for Mental Health, I conducted another longitudinal study at the rape crisis center where I had done my previous research (Frazier, 2003). Using multi-item scales this time, I assessed past control (behavioral self-blame and blaming the rapist), present control (control over the recovery process), future control (taking precautions), and the likelihood of future assaults and distress at four points from two weeks to one year post-assault.

The basic pattern of results was consistent with the temporal model in both cross-sectional and longitudinal analyses. Both types of past control were associated with more distress. Present control and the belief that future rapes were less likely were associated with less distress, although the present control correlations were stronger and more consistent. The future control measure (which was really a measure of control efforts rather than control beliefs) was unrelated to distress. Control beliefs did change over time, suggesting that, rather than being stable and trait-like, they may be amenable to change through psychosocial interventions.

The importance of present control was further illustrated by the following findings. In a study using the same longitudinal dataset (Frazier, Tashiro, Berman, Steger, & Long, 2004), present control was more strongly related to self-reported positive life changes than were other types of control, social support, or coping. We also replicated the negative relation between present control and distress in a community sample of women with a history of sexual assault, controlling for neuroticism, other life stressors, and time since the assault (Frazier, Steward, & Mortensen, 2004). In another community sample of women whose worst trauma was bereavement, present control was the only type of control related to better adjustment, again controlling for several other important factors (Frazier et al., 2004). Mediation analyses suggested that part of the reason why survivors who perceived that they had more present control reported less distress was that they were less likely to cope with the stress of the assault by withdrawing from others (Frazier, Mortensen, & Steward, 2005).

These studies convinced me that the temporal model had some utility and that focusing on what can be controlled in the present seemed helpful. The next step was to design an intervention to try to help people focus on what they can actually control. Before doing that we needed to develop a good measure of the three types of control that could be used to assess the efficacy of the intervention. Six years and eight studies later, we published the Perceived Control over Stressful Events Scale (Frazier et al., 2011), a non–event-specific measure of perceived past, present, and future control with evidence supporting the content validity, factor structure, internal consistency and test–retest reliability, and convergent and discriminant validity of its scores.

The most consistent finding across the studies used to develop the measure was that those who reported more present control over stressful events reported better outcomes in cross-sectional, longitudinal, and prospective analyses. Present control predicted outcomes beyond various measures of coping (all of which were associated with poorer adjustment). In contrast, both past and future control were associated with more distress in the context of generally uncontrollable events, although the belief that future outcomes were controllable did appear adaptive in the context of events that *were* more controllable (e.g., exam performance). Thus, focusing on what can be controlled in the present may allow individuals to maintain or regain a sense of control if they have experienced an event that they could not control in the past and cannot control or prevent in the future.

In developing our measure, we examined the relations between perceived control over specific events and more general trait-like measures of control. These included a measure of mastery beliefs and of "realistic control" (reflecting perceived control over events that are controllable). As we had predicted, those with higher general mastery and realistic control beliefs reported more present control over current stressors (i.e., they focused on aspects of stressors that were controllable). However, general control beliefs were not related to past control (i.e., whether the occurrence of the event was under their control) because many events, particularly traumatic events, are not in fact controllable. Thus, general control

beliefs may help people to focus on what they can actually control in the present.

Recall that in our review of the control literature (Frazier et al., 2002) we had concluded that beliefs about the future likelihood of events were more related to distress than were beliefs about the controllability of events. Because future likelihood is not the same as future control, we did not originally include future likelihood in our perceived control measure. We reconsidered that decision and later added a future likelihood subscale (Frazier et al., 2012). As predicted, the belief that future stressors were more likely was associated with poorer adjustment, controlling for social support, prior traumas, and neuroticism. Present control was associated with less event-related and general distress, greater life satisfaction, and better physical health, with correlations in the medium to large range. Of the variables studied, present control had the strongest relation with (lower) PTSD symptoms. We have since found that the adaptiveness of present control does not depend on gender or ethnicity (Frazier, 2014) or on the objective controllability of the event (Frazier & Caston, 2015).

To this point, we had consistently found that people who report greater control over present aspects of stressors (e.g., how they think and feel about an event) reported better adjustment. Although some of these relations were longitudinal, they were still all correlational and did not show that present control causes better adjustment. To do that, we needed to manipulate present control and show that doing so creates changes in distress and other adaptational outcomes. Then, we would have the evidence needed to justify developing an intervention. It would take my intrepid graduate students to do just that.

GENERATION 3: DEVELOPING PERCEIVED CONTROL INTERVENTIONS (LIZA'S ACCOUNT)

In 2012, Sam Hintz, another graduate student of Pat's, and I began to develop the initial version of the present control intervention. Our goal was to determine whether we could increase present control through a

brief intervention and thereby reduce distress. We decided to create an online intervention, given the growing body of data on their efficacy (e.g., Barak, Hen, Boniel-Nissim, & Shapira, 2008). Sam created the first pilot version in Moodle, an online learning platform, as part of his dissertation research. The intervention included written text, graphics, online exercises, and videos. In some of the videos, Pat talked about present control, and, in others, one of our undergraduate research assistants described how she applied present control to the stressors in her life. Students also completed interactive exercises in which they practiced applying present control to their current stressors. To assess the efficacy and acceptability of the initial intervention, Sam compared this present control intervention to another intervention he created that only included information about stress. The results of this first pilot study were encouraging. Present control scores increased from before to after the intervention in the present control intervention group but not in the stress-information only group, showing that present control could be increased (at least in the short-term) from a brief online intervention.

We then refined the present control intervention based on feedback from this initial pilot study. We developed four brief (10–12 minute) modules using Google sites, each of which had the same structure. Each began with a video of Pat providing education about stress or present control. Next was a video of Pat facilitating a discussion about present control with a group of undergraduate and graduate students. We added this component because we thought that students might benefit from watching their peers focus on present control over their stressors. Finally, each module contained an online application exercise.

We conducted a second pilot study to determine if our revised program was more effective than our original intervention and if our intervention could improve mood in addition to present control. This study did not have a comparison group, so we could only examine within-group changes. Participants reported greater increases in present control compared to the first pilot study and also reported improvements in mood.

Following the two pilot studies, we conducted our first large-scale randomized control trial (RCT) of the online present control intervention

with undergraduate psychology students at the University of Minnesota (Hintz, Frazier, & Meredith, 2015). Students were ineligible if they had high levels of present control at the pretest because we reasoned that they would have little to gain from the intervention. Eligible participants were randomly assigned to the present control intervention, the present control intervention with feedback on their exercises (to determine whether this boosted effectiveness), or a stress information-only comparison group, which only completed the first module of the intervention. We hypothesized that both present control interventions groups would demonstrate greater improvement on mental health outcomes and present control than the stress information-only group.

The intervention used in the first RCT was similar to that used in the second pilot study; however, we eliminated the group discussion videos because of mixed feedback about this component. (Students were less interested in hearing about other students than we thought they would be.) The new intervention had four modules containing videos and interactive exercises on the following topics: (1) common college student stressors and the effects of stress; (2) past, present, and future control and the benefits of present control; (3) potential problems focusing on present control; and (4) tips for moving forward. Between the third and fourth modules, participants completed stress logs in which they wrote about what was stressful in their lives, what they did and did not have control over, and what actions they could take regarding the controllable aspects. After they completed an online exercise or stress log, participants in the feedback condition received brief, personalized email messages from Sam that were intended to provide empathy and reinforcement for completing exercises.

Consistent with our hypotheses, the present control intervention groups reported greater increases in present control and greater reductions in anxiety, depression, and stress than the stress-information group. The average between-group effect size on the various mental health outcomes measures was $d = .30$ at posttest and $d = .35$ at three-week follow-up. We were excited that participants actually benefitted slightly more from our intervention over time (and even after they stopped using it). We

were surprised that participants who received feedback fared only slightly better than those who did not. However, this suggested that stand-alone online interventions, which can be disseminated inexpensively and widely, can be effective. Overall, we were encouraged that our first RCT suggested that our intervention improved college students' perceptions of control over current stressors and mental health symptoms. Although the effects were not large, the program cost nothing to develop and only took about one hour of the students' time over the course of several weeks to complete.

A second RCT at a local community college also supported the efficacy of our online intervention for reducing stress-related mental health symptoms in psychology students (Frazier et al., 2015). At posttest, effect sizes were similar to those found in the initial RCT. However, only the between-group differences in present control and perceived stress were significant at the three-week follow-up due to an unexpected drop in symptoms in the comparison group. In both RCTs, we found that changes in present control mediated the effects of the intervention on mental health symptoms.

Flushed with success, we offered our intervention to all students in our large introductory psychology class. More than 500 students were randomized to receive our intervention early in the semester or to be on a wait list. In this study, we found a preventive effect: in contrast to the wait-list group, students who completed our intervention at the beginning of the semester did not report increases in stress over time.

In 2013, another graduate student (Viann Nguyen-Feng) joined the team. She shared Pat's long-standing interest in interpersonal violence and was interested in whether our intervention would be helpful for students who come to college having been exposed to violence, a group we know to be at risk for mental health symptoms (Frazier et al., 2009). Importantly, the intervention was more effective for students with a history of exposure to interpersonal violence (39% of the sample) than for those without this history (Nguyen-Feng et al., 2015). Moreover, students with a history of exposure to violence who completed our intervention reported decreases in distress, whereas those on the wait list reported

increases in distress over time. Among the students with a history of exposure to interpersonal violence, intervention effects were mediated both by increases in present control and decreases in rumination.

We have continued to try to improve our intervention content. We created more structured stress logs that were adapted from an approach used by Solie (2013). We also created modules that included mindfulness training as a means of accepting uncontrollable aspects of stressors. Students randomized to these conditions tended to do somewhat better than those randomized to our original intervention condition. Completion rates tended to be lower than for the original version of the intervention, though, so there is a tradeoff. Another graduate student, Christiaan Greer, recently found that mindfulness alone was not as helpful as the combination of present control and mindfulness for students with a history of interpersonal violence (Nguyen-Feng, Greer, & Frazier, 2016). Kelli Howard, another of Pat's graduate students, and I are now independently assessing the efficacy of our intervention when used as a course assignment.

Returning full circle to Howard's research on control over medical conditions, we are also working with an otolaryngologist to examine the role of present control in coping with voice disorders (Misono, Meredith, Peterson, & Frazier, 2016). We have found that patients who endorsed more present control beliefs reported less distress and vocal handicap. Interestingly, present control also moderated the relation between vocal handicap and distress such that vocal handicap was only related to higher distress levels among those who perceived that they had less control. Because our intervention was successful in increasing control among college students, we are now adapting it for use with voice disorder patients.

Pat and I were not aware that, at the same time we were developing our online intervention, Howard was collaborating with John Reich and his colleagues on another technology-based intervention targeting control and mastery as well as mindfulness (Zautra et al., 2012). Although their interventions were designed to reduce depression in middle-aged adults (rather than stress in college students), the approach was similar in terms of creating brief interventions targeting specific skills (vs. comprehensive treatment packages). Both interventions, control/mastery and

mindfulness, were delivered via pre-recorded phone messages delivered for 27 days. Their control/mastery intervention included training regarding the differences between controllable and uncontrollable events and primarily involved behavioral activation (e.g., suggestions to increase positive events and avoid negative events). The mindfulness intervention involved brief guided meditations focusing on mindfulness skills (e.g., acceptance and self-compassion). Both interventions were more effective than receiving daily health tips, although the mindfulness intervention had positive effects on a broader range of outcomes. They noted that the combination of mastery and mindfulness may be more effective than either approach alone, which is what we have found in our research.

CONCLUSION

Such is the history of our collective attempts to understand how perceptions of control are related to adjustment to stressors large and small. Howard began with experimental laboratory research on control; dissatisfied with the results, he turned to field research on the role of control in adjusting to health challenges. Although he and Glenn Affleck did not frame it this way at the time, their work did in fact assess past, present, and future control. Their work established the importance of taking control of aspects of illnesses that are in fact more controllable in the present. Pat expanded on this work by developing a temporal model of control; creating a measure to assess past, present, and future control; and, with Liza and other students, developing an intervention to help individuals focus on aspects of stressors over which they do in fact have control. Throughout all of our research, the most consistent finding, underscored by Reich (2014) is the adaptational benefits of focusing on what is controllable and letting go of the rest.

We believe that one potentially fruitful avenue for future investigation is to translate this basic research on control beliefs (including general and event-specific beliefs) into interventions to improve adaptational outcomes for individuals coping with or adjusting to stressful

encounters. Such intervention studies should *not*, however, be modeled on the majority of previously published behavioral intervention studies. We urge interventionists in the area of perceived control to adhere to the highest standards of clinical trials by, for example, comparing new interventions to interventions with demonstrated efficacy, identifying primary outcomes (and publishing study protocols) in advance rather than reporting post-hoc analyses as if they involved primary outcomes, recruiting a sufficient number of participants to have adequate power to detect expected effect sizes based on previous research, engaging in appropriate blinding, applying intent-to-treat analysis, investigating the sustainability of intervention effects, reporting participation rates with care, assessing the proposed mechanisms of change, remaining free from financial conflicts of interest and the more insidious ideological conflicts of interest, and refraining from overinterpreting intervention findings. Relatively few published behavioral intervention studies have followed these standards. Hopefully, interventions related to perceived control can now lead the way. The EQUATOR Network is an international initiative to improve health research by promoting accurate reporting and, by extension, good design practices in clinical trials and is a valuable source of information for best practices in the conduct and reporting of intervention research (http://www.equator-network.org/). We hope that future overviews of the perceived control literature are able to report that the exquisite theoretical formulations in this area of inquiry have been matched by equally exquisite theory-guided research and by the highest quality intervention studies.

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9

Perceived Control and Behavior Change

A Personalized Approach

STEPHANIE A. ROBINSON AND MARGIE E. LACHMAN ■

In a 2012 interview for the BBC Radio Show, *Mind Changers*, Dr. Julian Rotter, at age 95, reflected on his theory of locus of control and his amazement at how this area of inquiry has evolved since he first introduced the Internal-External (I-E) scale in 1966 (Rotter, 1966). He remarked, "it was like walking through the woods and lighting a cigarette and throwing the match behind you . . . and then you turn around and see this huge fire behind you and think, 'My God, how did that happen?' " He continued, "The idea that what you do has consequences is really not some new brilliant idea, it's something that's been around civilization for a long time." Despite Dr. Rotter's modesty, it was this notion and his groundbreaking formulation that "sparked" a movement in personality and clinical psychology.

After half a century, researchers have discovered fascinating nuances, posited many more research questions, and demonstrated countless clinical implications for the locus of control construct. In this chapter, we will

cover some of the important insights gained from this area of inquiry. We discuss findings on variations in control beliefs as a function of age, socioeconomic status (SES), sex, race, and culture. We consider how individual differences in control beliefs are associated with important aging-related outcomes such as well-being, health, and cognitive functioning. Additionally, we present interventions conducted to modify control beliefs as a means to optimize health and well-being, and we suggest that such behavior change interventions can be personalized with regard to control beliefs to increase effectiveness. Avenues for future work are proposed to advance our understanding of this concept and its implications for behavior change as we celebrate its 50th anniversary.

CORRELATES OF PERCEIVED CONTROL

Over the past 50 years, research on the locus of control has evolved from a dichotomous conceptualization of internality versus externality to a spectrum of multiple dimensions, both generalized and domain-specific. Some of the most compelling work demonstrates the importance of control beliefs with evidence for consistent relationships with sociodemographic variables and consequences for behavior and health.

Sociodemographic Differences in Control Beliefs

Interestingly, factors often outside of one's control are associated with one's level of perceived control. That is, there are systematic variations in perceived control as a function of sociodemographic factors such as age, sex, SES, race, and culture.

Perceived Control and Age

There are many benefits to a greater sense of control, including successful aging (Lachman, 2006). Unfortunately, however, perceived control tends to show decreases when it may be most beneficial—that is, in later adulthood. One's level of perceived control changes throughout the life span.

On average, it increases in young adulthood, peaks in midlife, and declines in old age (Lachman & Firth, 2004; Lachman, Rosnick, & Röcke, 2009; Lachman & Weaver, 1998; Mirowsky & Ross, 2007). Mainly, age-related decreases in perceived control seem to occur because older adults experience fewer opportunities for control and more control-limiting situations. However, a loss of control to some extent may also be tied to stereotypes and ageist views about diminishing abilities and increased helplessness (Levy, 2003).

Not all research supports a decline of perceived control in old age. Some longitudinal studies suggest that perceived control is relatively stable across the life span (Gatz & Karel, 1993; Grover & Hertzog, 1991; Lachman, 1985, 1986). Goal relevance may explain some of these inconsistencies and influence the maintenance of control beliefs in old age. Brandtstädter and Rothermund (1994) proposed a model whereby the sense of control is maintained in later adulthood through shifts in the subjective importance of developmental goals. Certain domains may be more significant to a certain age group, therefore having a greater influence (be it beneficial or detrimental) on the perceived sense of control for that particular domain at different points in the life span (Lachman & Bertrand, 2001; Lachman & Firth, 2004). For example, previous research suggests that the importance of the work domain typically increases in midlife, especially for men (Clark-Plaskie & Lachman, 1999). Research suggests that older adults may even live longer if they are able to maintain their sense of control in the domains most salient to them (Krause & Shaw, 2000). Brandtstädter and Renner (1990) suggest that sense of control can be categorized into two forms: assimilative and accommodative. Assimilative forms, or persistent goal pursuits, tend to decline with age; whereas accommodative forms, or flexible goal adjustment, show increases with age (Brandtstädter & Renner, 1990; Lachman, Neupert, & Agrigoroaei, 2011). Similarly, the life span developmental theory of motivation and control focuses on primary and secondary control strategies. Primary control strategies (i.e., changing the environment) seem to remain relatively stable across adulthood, but are more likely to be replaced by secondary control strategies (i.e., changing the self) in later life, when older adults

are faced with greater obstacles to goal attainment (Heckhausen, Wrosch, & Schulz, 2010; Wrosch, Heckhausen, & Lachman, 2006).

There are individual differences in change over time, with some showing greater decline in perceived control than others, as found in the Midlife in the United States (MIDUS) study (Lachman et al., 2009). Older adults seem to maintain an overall sense of mastery, or beliefs about one's abilities (Bandura, 1997). This preservation can be explained by a possibility that older adults adjust to the salient domains, or the standards in which they define their competence. For example, if an older man used to excel in chess, he might still describe himself as an expert chess player despite his age-related slower processing speed affecting his time to make a move. That is, despite slowing down, for his age and relative to his peers, he is still an expert. Inconsistencies in the age-related patterns of perceived control may be qualified or moderated by various other group differences (e.g., SES, race, culture) that influence one's sense of control, perhaps differentially across the life span.

Variations in Control Beliefs by Sex, SES, and Culture

Men tend to have a higher sense of control, on average, although this difference is less prominent among college-educated adults (Lachman & Weaver, 1998). Additionally, in certain domains (e.g., social), women report more control than men (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Lachman & Weaver, 1998, Wolinsky & Stump, 1996). Another key factor is SES. For example, lower income and less education have been associated with a lower sense of control (Lachman & Weaver, 1998; Mirowsky & Ross, 2007). Nevertheless, not all individuals with a low SES have a low sense of control. In fact, research by Lachman and Weaver (1998) found that control beliefs play a buffering role in the relationship between SES and health. That is, low-SES individuals with a high sense of control had comparable health to those with a high SES. Understanding how those with low SES are able to develop a high sense of control is an important unanswered question with great relevance for addressing health disparities. Moreover, it remains to be established whether those with higher education develop a greater sense of control, or whether those

with a greater sense of control are more likely to seek out and achieve higher education. Some longitudinal studies suggest that it is more likely that education affects control beliefs and less likely that changes in control beliefs produce changes in education (Lachman et al., 2011; Mirowsky & Ross, 2007). However, other longitudinal work suggests that it is control beliefs that affect educational attainment. A study by Vargas Lascano, Galambos, Krahn, and Lachman (2015) found that one's educational level did not predict growth in perceived control; rather, those who had a greater sense of control at age 18 were more likely to reach higher levels of educational attainment.

Additionally, there are race and cultural variations in the conceptualization of the sense of control, with differential implications (Ashman, Shiomura, & Levy, 2006; Skaff & Gardiner, 2003). For example, African Americans tend to report a lower sense of control (Shaw & Krause, 2001), which may be linked to their perceived level of discrimination (Bruce & Thornton, 2004). Similarly, European Americans tend to have higher levels of global mastery than Latinos (Skaff & Gardiner, 2003). Among developed nations, Americans report having the highest sense of control, and South Koreans report having the lowest sense of control (Pew Research Center, 2014). Among developing countries, the majority believe their success in life to be determined by outside forces, including 74% in Bangladesh and 67% in Ghana (Pew Research Center, 2014). Such differences are likely tied to economic conditions, values, and religious views. However, an Asian or Asian American who reports a low sense of control will not typically experience the same negative consequences that an American with a low sense of control would experience. This may be attributed to differences in values between Eastern and Western cultures. Higher perceived control is more closely tied to positive health and well-being outcomes in Western cultures (Markus & Kitayama, 1991). Moreover, primary control strategies are more central for Western cultures, whereas secondary control strategies are more desirable among Eastern cultures (Schulz & Heckhausen, 1999). More recent work, however, has found contradictory evidence regarding differences between Japanese and Americans (Kan et al., 2014; Ryff et al., 2015). Specifically,

it was found that sense of control strongly mediated the links between social status and health outcomes in similar manners for both countries (Kan et al., 2014). There is a need for more cross-cultural comparisons as a means to understanding the nature of control beliefs and the circumstances in which control is adaptive.

Relationship of Control Beliefs to Health and Well-Being

In addition to its relationship to major sociodemographic factors, there are many well-documented benefits of a strong sense of control. Perceived control plays an important role in health and well-being across the life span. It is linked to performance in multiple domains and can buffer some of the deleterious effects of aging. For one, control may serve as a protective factor for psychological and emotional well-being (Kunzmann, Little, & Smith, 2002; Lachman, Röcke, Rosnick, & Ryff, 2008; Rodin, 1986). As Lachman (2006) stated, those with a high sense of control are "happy, healthy, wealthy, and wise." Perceiving that one is in control of one's own destiny is tied to greater life satisfaction, a more optimistic view of adulthood, and fewer depressive symptoms compared to those who believe they do not have an influence over outcomes in their life. A strong belief in one's ability to bring about desired outcomes has also been linked to better health, including higher self-rated health, fewer chronic conditions and functional limitations, and even longevity (Infurna & Gerstorf, 2013; Turiano, Chapman, Agrigoroaei, Infurna, & Lachman, 2014). As for wealth, higher control beliefs are associated with higher SES, including higher incomes and greater educational attainment (Mirowsky & Ross, 2007). Furthermore, a greater sense of control has been associated with cognitive outcomes including better memory performance (Windsor & Anstey, 2008), greater strategy use (Lachman & Andreoletti, 2006), more frequent computer use (Czaja et al., 2006), and greater effectiveness of cognitive training (Rebok, Rasmusson, & Brandt, 1996; Wolinsky et al., 2010). In fact, recent findings from the Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) study suggested that one's

locus of control could be a factor in understanding why minorities are at greater risk for developing cognitive impairment (Zahodne et al., 2015). Specifically, Zahodne and colleagues (2015) found that locus of control mediated the relationship between race and gains from cognitive training. Compared to non-Hispanic whites, African Americans reported a more external locus of control, which was associated with smaller gains in memory and reasoning after cognitive training (Zahodne et al., 2015). Additionally, those with a greater sense of control are less likely to show age-related declines in cognitive functioning (Caplan & Schooler, 2003; Infurna & Gerstorf, 2013). The directionality of the relationship between control beliefs and (physical, cognitive, and psychological) health has been of interest for quite some time. Some of the most promising work from longitudinal studies shows that beliefs do have an influence on important outcomes such as health and longevity (Infurna & Gerstorf, 2013; Turiano et al., 2014). Nevertheless, the evidence also suggests that the relationship is reciprocal: beliefs not only affect health, but changes in health also in turn influence beliefs about control (Infurna & Okun, 2015).

IMPORTANT DISTINCTIONS AND RELATED THEORIES

It is significant to note that a "sense of control" is distinctive from "self-control" and/or "self-regulation." Self-control and self-regulation are frequently used interchangeably, with both defined as the overriding of one action to achieve another goal (Carver & Scheier, 2011). Sense of control and self-control are related in that to have self-control, one must believe there is control over the desired outcome (i.e., a sense of control), usually achieved through one's own behavior (self-control). However, there are also differences between the two constructs. Self-control represents one's ability to regulate the self, emotions, or behaviors (e.g., "I will not smoke a cigarette;" "I can study rather than going out with my friends;" "I am able to control my emotions"), whereas perceived control is more closely tied to one's beliefs as to whether the self or someone else can regulate an outcome or bring about a desired result (e.g., "I believe I have control over

my memory;" "I think I can get a good grade;" "I will be able to refrain from yelling at my children when they do something I do not like"). For the most part, self-control refers to a behavior, and sense of control is a belief about one's abilities pertaining to that behavior. It is unlikely that one would engage in self-control without a belief in one's ability to take control. Thus, a sense of control may be considered a necessary, although not sufficient, condition for self-control.

There are a multitude of models that describe control over health behaviors, for example, social cognitive theory (SCT; Bandura, 1986), the theory of planned behavior (TPB; Ajzen, 1991), the theory of reasoned action (TRA; Ajzen & Fishbein, 1980), and the transtheoretical model of behavior change (TTM; Prochaska, DiClemente, & Norcross, 1992). These theories have been mainly used to elucidate why people engage in a particular healthy or unhealthy behavior (e.g., smoking, signing up for a gym) (Rothman, Baldwin, Hertel, & Fuglestad, 2011). According to SCT, self-efficacy beliefs are a critical predictor of the initiation and maintenance of a change in behavior (Bandura, 1986). Self-efficacy refers to beliefs about one's ability to engage in a specific behavior, whereas beliefs about control consider one's expectations as to whether one's actions will lead to desired outcomes or whether one's efforts will be thwarted.

As human beings, we are motivated to avoid the perception of randomness in our lives, particularly because this notion can be psychologically stressful (Pennebaker & Stone, 2004). As such, we have a need to defend the aversive emotional experience of perceiving one's world as haphazard (i.e., experiencing a low sense of control or helplessness) (Laurin, Kay, & Moscovitch, 2008). Traditionally, the primary means through which people have been assumed to avoid this perception is by affirming their belief in personal control (Presson & Benassi, 1996). It has been noted, however, that not all individuals, and certainly not all cultures, place such a strong emphasis on personal control (Ji, Peng, & Nisbett, 2000). Therefore, when this is the case, those who do not emphasize personal control must draw on other resources in response to the threat of chaos and randomness in their environment. One such resource used to counteract the perception of a low sense of control is religion. Indeed,

previous research suggests that religion helps to amplify one's sense of control (Krause & Tran, 1989). However, other work suggests the opposite in that religiosity has been associated with a lower sense of control (Shaw & Krause, 2001). This discrepancy may be due to differences between primary and secondary control strategies (Rothbaum, Weisz, & Snyder, 1982; Shaw & Krause, 2001). That is, a negative association between religiosity and sense of control might reflect one relinquishing control (i.e., primary control) to a powerful other (i.e., secondary control), such as God (Shaw & Krause, 2001).

IS THERE A DOWNSIDE TO GREATER PERCEIVED CONTROL?

In the 2012 *Mind Changers* interview (Hammond, 2012), Rotter noted that he did not necessarily intend internality to always be good and externality to be bad, remarking, ". . .there are a lot of things that I can't control. . . I knew that from the beginning." Although the majority of studies suggest that perceived control is beneficial, there is some work to suggest that, in some contexts, a higher sense of control might be deleterious and a lower sense of control may be more protective, especially when there are limited opportunities for control (Skaff, 2007). In the context of health, having a higher sense of control may make one more likely to ignore realities of health problems. For example, a high level of control can create a sense of invulnerability, leading one to ignore symptoms and perhaps to avoid doctor visits. As another example, work by Bisconti, Bergeman, and Boker (2006) found that recent widows with greater levels of perceived control over their social support had poorer overall adjustment during the first four months of widowhood, although they rebounded over the long run, perhaps due to better coping skills.

Lachman, Agrigoroaei, and Rickenbach (2015) suggested that there is a paradox involving the benefits and consequences of high perceived control. That is, those who feel in control often do not accept help from others or may not want to use environmental supports even if it would

be beneficial. However, using support from others or assistive devices to maintain one's well-being and lifestyle are effective means to increase control. In some circumstances, realistic assessments of control may be more beneficial than an inaccurate subjective sense of control. That is, knowing to let go of things that are outside of one's control may be a form of wisdom and associated with increased personal well-being (Brim, 1974; Lachman et al., 2011).

MECHANISMS TO OPTIMIZE PERCEIVED CONTROL

To develop effective interventions to enhance one's sense of control, a first step is to identify the mechanisms and processes involved in linking control beliefs with positive outcomes of interest (e.g., health, memory, well-being, etc.; Carstensen & Hartel, 2006; Hess, 2006). As illustrated in Figure 9.1, a lowered sense of control can influence one's affect, behavior, motivation, and physiology, including increased stress, decreased effort, persistence, and adaptive strategy use, as well as decreased engagement in memory or physical exercises, which has been shown to influence aging outcomes in multiple domains. It has been suggested that a sense of control and other related components (such as self-efficacy) function as mediators in the relationship between aging stereotypes and physiological activity and performance (Levy, Hausdorff, Hencke, & Wei, 2000). Those who are exposed to negative information about aging may lower their sense of efficacy and control, thereby resulting in poorer health.

Miller and Lachman (1999) proposed a conceptual model, updated by Lachman (2006; see Figure 9.1), concerning some of the possible mechanisms linking control beliefs and performance, as well as potential mediators. Control beliefs are believed to influence outcomes and performance through behavior (e.g., strategy use), physiology (e.g., anxiety, stress), motivation (e.g., effort), or affect (e.g., depression). This model, derived from cognitive-behavioral theory (Bandura, 1997), assumes the processes to be reciprocal and cyclic such that the outcomes (e.g., memory, physical declines, well-being) may impact one's control beliefs, self-efficacy, and

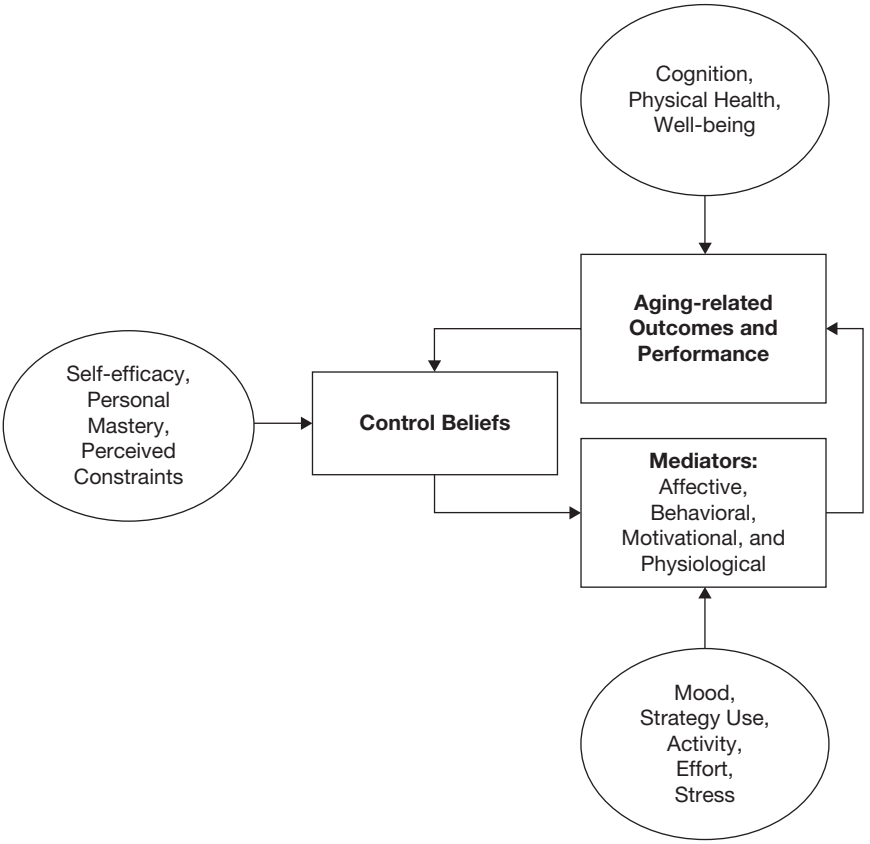

Figure 9.1 Conceptual model of the relationship between control beliefs and aging-related outcomes and performance with mediators (Based on Lachman, 2006; Lachman, Neupert, & Agrigoroaei, 2011; and Miller & Lachman, 1999).

feelings of mastery, or beliefs about one's abilities and/or constraints, which in turn can impact possible behavioral or physiological mediators as well as future outcomes (Bandura, 1997; Miller & Lachman, 1999). For example, older adults who are experiencing trouble with their memory or physical ability may react with a decreased sense of control in these domains, especially if the difficulties can be attributed to uncontrollable factors (e.g., age, injury). This lowered sense of control can be harmful if it is associated with increased stress, anxiety, or inactivity (Agrigoroaei & Lachman, 2010). In sum, perceived control and related behaviors seem to be involved in a multidirectional, reciprocal relationship wherein

perceived control is both a predictor and outcome of age-related changes such as memory (Lachman, Ziff, & Spiro, 1994; Miller & Lachman, 1999) and health (Skaff, 2007).

PERCEIVED CONTROL AND BEHAVIOR CHANGE INTERVENTIONS

There is good evidence that control beliefs influence effort, strategy use, anxiety, and other factors tied to goals and performance (Lachman et al., 2011). The widespread findings on the advantages of a strong sense of control suggest the importance of identifying methods to maintain and optimize perceived control in later life. Attempts to maintain a sense of control occur in everyday life, as well as through experimental manipulations and interventions. On a daily basis, there are opportunities for one to feel or take control in a multitude of life domains (e.g., medications promising that they will allow you to control everything from embarrassing skin conditions to bladder dysfunction). The ubiquity of this notion was revealed by a search of the phrase, "taking control of your life," on Amazon.com's book section, which showed a staggering 1,456 hits.

Experimental Manipulations of Perceived Control

There have been many intervention efforts designed to increase perceived control. A first step is to establish that one's sense of control can be changed. Indeed, Rotter noted in an interview with the BBC that locus of control is not completely fixed and that major life events such as marriage, having children, or changing jobs could lead to fluctuations (Hammond, 2012). Several studies have provided such evidence for change in control beliefs in response to experimental manipulations (Lachman et al., 2011). For example, Laurin et al. (2008) found that participants' sense of control could be altered when they were presented with scenarios in which they did not have control over the outcome. Similarly, Kay and colleagues (Kay, Gaucher, Napier, Callan, & Laurin, 2008) found that when they

asked participants to recall recent events in which they did not have control, they reported having a lower sense of control (Kay et al., 2008). Other work by Whitson and Galinsky (2008) proposed that when individuals were unable to gain a sense of objective control, they would try to change their perceptions. Specifically, participants were assigned to either a baseline condition, in which they were not given feedback on their responses, or a no-control condition, in which they were given feedback on their performance that was not dependent on their responses. All participants were exposed to a variety of tasks such as trying to identify patterns in random stock market information or identify images in pictures with white noise. They predicted that participants who lacked control would try to gain a sense of control by identifying a coherent and meaningful relationship among the random, unrelated stimuli. As predicted, the participants who lacked control were more likely to report perceiving illusory patterns, such as forming sham correlations in stock market information or perceiving images that were not there, likely letting them feel more in control. Studies such as these provide evidence that one's sense of control can be manipulated with implications for understanding possible avenues to promote control and develop appropriate interventions.

Interventions to Optimize Control

Some interventions to promote perceived control have focused on cognitive restructuring as a way to reframe misconceptions about controllability (Lachman et al., 2011). Other interventions have focused on increasing choice, flexibility, and support in the environment as a means toward increasing control (Lachman et al., 2015). For example, Langer and Rodin (1976) conducted an intervention with nursing home residents where they were provided with more control over their environment (e.g., taking care of their own plant or choosing their own activities). Increasing these choices led to positive long-term effects on well-being, activity, and health, although the researchers did not directly assess whether there were changes in perceived control.

It is also possible to address perceived control in specific domains. For example, many adults feel a lower sense of control about the aging process and presume that it is too late for them to improve their performance or functioning or compensate for losses in areas associated with aging, such as memory or physical ability. Past work has found that solely focusing on performance feedback does not seem to be enough to result in behavior change for older adults, perhaps because maladaptive beliefs about aging interfere (Bandura, 1997). Thus, multifaceted interventions that target both skills training and modifying control beliefs may be the most effective (Lachman et al., 1997). One example of this proposed multifaceted approach found that a combined intervention of cognitive restructuring of beliefs and memory skills training resulted in the greatest sense of control and perceived ability to improve memory, compared to cognitive restructuring or memory skills training alone or just practice on memory tasks, and a no-contact control group (Lachman, Weaver, Bandura, Elliott, & Lewkowicz, 1992). Importantly, there were no differences found between the groups in the amount of change in memory performance, and all groups increased their memory performance over time. Yet individual differences in control beliefs were positively related to memory performance (Lachman et al., 1992).

Such multifaceted intervention approaches involving beliefs and skills have been used in other domains such as physical activity. Older adults often are sedentary and restrict their physical activity. This stems in part from misconceptions about the aging process. That is, many adults believe that physical decline is unavoidable and irreversible with advancing age (i.e., uncontrollable). Thus, motivation for behavior change is low because it is assumed that exercise will not do any good or may even cause harm. Moreover, many adults may not have the requisite skills to change their routines. Based on this work, Lachman and colleagues (1997) proposed that interventions to promote physical activity should also employ this multifaceted approach by focusing on both teaching physical activity skills as well as promoting a sense of control. For example, a fear of falling is relatively common among older adults and often results in restricted activity levels. This is typically manifested as a low sense of control for

engaging in activity without falling and a sense that falling is uncontrollable (Tennstedt et al., 1998). One intervention, titled "A Matter of Balance" (Tennstedt et al., 1998), targeted older adults' faulty attitudes and self-efficacy about falling and activity restriction, as well as providing them with ways to reduce falls and increase their strength and balance through exercise. The intervention group, compared to a control group matched for amount of social contact, demonstrated greater short-term changes in the self-reported intentions to engage in physical activity and a greater sense of control. A key assumption of this twofold approach is that without first ensuring confidence that age-related declines can be controlled, lasting behavior change is unlikely.

Personalized Interventions

Within the medical community, there is currently a widespread trend toward "personalized medicine"—a field of health care that takes into account each individual's unique clinical, genetic, genomic, and environmental information to guide decisions about the prevention, diagnosis, and treatment of disease (National Institutes of Health, 2015). In fact, this trend is so prevalent that President Obama mentioned it in his most recent State of the Union address and has launched a multimillion-dollar initiative to promote personalized medicine (Office of the Press Secretary, 2015). While personalized medicine has typically focused on biomarker discovery and targeted treatments, we posit a similar individual-based approach for developing effective interventions to optimize control and promote adaptive health and aging-related outcomes.

Personalized interventions have been successful in reducing risky health behaviors (e.g., alcohol consumption) and promoting healthy behaviors (e.g., smoking cessation, self-management of type 2 diabetes; Bierut, Johnson, & Saccone, 2014; Clark, Hampson, Avery, & Simpson, 2004; Neighbors, Lee, Lewis, Fossos, & Walter, 2009). For example, one study randomly assigned college students to either receive or not receive feedback that was personalized based on their baseline assessments related

to their drinking behaviors. Students who received the intervention consumed less alcohol, and the intervention was most effective among those who intended to drink more (Neighbors et al., 2009).

We propose that a similar approach could be helpful in creating effective interventions for other types of behavior change, such as increasing physical activity (see Figure 9.2).

Specifically, interventions could consider an individual's unique characteristics (e.g., age, gender, SES, race, culture) as well as information about their personality and beliefs when creating and implementing interventions. For example, if a physician suggests that an older adult increase his physical activity, it would be helpful to identify what specific barriers are preventing him from engaging in physical activity. If a low sense of control about physical activity (e.g., "It's not going to do any good at my age") is implicated, then the intervention would aim to promote a greater sense of control (e.g., physical activity at any age is beneficial; it is possible to increase activity levels) and provide the necessary skills and environmental supports to engage in more physical activity. Those who have low self-efficacy about the ability to exercise or to make changes in one's daily routine would also presumably benefit from interventions to increase the sense of control. On the other hand, if the main barrier to becoming more active is lack of knowledge about what machines to use in the gym and how, rather than a low sense of control, this would suggest a focus on strategies to obtain the necessary information. Figure 9.2 illustrates how a personalized approach could be applied to develop effective interventions to promote control beliefs and related outcomes.

By taking into account sociodemographic factors (e.g., age, gender, SES, race, culture) and personality traits or beliefs, we can develop effective interventions that are relevant to the unique goals or barriers of an individual. Differences in beliefs about control can have a critical impact on the effectiveness of interventions, such as one's willingness to enroll in the intervention and one's receptivity to and success with the intervention. Those who have a low sense of control would first receive an intervention to target these beliefs. This would be followed by training focused on the specific behaviors of interest (e.g., incorporating more walking into

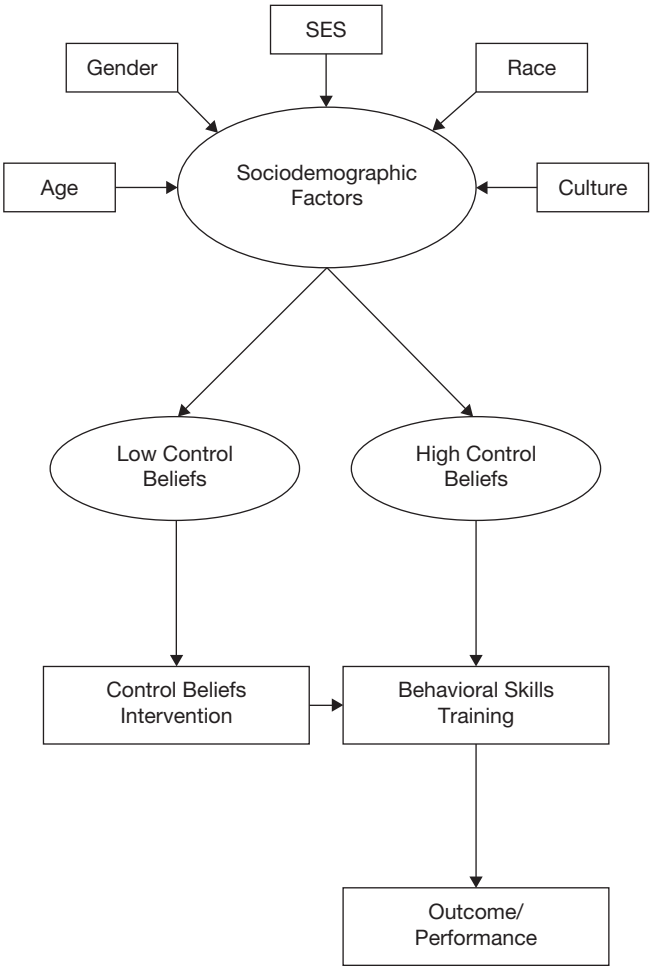

Figure 9.2 A personalized approach to behavior change targeting demographic factors, control beliefs, and skills.

one's daily schedule). This personalized approach considers that there are types or clusters of people with commonalities who would respond to particular treatment approaches in similar ways. Thus, the goal is to tailor the treatments accordingly with the goal of sustained behavior change. Ultimately, these changes in beliefs and behavior are expected to have long-term benefits for performance (e.g., cognitive) and health outcomes (e.g., fitness).

FUTURE DIRECTIONS FOR BEHAVIOR CHANGE INTERVENTIONS

Given the reciprocal nature of the relationship between perceived control and associated outcomes, it is suggested that behavior change interventions should target both control beliefs and the behaviors and skills in the domain of interest. For example, in the context of memory, an effective intervention could utilize cognitive restructuring to target control beliefs about memory and cognitive training to target skills (e.g., strategies) related to memory improvement. In the domain of physical exercise, this could involve developing beliefs about one's ability to exercise and the potential benefits, as well as providing information about exercise techniques and regimens, environments conducive to physical activity, and opportunities for practice. Future work should continue to acknowledge and capitalize on the multidirectional relationship between control beliefs and functional domains by exploring interventions that target both sense of control and desired goals and skills.

As previously mentioned, engagement in physical activity is strongly tied to one's level of perceived control. Those with a greater sense of control are more active, in part, because they see a connection between their behaviors and desired outcomes such as health and well-being. Physical activity is a promising, cost-effective, and noninvasive method of health promotion. Yet, only a small percentage of adults engage in the recommended levels of physical activity (Centers for Disease Control and Prevention [CDC], 2013). Therefore, there is interest in developing interventions to promote behavior change toward greater physical activity, and a focus on perceived control is one promising approach. The Boston Roybal Center for Active Lifestyle Interventions (RALI Boston; www.brandeis.edu/roybal) is dedicated to improving health outcomes in middle-aged and older adults by cultivating more active and engaged lifestyles. This center, which involves researchers with specialized expertise in healthy aging from five Boston-area institutions (Brandeis University, Boston College, Northeastern University, Boston University, and Hebrew SeniorLife, a Harvard Medical School

affiliate), employs motivational, social, and behavioral strategies as mechanisms to increase and sustain activity. Such strategies include interventions that target common barriers adults might experience that prevent them from engaging in physical activity, such as a low self-efficacy for regular exercise or a perceived lack of control over changing their activity levels.

One of the RALI projects focuses on a commonly reported barrier to engaging in physical activity among middle-aged adults—a perceived lack of time. This study employs implementation intention strategies to help working middle-aged adults take control of their schedules, physical activity, and perceived lack of time. Implementation derived from Gollwitzer's (1999) social psychological theory have been effectively used to change health behaviors, such as getting flu shots (Milkman, Beshears, Choi, Laibson, & Madrian, 2011). It involves specifying how, what, when, and where one will implement a new behavior, Previous studies have used this approach to increase participation in formal exercise programs (Gollwitzer, 1999); however, the current study will apply the technique to increasing daily walking in the context of work and leisure schedules. We expect that the specific implementation intention planning will lead to a greater sense of control and exercise self-efficacy, which are important for sustained behavior change. (Lachman et al., 2011). There is evidence to suggest that planning leads to a greater sense of control and to increased perceptions of well-being (Bandura, 1997; Lachman & Burack, 1993). For example, previous life span work has demonstrated associations among planning, control beliefs, and life satisfaction (Prenda & Lachman, 2001). Specifically, they found that those who were more future-oriented and goal-focused reported greater life satisfaction and that this relationship was more pronounced with increasing age (Prenda & Lachman, 2001). Furthermore, control beliefs mediated the relationship between planning and age, suggesting that planning may facilitate a sense of perceived control across the life span, which enhances life satisfaction (Prenda & Lachman, 2001).

Another avenue of interest to increase perceived control is through cognitive-behavioral approaches, such as cognitive restructuring.

Cognitive restructuring is a central part of cognitive-behavioral therapy (CBT)—a psychotherapeutic process of learning to identify and dispute irrational or maladaptive thoughts and misconceptions that was derived in part from Rotter's social learning theory. CBT has been used successfully to treat a wide variety of conditions, including depression, posttraumatic stress disorder (PTSD), addictions, anxiety, social phobias, relationship issues, and stress (Butler, Chapman, Forman, & Beck, 2006). Cognitive restructuring is a useful technique to increase perceptions of control and change negative thoughts, which have been linked with damaging behaviors and negative health outcomes. Indeed, recent work suggests that less perceived control is directly associated with less engagement in physical activity and higher cardio-metabolic risk (Infurna & Gerstorf, 2012; White, Wójcicki, & McAuley, 2011). Previous work has utilized cognitive restructuring techniques to increase perceived control and intentions to become more active (Lachman et al., 1992; Tennstedt et al., 1998). However, it remains to be determined if a cognitive restructuring intervention targeted at promoting control beliefs can also result in behavior change. Specifically, further work is needed to determine if this intervention approach will lead to increases in actual physical or cognitive activity levels. Future work should also continue to take into account group differences that may influence one's initial level of perceived control or moderate the treatment effects.

Although it is not always possible to modify control beliefs, researchers could take these beliefs into account when developing interventions. For those who are resistant to changing beliefs, the focus may be adapted to target environmental manipulations that create conditions that foster control without necessarily directly changing beliefs. For example, older adults in a nursing home could be allowed to decide when the doctor will visit or how to arrange their rooms. Finally, it is important to acknowledge that those who enroll in interventions are likely those who already have a relatively strong sense of control. Targeting those who are low in perceived control may require a form of intervention to get them to participate in the first place.

CONCLUSION

Ironically, when Julian Rotter was asked in a radio interview how he came up with the idea for the locus of control, he referred to a chance occurrence (Bandura, 1982). He told the BBC interviewer that the idea came to him during clinical supervision for a graduate student whose patient explained events in his life as due to luck (Hammond, 2012). Since Rotter's groundbreaking conceptualization of the locus of control, a large body of work has explored various aspects, such as how perceived control is related to circumstances or conditions such as aging, SES, culture, and health. It is also important to understand under what conditions greater perceived control is most beneficial. With some notable exceptions, the majority of this research does suggest that greater perceived control is tied to greater well-being across the life span. To further understand these benefits, future work should continue to explore the mechanisms associated with perceived control and its influence on desired outcomes. With so many advantages to maintaining a sense of control across the life span, it is especially important that future work further explore interventions that may help to optimize perceived control. Past and current work suggests that multifaceted interventions focused on augmenting perceived control in conjunction with skills training may be among the most effective. This strategy recognizes that beliefs in controllability serve as an important foundation for behavior change. Furthermore, a personalized approach with interventions that are tailored to sociodemographic factors and personality characteristics, such as beliefs about control, is suggested as a potentially fruitful avenue to pursue for promoting successful behavior change.

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10

Perceived Control and Depression

Forty Years of Research

LIZA M. RUBENSTEIN, LAUREN B. ALLOY, AND LYN Y. ABRAMSON ■

INTRODUCTION

Perceived control over environmental events is an important component of adaptive behavior. Information about one's control over events in the world provides individuals with a means of explaining the past, influencing the present, and predicting the future, thereby increasing the likelihood that they can obtain desired goals and avoid negative outcomes. The construct of control has been defined in several ways. For example, Rotter (1966) distinguished between internal versus external locus of control based on whether people perceived the primary causes of events to be something about themselves (internal) or about other people or circumstances (external). Alternatively, in the learning literature, control is defined in terms of response–outcome contingency: an individual is considered to have some control over an outcome if the likelihood of

the outcome's occurrence varies as a function of the person's responses (e.g., Alloy & Abramson, 1979).

The concept of control has been central to several substantive areas of psychology. Generalized perceptions of control are important determinants of people's behavior in instrumental conditioning situations (e.g., Bolles, 1972; Maier & Seligman, 1976). Perceived control also figures prominently in several social and clinical psychology areas including attribution theory, implicit personality theories, self-efficacy, and learned helplessness (e.g., Alloy & Tabachnik, 1984; Bandura, 1977; Crocker, 1981).

Furthermore, the perception that one can control events in one's environment has implications for psychological and physical well-being. The perception of control, even when not based in reality, has been found to reduce subjective pain and stress, reverse performance deficits associated with lack of control, reduce anxiety and depressive symptoms, and decrease susceptibility to heart disease, cancer, and other illnesses (e.g., Seligman, 1975; Thompson, 1981).

LEARNED HELPLESSNESS, DEPRESSION, AND PERCEPTIONS OF CONTROL

In the 1970s, based on earlier research in animals and humans examining the motivational, affective, and cognitive consequences of exposure to objectively uncontrollable events, Seligman (1975) proposed the learned helplessness theory of depression. According to the helplessness theory, individuals who perceive that they have no control over important outcomes in their lives become depressed. In the more recent version of this theoretical model, the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989), depression occurs when individuals expect both that negative events will occur ("negative outcome expectancy") and that they have no control over the occurrence of these negative events ("helplessness expectancy"). Thus, the ability to perceive that outcomes are not contingently related to one's responses (i.e., that one does not have control over outcomes) is central to the development of depression in the learned

helplessness theory. Moreover, a prediction from the helplessness theory of depression is that individuals with depression will either underestimate their control over outcomes or will judge that they have less control over outcomes than do nondepressed individuals.

Recognizing the similarity between the helplessness concept that responding and outcomes are independent, and Rotter's (1966) concept of external locus of control, early studies (Klein & Seligman, 1976; Miller & Seligman, 1975, 1976) attempted to test the helplessness theory's hypothesis that depressed individuals would perceive that they have less control over outcomes than would nondepressed individuals using Rotter's chance and skill tasks (e.g., James & Rotter, 1958; Rotter, Liverant, & Crowne, 1961; see the later section on Expectancy/Prediction Studies). On these tasks, Rotter and colleagues found that outcomes of previous trials have a greater effect on expectancies for future success when people believe that outcomes are dependent on responses (skill-determined or controllable) than when they believe that outcomes are independent of responses (chance-determined or uncontrollable). Although Seligman and colleagues (Klein & Seligman, 1976; Miller & Seligman, 1975, 1976) found that depressed individuals showed smaller expectancy of success changes on the skill task than did nondepressed individuals, the chance–skill tasks are problematic as assessments of people's perceptions of response–outcome contingencies (see Alloy & Abramson, 1979). Another challenge to the learned helplessness theory came from early findings that people are poor at accurately perceiving their control over events and particularly have difficulty in perceiving when they have no control over outcomes (e.g., Jenkins & Ward, 1965). Consequently, Alloy and Abramson (1979) set out to more adequately test the helplessness theory's prediction that depressed individuals underestimate their control over outcomes either absolutely or relative to nondepressed individuals by employing modified versions of the Jenkins and Ward (1965) judgment of contingency tasks.

In the remainder of this chapter, we review evidence from the past 40 years regarding depressed individuals' perceptions of control. We begin with judgment of control/contingency studies because they provide an objective measure of level of contingency against which individuals'

judgments of control can be compared. Next, we review expectancy of success studies and attribution studies. For each of these types of studies, the findings suggest that depressed individuals are often more accurate or realistic in their perceptions of control than are nondepressed individuals. We then discuss situational and personal factors that provide boundaries on these "depressive realism" findings. Finally, we end with directions for future research to better understand the association between depression and perceived control.

JUDGMENT OF CONTROL/CONTINGENCY STUDIES

To understand how depressed and nondepressed individuals differ in their perceptions of control, it is first useful to examine studies that focus on judgments of contingency. These studies are valuable because they provide an objective standard of reality against which to assess the accuracy of people's judgments as measured by the difference between the actual contingency between study outcomes and participants' responses and participants' judgments of the response–outcome contingency. Generally, the illusion of control, or overestimation of one's ability to influence various outcomes, is common among nondepressed individuals. This illusion may serve a protective or self-enhancing function by bolstering one's sense of self (Alloy & Abramson, 1988; Alloy, Wagner, Black, Gerstein, & Abramson, 2010). However, past research on judgment of contingency has revealed that depressed people do not perceive this same illusion of control. Instead, as exemplified by the depressive realism phenomenon (Alloy & Abramson, 1979), depressed people often are more accurate than others at judging their ability to control events. These more accurate perceptions may occur because of the breakdown of a positive sense of self that occurs in depression. Findings from research chronicling judgment of contingency consistently reveal that that whereas nondepressed individuals tend to make optimistic errors about their amount of control, people with depression provide more accurate judgments of their control over outcomes.

Alloy and Abramson (1979) first observed this tendency for depressed individuals to make accurate judgments of contingency in four experiments that brought depressive realism, or the "sadder but wiser" effect, to the forefront of depression research. In a series of contingency learning problems, the experimenters varied the objective degree of contingency between participants' responses (pressing vs. not pressing a button) and an outcome (green-light onset), along with the valence and frequency of that outcome. Results of all four experiments revealed that depressed individuals were relatively accurate in their judgments of how much control they exerted over green-light onset in various conditions (i.e., contingent and noncontingent response–outcome scenarios). In contrast to this accuracy of contingency judgments, nondepressed individuals displayed an illusion of control in which they systematically overestimated how much control they exerted over uncontrollable (noncontingent) outcomes with high frequencies (Experiment 2) and outcomes associated with the success of winning money (Experiment 3). Furthermore, nondepressed individuals underestimated their levels of control when the outcomes of losing money were associated with a passive response (not pressing a button, Experiment 4).

Results from Alloy and Abramson's (1979) investigation reveal that nondepressed people tend to make systematic errors in contingency judgments that vary based on outcome and response characteristics, including outcome desirability, outcome frequency, and active versus passive responses. These findings on the illusion of control in nondepressed individuals may help to explain the conditions that lead to distorted, optimistic perceptions of control and how these distortions may serve a self-enhancing function. Comparatively, participants who were depressed displayed consistent relative accuracy in judgments of control across all four experiments. The depressed individuals did not engage in any self-enhancement or overestimation of control for outcomes associated with success (e.g., winning money) or self-protection/underestimation of control for outcomes associated with failure (e.g., losing money). Instead of perceiving little control in all situations, which would have been expected from the learned helplessness theory (Maier &

Seligman, 1976), depressed individuals judged their response–outcome contingency accurately, demonstrating that they are "sadder but wiser" (Alloy & Abramson, 1979).

Since Alloy and Abramson's (1979) original experiments were conducted, many studies have replicated and extended the judgment of control findings in various samples (e.g., Alloy & Abramson, 1982; Alloy, Abramson, & Kossman, 1985; Alloy, Abramson, & Viscusi, 1981; Benassi & Mahler, 1985; Martin, Abramson, & Alloy, 1984; Presson & Benassi, 2003; Vazquez, 1987). Alloy and Abramson (1982) presented individuals with exposure to various noise conditions (controllable, uncontrollable, or no noise) in a learned helplessness triadic design and subsequently exposed them to judgment of contingency tasks in which the outcome was uncontrollable and associated with either failure or success. Nondepressed individuals exposed to uncontrollable and no noise conditions overestimated control in noncontingent-win scenarios, whereas those who experienced controllable noise accurately judged the noncontingency. However, regardless of prior noise condition exposure, depressed individuals accurately judged noncontingency for both success and failure outcomes. Findings from this investigation (Alloy & Abramson, 1982) suggest that depressed individuals may not succumb to illusions and biases that allow them to view themselves and their interactions with the world in an optimistic manner.

Additionally, Alloy, Abramson, and Viscusi (1981) examined the directionality of the relationship between depressed mood and judgment of contingency by utilizing a mood induction paradigm. They induced depressed mood in nondepressed students and induced elated mood in depressed students. Following mood induction, Alloy and colleagues (1981) evaluated the impact of these transient moods on judgments of control over an uncontrollable, positive outcome (winning money). Results indicated that depressed students who were temporarily induced to be in an elated mood judged that they had more control over the positive outcome than depressed students who did not receive a mood induction or who merely simulated an elated mood state. Similarly, nondepressed students induced to feel depressed were more accurate in judging their lack of control over the positive outcome than nondepressed students who did

not receive an induction of depressed mood or who simulated depressed mood. Thus, the accuracy of control judgments may be due in part to current depressed mood state.

On the other hand, Alloy and Clements (1992) found that more accurate judgments of lack of control predict subsequent depression. Specifically, individuals who more accurately perceived that they had no control over noncontingent positive outcomes (i.e., winning money) were more likely to exhibit depressed mood following a laboratory failure and to develop depressive symptoms following stressful events a month later than were individuals who exhibited an illusion of control (Alloy & Clements, 1992). Thus, there may be a bidirectional association between depression and relatively accurate judgments of control.

Of interest, depressive realism in judging personal control and nondepressives' illusions of control have been found for individuals' assessments of their own, but not others', control over outcomes (Martin, Abramson, & Alloy, 1984). Whereas nondepressed individuals overestimate their own control over outcomes that are uncontrollable, they are more accurate in judging that other people do not control such noncontingent outcomes. In contrast, depressed individuals judge their own lack of control over noncontingent outcomes accurately but overestimate other people's control over these uncontrollable outcomes (Martin et al., 1984). Similarly, in another study, both nondepressed and depressed individuals were equally accurate in judging the control others' responses exerted over both controllable and uncontrollable outcomes. However, nondepressed individuals showed an illusion of control with regard to their own responses under these circumstances, whereas depressed individuals remained accurate in their judgments regarding their own responses (Alloy et al., 1985). This suggests that nondepressed individuals may succumb to the illusion of control as a self-enhancing function. Thus, the illusion of control may occur selectively for nondepressed individuals at times when the ability to control their own environments is uncertain.

Other studies suggest that judgments of control may vary based on circumstances. In a judgment of contingency task, Vazquez (1987) utilized outcomes that consisted of positive or negative sentences. Findings

indicated that nondepressed individuals overestimated their control over positive content but not over negative content. Consistent with depressive realism, depressed students reported relatively accurate and equivalent judgments for both types of sentences. Interestingly, when sentences were self-referent, and outcomes and responses were noncontingently related, nondepressed individuals demonstrated an illusion of control for positive sentences only, and depressed individuals exhibited an illusion of control for negative sentences only. Thus, depressed individuals may fail to engage in self-protection; instead, they may accept responsibility for negative content over which they did not have control. In addition, Kapci and Cramer (1999) found that the severity of depressive symptoms was associated with more pessimistic contingency judgments than realistic contingency judgments. Therefore, greater levels of depression may be associated with more self-defeating judgments of control that go beyond accurate contingency judgments and depressive realism.

Recent research has begun to examine potential mediators of depressive realism in perceived control. Bogdan and colleagues (Bogdan, Pringle, Goetz, & Pizzagalli, 2012) examined how depressive symptoms, anhedonia, and perceived stress impact illusion of control. In a noncontingency task, the researchers found that perceived stress and anhedonia, but not depressive symptoms, were associated with low illusion of control (Bogdan et al., 2012). Furthermore, anhedonia served as a full mediator of the relationship between perceived stress and low illusion of control. Therefore, perceived control may be more related to anhedonia than to general depressive symptoms. Low levels of the illusion of control also could function to promote depressive symptoms via anhedonic mechanisms (Bogdan et al., 2012). Recent research also suggests that activity level (i.e., rate of responding to a contingency learning task) may mediate the relationship between depression and perceived control (Blanco, Matute, & Vadillo, 2012). The probability of responding to a contingency learning task served as a mediator of the relationship between depression and judgments of control. Thus, it is useful to examine the mechanisms through which depressed mood impacts perceptions of control and contingency.

Alternatively, some studies challenge the strength and validity of depressive realism and nondepressive illusion of control in judgments of control and, consequently, suggest methodological boundary conditions for these effects. One such study (Dobson & Pusch, 1995) that failed to replicate group differences in contingency judgments between depressed and nondepressed individuals utilized a didactic practice trial prior to the task, which may have obscured the depressive realism effect by inducing an illusion of control in the depressed participants. Furthermore, another failed replication (Bryson, Doan, & Pasquali, 1984) did not find evidence that the frequency of noncontingent outcomes impacts judgments of control. Other studies (Msetfi, Murphy, & Simpson, 2007; Msetfi, Murphy, Simpson, & Kombrot, 2005) suggested that depressed–nondepressed group differences in contingency judgments are, in fact, an effect of mood on learning, instead of a depressive realism effect, that occurs in experimental designs with long intertrial intervals. Andrews and Thomson (2009) suggested that perceived control discrepancies occurred because depressed individuals were able to stay focused on contingency problems, rather than because of intertrial intervals in past studies. A recent meta-analysis of 25 studies that utilize a judgment of contingency paradigm (Moore & Fresco, 2012) found that contingency tasks with a low predetermined contingency (–50% to 49%) led to results consistent with depressive realism with a greater effect ($d = -0.20$) than studies with a high objective contingency (50% to 100%; $d = 0.03$). This result highlights the heterogeneity of studies that have been conducted to examine depressive realism based on contingency judgments. Ultimately, future research is needed to further characterize and explore why depressed individuals are typically less optimistically biased and more accurate in their control judgments than nondepressed individuals.

EXPECTANCY/PREDICTION STUDIES

Depressed and nondepressed individuals also differ in their predictions of future success in studies that are designed to examine perceived

control on "skill" versus "chance" tasks. Studies that examine expectancy of success compare individuals' estimates of the likelihood of success on various tasks that are designed to appear to be skill-determined (i.e., controllable) when, in reality, they are determined by chance. When factors characteristic of skilled tasks are present, such as personal involvement, nondepressed individuals tend to provide overly optimistic expectancies of success compared to the objective probability of success on tasks that are actually chance-determined (Langer, 1975). Thus, these individuals display an illusion of control over future successes. Subsequently, studies of expectancy of success that compare depressed and nondepressed individuals have determined that nondepressed people estimate higher expectancies of their own success than do depressed people, who estimate their success as closer to the objective probability that success will occur (Golin, Terell, & Johnson, 1977). This finding also holds true in depressed versus nondepressed psychiatric inpatients, many of whom had a diagnosis of schizophrenia (Golin, Terrell, Weitz, & Drost, 1979).

Additionally, further studies examined how depressed and nondepressed individuals perceive success over a series of trials following prior successes and failures in tasks that are chance-determined and supposedly skill-determined (for review, see Alloy & Abramson, 1980). In reality, the chance-determined and "skill-determined" tasks both have a 50% chance of success, which is determined by the experimenter. On tasks that are supposedly due to skill and therefore controllable, depressed individuals (both undergraduates and inpatients) show smaller changes in expectancy across trials than nondepressed students and inpatients, whereas the depressed and nondepressed groups' expectancy changes did not differ on the chance tasks (e.g., Abramson, Garber, Edwards, & Seligman, 1978; Klein & Seligman, 1976; Miller & Seligman, 1976).

Notably, like the judgment of contingency studies reviewed earlier, evidence suggests that depressed individuals are more accurate at judging expectancies of success for themselves as opposed to judging the success of others. Golin and colleagues (Golin et al. 1977) found that depressed students' predictions of success in a game of dice were closer to the actual probability of success as compared to nondepressed students' success

predictions when the participants themselves rolled the dice. When the experimenter rolled the dice, depressed individuals' expectancies of success exceeded the actual probability of success more than did the judgments of nondepressed individuals. Furthermore, when depressed individuals are responsible for a task, they show smaller changes in expectancies of success on supposedly skill-based trials than they do for tasks in which another person is responsible (Garber & Hollon, 1980). These results indicate that an illusion of control may characterize nondepressed individuals when predicting success for themselves during tasks that are ostensibly skill-based even when they are actually based on chance. In contrast, depressed individuals do not exhibit this illusion for their own control, and they exhibit smaller changes in expectancies of success over multiple trials, thereby more accurately predicting the true 50% success rate. This depressive realism occurs when depressed people judge their own expectancies of success, yet they overestimate control when they are judging others' likelihoods of success.

Similarly, research investigating expectancies of positive outcomes indicates that depressed and nondepressed individuals differ in their broad predictions of successes and positive events that may occur. Whereas nondepressed individuals predict that they are more likely to experience positive events (e.g., academic success; Alloy & Ahrens, 1987) and less likely to experience negative events than others, depressed people think that they are more likely to experience sad events (Pietromonaco & Markus, 1985) and less likely to experience positive events than others (Pyszczynski, Holt, & Greenberg, 1987). Furthermore, in some situations, depressed individuals may negatively distort the likelihood that events will occur in the future. Individuals high in depressive symptoms are more likely to have a pessimistic bias in predicting what events will occur in the upcoming month (in comparison to the events that actually occurred in that month), in comparison to people low in depressive symptoms who show a slight optimistic bias and those with mild depressive symptoms who do not exhibit any bias (Strunk, Lopez, & DeRubeis, 2006). These findings substantiate the idea that depressed individuals expect less success and more failure in the future as compared to others.

Therefore, whereas nondepressed people may believe that they are able to control the occurrence of certain life events, depressed people perceive less control in this domain.

ATTRIBUTIONAL STYLE STUDIES

Another manner in which depressed and nondepressed individuals make judgments about the amount of control they perceive is via the attributions they make for the causes of negative and positive life events. According to the reformulated learned helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978) and the more recent hopelessness theory of depression (Abramson et al., 1989), depressed individuals tend to make attributions about negative events that are internal (caused by something about themselves), stable (caused by something that will persist over time), and global (caused by something that will affect many situations). Further, depressed individuals are prone to perceiving positive events as caused by external, unstable, and specific factors. This pattern of thinking is referred to as a negative attributional style; thus, if a depressed college student receives a poor grade on an exam, she may make the attributions, "I am stupid, I will do poorly on all of my exams, and I will never graduate from college or be successful in the future." Studies have found that both self-reported and clinical depression are associated with a negative attributional style in children and adults (e.g., Joiner, 2000; Sweeney, Anderson, & Bailey, 1986). Additionally, the vulnerability-stress hypothesis of helplessness and hopelessness theories suggests that individuals who exhibit a negative attributional style (internal, stable, global) are more vulnerable to developing depression when they experience negative events (Abramson et al., 1978, 1989). In contrast, nondepressed individuals may engage in self-enhancement by attributing the causes of positive events to internal, stable, and global causes and the causes of negative events to external, unstable, and specific causes. In this way, nondepressed individuals may perceive more control over positive events and less control over negative events than depressed individuals,

thereby exhibiting a self-serving attribution bias (Miller & Ross, 1975). On the other hand, depressed individuals tend to exhibit this bias to a lesser extent or make more similar attributions for positive and negative events (e.g., Kuiper, 1978; Raps, Reinhard, Peterson, Abramson, & Seligman, 1982).

The difference in attribution biases between depressed and nondepressed individuals has been documented in a range of experimental and clinical studies (for review, see Mezulis, Abramson, Hyde, & Hankin, 2004). According to a meta-analytic review (Mezulis et al., 2004), in the general population and in individuals without psychopathology, the self-serving attribution bias has a strong effect size (d = 0.96 and 1.28, respectively). However, the smallest effect size for the self-serving attribution bias was reported in depressed individuals (d = 0.21). This information suggests that, although most people tend to exhibit a self-serving attribution bias in which they perceive more control over positive than negative outcomes, the magnitude of this effect is much smaller in people who are depressed. Additionally, research on the neural correlates of depressive realism and attribution biases has begun to examine differences in brain activity between depressed individuals and healthy controls. Using functional magnetic resonance imaging (fMRI), Seidel and colleagues (Seidel et al., 2012) found that the frontotemporal network was activated in controls during non–self-serving attributions and in depressed individuals during self-serving attributions. The authors also observed weaker coupling between the dorsomedial prefrontal cortex and limbic regions in depressed individuals than in controls. These differences in brain activation patterns may indicate that, in controls, a non–self-serving bias is in greater conflict with self-concept; on the other hand, for depressed individuals, self-serving attributions are in greater conflict with self-concept. These conflicts may require more cognitive resources from individuals, which leads to greater recruitment of the frontotemporal network.

Furthermore, recent studies have focused on comparing depressed and nondepressed individuals on the magnitude of the self-serving attribution bias. Watson and colleagues (Watson, Dritschel, Jentzsch, & Obonsawin, 2008) asked individuals to rate the degree of self-reference

and emotional valence of 240 words. Consistent with past research, nondepressed individuals tended to display a self-serving attribution bias by rating negative words as non–self-referent and positive words as self-referent. Not surprisingly, depressed individuals did not display this same bias. Interestingly, the difference in ratings between the depressed and nondepressed participants in this study emerged in the self-reference ratings and not in the valence ratings of the words. Although participants, regardless of their level of dysphoric mood, were likely to produce similar ratings of the valence of the words, they varied in how much they associated each word with themselves. Therefore, the depressed group lacked a positivity bias that the nondepressed group exhibited, thus demonstrating the lack of a self-enhancing bias.

Additionally, a recent study by Romens and colleagues (Romens, MacCoon, Abramson, & Pollak, 2011) tested whether negative attributional style, a risk factor for depression, was associated with differences in attention to neutral and negative attribution-relevant words. This study employed an attentional blink paradigm in which participants were instructed to attend to two target words or images from a quick succession of various distracter stimuli. The first target stimulus is intended to drain the participants' attentional resources so that the second target stimulus becomes more difficult to perceive because it occurs during the "attentional blink" period. Research indicates that personal or highly arousing stimuli can break through the "attentional blink." Results indicated that individuals with a negative attributional style better attended to negative attribution-relevant words during the "attentional blink" than did individuals who did not have a negative attributional style (Romens et al., 2011). This finding suggests that individuals at risk for depression perceive stimuli in their environments that are congruent with negative attributions. Thus, individuals with depression may not only perceive themselves as more negative, but also may attend more to negative information presented in the world. All of these factors contribute to the negative attributions that depressed individuals hold about themselves, the world, and the future that lead them to perceive that they have less control over their own circumstances than do nondepressed individuals.

BOUNDARY CONDITIONS

This review of empirical studies comparing how depressed and nondepressed individuals perceive their control over events suggests that, overall, people who are depressed may be more accurate, less biased, and more negatively focused than people who are not depressed, at least under some conditions. These studies demonstrate empirical support for depressive realism in a variety of different settings. However, some studies suggest that the two groups do not differ in their perceptions of control. The perceived control of people with and without depression may be susceptible to certain biases based on situational, personal, or other conditions present. Thus, these factors that set boundary conditions for depressed–nondepressed differences in perceptions of control should be considered when conducting and interpreting investigations of perceived control.

Several situational constraints help to dictate how depressed and nondepressed individuals perceive judgments of control. As mentioned previously, self- versus other-reference plays a key role in determining how depressed individuals make judgments. Consistently, research indicates that depressed individuals are often less biased and more realistic about their own control and are more optimistic in their judgments of others' control. In contrast, people who are not depressed tend to be self-enhancing and optimistic in their judgments of their personal control, but not others' control. In judgments of contingency, people who are depressed are more accurate in their judgments of their own degree of control over outcomes but overestimate other people's degree of control (Martin et al., 1984), whereas nondepressed individuals are accurate in judgments of others' degree of control yet overestimate their own degree of control (Alloy et al., 1985; Martin et al., 1984). Depressed individuals also appear accurate in rating their own likelihood of success, whereas they overestimate the degree of others' success on chance tasks designed to appear to be skill-determined (Garber & Hollon, 1980; Golin et al., 1977). This pattern of discrepancies in self–other judgments is consistent with cognitive theories of depression, such as the hopelessness theory (Abramson et al., 1989). These distinctions highlight how depressed

individuals perceive themselves as less likely to control life circumstances than others, perhaps based on the breakdown of motivation to enhance the self, which enhances others at the expense of one's own self-efficacy (Alloy et al., 2010).

Furthermore, studies indicate that the degree of privacy in a situation may impact how depressed and nondepressed individuals make judgments of control. Nondepressed individuals tend to be more optimistic in their perceptions of control in public than in private, whereas depressed individuals perceive personal judgments of control and expectancies of success as less optimistic in public than in private (Sacco & Hokanson, 1978, 1982). Research also suggests that depressed and nondepressed individuals' judgments of feedback are dependent on the timing of their inferences. Whereas nondepressed individuals tend to show optimistic biases in their immediate and delayed perceptions of feedback, depressed individuals typically are unbiased in their immediate judgments of feedback yet display more bias in their delayed memories of such feedback (e.g., Gotlib, 1981; Hoehn-Hyde, Schlottman, & Rush, 1982; Vestre & Caulfield, 1986). Thus, both the setting and the timing of perceptions may contribute to how depressed individuals perceive themselves and the amount of control they have over their environments.

Interestingly, perceptions of control, success expectancies, and attributions also may vary based on the type of stimuli presented. Alloy and Abramson (1988) reviewed numerous studies on this topic and found that nondepressed individuals exhibited optimistic biases in 87% of studies involving ambiguous information (e.g., neutral or no information) and in 61% of studies involving unambiguous information (e.g., overt negative or positive information). However, people with depressed mood displayed pessimistic biases in only 26% of studies involving ambiguous information and in 44% of studies with unambiguous information. These findings indicate that people with depression are less likely overall to exhibit cognitive biases, which exemplifies depressive realism. Further, depressed individuals are more susceptible to biases in situations where information is not ambiguous, whereas nondepressed individuals are more likely to exhibit biases in situations where information is not clear.

Personal factors also contribute to depressed and nondepressed individuals' perceptions of control. Namely, severity of depression is associated with the degree of distortion or accuracy of judgments. Some research indicates that people with mild depressive symptoms may display relatively accurate judgments, whereas individuals with more severe depression are likely to exhibit more negatively distorted perceptions and attributions. Studies on perceptions of future events (Strunk et al., 2006), accuracy of judging others' emotional states (Harkness, Sabbagh, Jacobson, Chowdrey, & Chen, 2005; Lee, Harkness, Sabbagh, & Jacobson, 2005), recall of positive feedback frequency (Dennard & Hokanson, 1986), and self-evaluations of social competence relative to peer ratings (Whitton, Larson, & Hauser, 2008) provide evidence that the severity of depression contributes to perceptions. Therefore, a spectrum may exist in which nondepressed mood is characterized by optimistic biases, illusions of control, and self-enhancement: mild to moderate depression is associated with a decreased optimistic bias and increased accuracy in judgments of control and more severe depression leads to further breakdown of the optimistic bias, which is associated with self-denigration (Alloy et al., 2010). Therefore, perceptions of control in depression may depend not only on situational factors such as self- versus other-reference and the degree of ambiguity of information, but also on personal characteristics, such as the severity of an individual's depressive symptoms.

FUTURE DIRECTIONS AND CONNECTIONS TO RELATED SCIENCES

Much research has examined the connection between depression and perceived control over outcomes during the past 40 years, and many avenues for additional research continue to remain open. First, further research is needed on the moderators and mediators of the association between depression and more realistic perceptions of control. Greater knowledge about the personal and situational factors that influence control perceptions will better illuminate the conditions in which depressed individuals

judge their control over outcomes accurately and are less susceptible to optimistic illusions of control. Similarly, additional study of the mediators of the association between depression and more realistic control perceptions will increase understanding both of the specific components of depression that contribute to more accurate judgments of control and the potential mechanisms that account for this relationship.

Second, with the emergence of novel related fields, psychological studies on depression and perceived control could benefit from the inclusion of other sciences that involve cognition. Foremost, the field of neuroeconomics combines ideas from behavioral economics, neuroscience, and decision-making (Ernst, 2012). Neuroeconomics employs techniques such as mathematical modeling to examine how the brain functions when individuals make decisions. Evidence from neuroscience research suggests that the hallmark symptoms of depression (anhedonia, amotivation, social withdrawal, and impaired cognition) are associated with three distributed functional neural systems in the brain: 1) the neural system that supports emotion focuses on the amygdala and its connections to the insula, medial prefrontal cortex, and striatum, 2) the motivation system connects the striatum and orbitofrontal cortex, 2) the executive function system is a distributed network based in the prefrontal cortex (Ernst, 2012). With this knowledge, neuroeconomic models can lend insight into how depressed and nondepressed individuals make decisions in various settings (e.g., choices that involve contingency, chance–skill tasks). Functional neuroimaging techniques also may provide further information about which neural networks are involved in depressed individuals' tendencies to make more realistic judgments about their control over outcomes (i.e., Seidel et al., 2012).

Neuroeconomic research on prediction error in depression also may broaden our understanding of how depressed individuals perceive stimuli. Using electroencephalography (EEG), Cavanagh and colleagues (Cavanagh, Frank, & Allen, 2011) found that depressed individuals displayed a stronger EEG response (i.e., hyperresponsivity of the self-monitoring neural network in the medial prefrontal cortex) to aversive choices than did nondepressed individuals. Studies of expectancy and

prediction in depressed individuals should be expanded beyond EEG to include functional neuroimaging as a way to further capture how neural networks function in judgments of control and expectancy/prediction for people with depression.

Additionally, the neuroeconomic approach of game theory could be explored to further conceptualize the phenomenon of depressive realism in perceptions of control. Judgments (i.e., of control, of expectancy) inherently involve a degree of uncertainty. Thus, when people make judgments, they assign values to options and assess risks and payoffs. Neuroeconomics provides a computational structure for analyzing how individuals' perceptions reflect uncertainty via internal probability estimates. Past research indicates that lesions in the orbitofrontal cortex are associated with decreased sensitivity to uncertainty (for review, see Kishida, King-Casas, & Montague, 2010). Thus, it may be useful to identify abnormalities in the brains of people who are depressed that could impact how depressed individuals perceive control across various circumstances. Research using game theory paradigms (e.g., gambling games) to assess choice behavior has revealed biomarkers for various disorders, including anxiety (Paulus, Feinstein, Simmons, & Stein, 2004) and bipolar disorder (Minassian, Paulus, & Perry, 2004). Future studies could focus on functional neuroimaging of depressed individuals' brains during game-theoretic paradigms to begin to understand and model the neural networks involved in judgments of control and expectancy during depression.

Furthermore, social exchange, or detecting and tracking who receives credit for an outcome, is important to examine, especially in the context of depression, in which social agency is often diminished (Kishida et al., 2010). As previously mentioned, depressed individuals tend to overestimate others' degrees of control over outcomes (Martin et al., 1984) and overestimate others' degrees of success on chance tasks that appear to be skill-determined (Garber & Hollon, 1980; Golin et al., 1977). Therefore, it is clear that depressed individuals' judgments involve dysregulated social perceptions. Neuroeconomics can aid psychological research by providing social agency computations to generate models of how depressed

individuals view others' mental states (Kishida et al., 2010). Recently, models of social learning, social signaling, and detection of social agents are beginning to provide information about the neural and behavioral computations that underlie pathological social interactions that occur in mental disorders (Behrens, Hunt, & Rushworth, 2009). By assessing the neural underpinnings of depressed individuals' perceptions of others' control in comparison to their own, researchers may gain a more complete understanding of the cognitive computations that lay the foundations for judgments of control.

CONCLUSION

The perception that one has control over outcomes in one's life is a necessary ingredient of adaptive behavior. Optimistic perceptions of control of the kind frequently displayed by nondepressed individuals, even if overestimates of one's true control, may contribute to maintaining positive affect, high self-esteem and self-efficacy, motivation to achieve desired goals, persistence, improved coping with stress, and decreased vulnerability to depression (Alloy & Abramson, 1988; Alloy & Clements, 1992). The 40 years of research on depression and perceived control reviewed herein indicates that depressed individuals are less susceptible to illusions of control, self-serving attributional biases, and overly optimistic expectancies of success and, in at least some situations, judge their control over outcomes more accurately than do nondepressed individuals. These "depressive realism" findings suggest that depression may be both a cause and consequence of perceiving one's control over outcomes more realistically.

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11

Control Striving and Control Perception in a Life Span Developmental Framework

BRANDILYNN VILLARREAL AND JUTTA HECKHAUSEN ■

The construct of "control" and related psychological constructs (e.g., self-efficacy and learned helplessness) are consistently and positively related to psychological well-being and adaptive functioning in multiple life domains (e.g., school, work, family). However, the construct of "control" is notoriously heterogeneous (Skinner, 1996). In an effort to make sense of the vast literature on control findings, Skinner (1996) developed a framework for organizing control conceptualizations using two basic dimensions: (a) objective, subjective, and experiences of control; and (b) agents, means, and ends of control. The first dimension is particularly relevant for this chapter and serves as the foundation for more sophisticated models and theories of control. It sets the stage to discuss a specific set of control constructs that have been integrated into a comprehensive theory of development; namely, constructs related to perceptions and beliefs about control, constructs associated with the distinction between primary and

secondary control, and constructs associated with the striving for control, particularly those directed at developmental and life goals.

The first distinction to be made is the distinction between actual or objective control on the one hand and perceived or experienced control on the other (Skinner, 1996). *Actual* control describes the objective amount of control the individual has over the environment or outcome, whereas *perceived* control is an individual's subjective beliefs about the amount of control he or she has over the environment or outcome.

OBJECTIVE OR ACTUAL CONTROL

At a single point in time, we can expect a reasonable consensus between people in judgments about the control they have over certain things in their lives (e.g., attaining a high school degree vs. winning an Olympic gold medal, respectively). When taking a life span view, however, the actual degree of control people have over the environment and their lives varies substantially by age (Heckhausen, Wrosch, & Schulz, 2010; see primary control capacity in Figure 11.1). The total

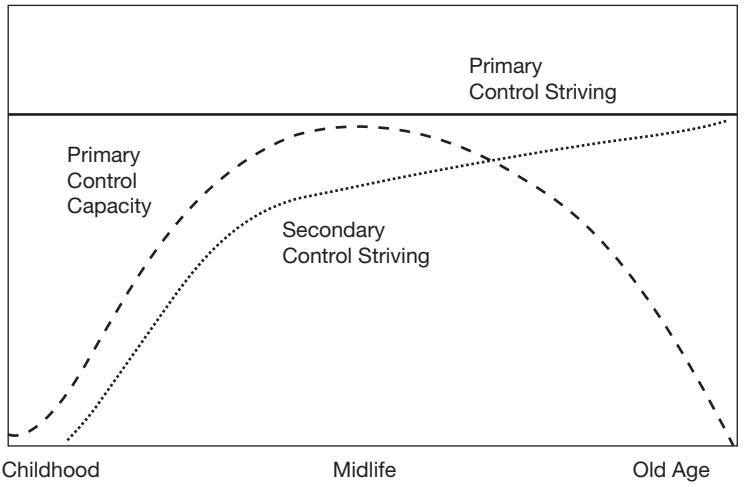

Figure 11.1 Hypothetical life span trajectories for primary control capacity and primary and secondary control striving (adapted from Heckhausen, 1999).

degree of actual control available is contingent upon one's progression through the life span and one's position in society and the world. In other words, it depends on one's situation or environment. Actual control is low in childhood and rises throughout adolescence and young adulthood, reaching a peak some time in midlife. As an individual approaches older adulthood, actual control over the environment gradually decreases. At both extremes of the life span (infancy and old age), the ability to influence one's environment is compromised because individuals depend on others for care and assistance in daily activities. Thus, actual control waxes and wanes over the life span according to available opportunities and constraints in the environment. To optimize development across the life span, individuals need to consider the amount of actual control they have over the environment when choosing developmental goals to pursue.

Whereas Figure 11.1 shows the overall degree of control individuals have over their goals more generally, specific goals are subject to their

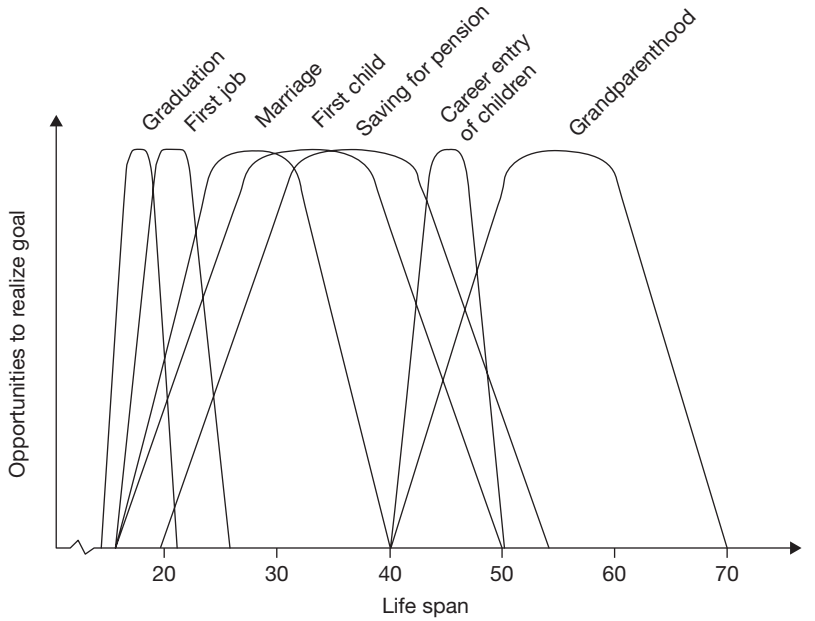

Figure 11.2 Age-graded sequencing of opportunities to realize various developmental goals (adapted from Heckhausen, 2000).

own unique trajectories of controllability. Each domain of functioning, and the relevant goals under each domain, undergo changes in controllability as a function of biological maturation and aging, and skill and knowledge development, as well as societally set windows of opportunity (e.g., the legal age to enter the workforce or the expected time to complete one's education). This sets up an overlapping sequence of opportunity trajectories for major life goals, which can serve as a timetable to orient the individual toward specific life goals to invest in at different times of the life span (see Figure 11.2).

PERCEIVED CONTROL

Now to the different constructs of perceived control, which emerged as a psychological construct of interest earlier than actual control. As the history of this field had it, it was this individual disposition-based control construct that dominated the field first, thus pushing situation- or environmentally based conceptions of objective control to the margins.

Perceived control (sometimes also referred to as *personal control*), or the amount of control an individual perceives over his or her self-selected goals, environment, and outcomes, originally emerged from research on locus of control as either internal or external (Rotter, 1966). Several decades of research have since demonstrated the positive effect of holding beliefs about one's control over important life outcomes, or what is referred to as an *internal locus of control*. In this conception of control perceptions, perceived control is more a function of personality differences than a function of actual variations of control. A fascinating complication with control is that, in many cases, it is not clear how controllable certain outcomes or goals are, so perceptions of control have some leeway to reflect individual differences in overall hopefulness or optimism about the controllability of goals, and it was this facet that drew the attention of researchers when initially studying perceived control, personal control, or locus of control as an individual difference variable.

Levels of perceived control fluctuate across the life span. Heckhausen and Baltes (1991) found that, as adults age, their expectations about developmental changes become more negative and less controllable. In a cross-sectional study by Brandtstädter and Baltes-Götz (1990), middle and older adults were more likely to believe that uncontrollable factors had a larger influence on their development. Thus, it appears that perceived control over one's personal development, broadly, decreases in advanced age. However, because individuals always strive to maximize actual control (i.e., primary control), the types of goals people select for themselves are reasonably and comparably controllable across the life span. For example, an older adult is rather unlikely to choose a goal that is far beyond his or her physical capabilities, such as becoming a world-class athlete. Older adults make active efforts to modify the activities and goals they set for themselves to maximize primary control (Baltes, 1987; Baltes & Baltes, 1990). Thus, perceived control appears to remain stable across the life span if the individual is asked about the controllability of self-selected goals. This remains true for older adults: a study by Brandtstädter and Baltes-Götz (1990) reported no age-related losses in perceived autonomous control over personal development over a four-year interval.

PRIMARY AND SECONDARY CONTROL PROCESSES

Approximately 20 years after Rotter's research on the locus of control, Rothbaum, Weisz, and Snyder (1982) pushed the field forward by expanding the concept of perceived control. Rothbaum et al. differentiated between two ways of attaining a high perception of control via primary and via secondary control processes. As defined by Rothbaum and colleagues, primary control processes are directed at changing the environment in accordance with one's goals, such as directing resources toward a goal. Secondary control, on the other hand, refers to processes directed by the individual to align one's goals with the environment. This might require the individual to change some aspect of him- or herself, such as cognitive and motivational resources, to be more aligned with the environment.

Primary and secondary control processes reflect a conceptual cluster of distinctions used in a set of major theories of coping and control striving; that is, the distinction between problem- versus emotion-focused coping (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986), active versus avoidance coping (Holahan & Moos, 1987), assimilation versus accommodation (Brandtstädter & Renner, 1990), and primary versus secondary control striving (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996).

The distinction between primary and secondary control was the starting point for conceptual and empirical work on the role of agency and motivation in life span development and the formulation of the *life span theory of control* (Heckhausen, 1999; Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996), the *model of optimization in primary and secondary control* (OPS; Heckhausen & Schulz, 1993), and the *action-phase model of developmental regulation* (Heckhausen, Wrosch & Fleeson, 2001; Wrosch & Heckhausen, 1999). This research program culminated in the comprehensive *motivational theory of life span development* (MTD; Heckhausen et al., 2010), which led to new conceptualizations and functions for perceived control.

FUNCTIONAL PRIMACY OF STRIVING FOR PRIMARY CONTROL

The MTD is a comprehensive theory of development across the life span that addresses individual agency and its effects on regulating life span development. A major and unique characteristic of the theory (and its precursor models) is that Heckhausen and Schulz focused their control theory on objective control and the striving for greater control and not on the subjective perception of control. In their view, perceived control cannot replace actual control, as had been suggested by Rothbaum et al. (1982). Perceived control is not a goal in itself, and it certainly is not the ultimate indicator of successful development. According to their theory, the hallmark of successful development is

maximizing control striving for developmental goals while matching goals with available opportunities in the developmental ecology (e.g., workplace, family, neighborhood, time in the individual's life). The theory proposes that perceptions of control play an important role in choosing developmental goals that maximize primary control across the life span (see the later discussion of optimization) and also in enhancing self-motivation, particularly when difficulties arise, to ensure the maintenance of primary control striving (see later discussion of selective secondary control).

A second unique characteristic of the MTD is its ability to overcome a major limitation in previous work on control perceptions; that is, the singular focus on person characteristics (i.e., perceived control as a personality trait) or situational/environmental characteristics (i.e., distinguishing between low- and high-control life situations) with little overlap or mutual recognition of both components (e.g., see Landau, Kay, & Whitson, 2015).

Taking precedent from the field of motivational psychology, the theory asserts that control perceptions and strivings are the result of dynamic, bidirectional relationships between the individual and the environment. On the one hand, perceptions of control vary between people. They reflect individual dispositions in the overall level of perceived control and the use of control strategies (e.g., strong and failure-resistant primary control striving). Control perceptions also vary within people, across the life span, and, importantly, also between different phases of action (see later discussion of action phases). According to the MTD, both types of individual differences (i.e., differences in inter- and intraindividual change) interact with opportunities and constraints in the environment to determine perceptions of control and control striving at any given point in time.

In the following sections, we will discuss the development of the MTD and how it has led to specific predictions about the role of perceived control in maximizing primary control striving in goal choice, engagement, disengagement, and re-engagement. Specifically, the construct of perceived control is valuable in that it reflects objective

control, plays a role in goal choice, is used as a tool in control striving, and serves as a motivator during goal engagement as well as a demotivator during disengagement.

THE LIFE SPAN THEORY OF CONTROL

The life span theory of control proposes that, throughout life, individuals strive to maximize primary control of the environment and their own development by using primary and secondary control strategies (Heckhausen & Schulz, 1993, 1995; Schulz & Heckhausen, 1996). Figure 11.1 displays the developmental trajectory of primary control striving, which is continuously high and stable throughout the life span (Heckhausen, 1999). Individuals are constantly striving to control their environment as much as possible, even if their actual ability to control the environment is low. Primary control potential is low early in life when young children are dependent on others, and it gradually increases until midlife, when the ability to influence the environment is at a maximum. From midlife onward, primary control potential tends to decrease due to additional biological and environmental constraints.

In contrast, secondary control strategies are used increasingly throughout the life course. They are expected to increase during childhood because they are based on more sophisticated cognitive processes (e.g., self-protective social comparison strategies) and increase more steeply in midlife and old age. Losses in control can happen at any point in the life span but are increasingly common in old age, leading to a corresponding increase in the use of secondary control strategies among older adults.

THE MODEL OF OPTIMIZATION IN PRIMARY AND SECONDARY CONTROL

The model of optimization in primary and secondary control specifies how and when individuals should select developmental goals to pursue

and which control strategies support goal engagement versus goal disengagement when pursuing goals (Heckhausen, 1999; Heckhausen & Schulz, 1993). The model proposes the higher order, self-regulatory process of *optimization* to guide adaptive and age-appropriate goal choice across the life span. Based on opportunities and constraints in the environment, an individual should choose a goal that (1) is congruent with the available opportunities for control; (2) takes into account long-term consequences and the consequences for alternative, concurrent goal pursuits (i.e., opportunity costs and tradeoffs); and (3) protects a diversity of goal pursuits to avoid developmental dead ends (Heckhausen et al., 2010).

According to the first optimization heuristic, individuals should engage with goals when control opportunities are good and should disengage from goals when control opportunities are limited or lost. When deciding to engage with one developmental goal over another (e.g., pursue an educational degree or pursue a full-time career), one of the things an individual should assess and compare is the degree of control he or she has over attaining the goal. If perceptions of control for one goal are reasonably high, the individual should feel confident that he or she can attain the goal with appropriate goal striving. If the perceived degree of control is very low, perhaps because external factors prevent it or because the time is not right yet, the individual should avoid selecting the goal because engaging with an uncontrollable goal will lead to unfulfilled goals and wasted resources that could have been more productively invested in controllable goals. Thus, the amount of control an individual perceives with regards to an eligible goal will either encourage the individual to pursue the goal because control over the outcome is likely or will discourage the individual from pursuing the goal because control over the outcome is unlikely.

Several studies have demonstrated that individuals who are able to adapt their control striving to the controllability of the environment experience more positive mental and physical health outcomes (e.g., Hall, Chipperfield, Heckhausen, & Perry, 2010; Heckhausen et al., 2001; Wrosch & Heckhausen, 1999; Wrosch, Miller, Scheier, & de Pontet, 2007). In a study by Hall et al. (2010) with older adults who had serious

health conditions, goal engagement with health goals was associated with greater survival rates for those who could control their health conditions (e.g., via rehabilitation), whereas goal disengagement from health goals was associated with poorer physical health. The opposite was true for older adults with chronic and uncontrollable health conditions. For these older adults, goal engagement with health goals was associated with poorer physical health, whereas goal disengagement was associated with improved physical health. Thus, individuals with control opportunities that matched their goals experienced the most positive health outcomes.

When choosing developmental goals to pursue, an individual should also consider the broader context and impact of pursuing the goal for overall functioning and long-term development. A goal that optimizes primary control in the short-term may not necessarily support primary control striving in the long-term. Alternatively, pursuing one developmental goal, such as advancing one's career, might negatively impact the attainment of a concurrent goal, such as raising children.

Last, the individual should preserve a diversity of goals such that resources and opportunities are maintained through multiple goals. This safeguards the individual against having too few options if the original goal can no longer be pursued. For example, an aspiring athlete should invest in non–sport-related goals, such as attaining a college degree, in the event that an injury or other circumstance prevents further investment in the sport.

When opportunities to pursue goals are good, long-term goals are considered, and the diversity of goals is supported, individuals should invest in specific control strategies to facilitate goal pursuit (i.e., goal engagement). If the opposite is true or individuals experience a loss of control such that it is no longer adaptive to pursue the goal, individuals should invest in alternative control strategies (i.e., goal disengagement). Heckhausen (1999) specifies goal engagement and disengagement strategies by crossing two major regulatory challenges (selection of resource investment in a developmental goal and compensation for failure or loss of control) with two types of control (primary and secondary) to

identify four different control strategies: selective primary and secondary control strategies, and compensatory primary and secondary control strategies, respectively.

The use of *selective primary control strategies* includes the activation of behavioral resources such as time, effort, and skills toward the goal. The use of *selective secondary control strategies* involves the activation of additional motivational resources that mobilize one's volition, such as increasing commitment to the goal, control perceptions, or the goal's value (Heckhausen, 2007). Thus, increasing one's perceived control over the conditions of goal pursuit is a way to increase motivational commitment to the goal. These two strategies comprise goal engagement, although a third type of control strategy (*compensatory primary control*) may be used to enhance the former strategies when internal control resources are insufficient to attain the goal. For example, when pursuing a long-term goal, additional creative means or detours to achieve the goal may be needed, such as soliciting help from others.

If it is no longer possible to pursue the goal, the individual may use goal disengagement strategies that involve adjustment of the goal and self-protective strategies. For example, as individuals progress through life, they encounter growing biological and societal constraints. Unfortunate life events, illness, or disability reflect a loss of control and may require the individual to disengage from certain goal pursuits. When it is no longer possible to pursue a goal because of biological or environmental constraints, or when a goal becomes too costly to pursue, the individual can disengage from the goal and use *compensatory secondary control strategies*. These strategies devalue the original goal and protect the self from harm by averting self-blame or using downward social comparisons. Goal disengagement strategies can also help the individual adjust and recover from temporary setbacks in long-term goals and pursue more appropriate developmental goals. Perceptions of control once again play a role in the decision to disengage from a goal. If an individual experiences a substantial loss in perceived control, this can serve as a signal to loosen commitment to a goal and consider pursuing goals that one has more control over.

Individuals strive to maximize control of the environment and their development through the use of primary and secondary control strategies. It is important to note that these strategies are often used at the same time, particularly when pursuing a difficult goal. In this case, secondary control strategies can reinforce primary control strategies (Heckhausen et al., 2010). Thus, through the coordinated use of primary and secondary control strategies, individuals actively regulate the pursuit of developmental goals.

THE ACTION PHASE MODEL OF DEVELOPMENTAL REGULATION

The action phase model of developmental regulation (Heckhausen et al., 2001; Wrosch & Heckhausen, 1999) organizes the life span into a series of goal-oriented action cycles. These action cycles optimize development by guiding the selection of goals and managing goal engagement and disengagement cycles.

Each action cycle is divided into different stages of goal pursuit with distinct mindsets that promote adaptive developmental regulation. Before a decision is made to pursue a goal, individuals use optimization heuristics to choose a developmentally appropriate goal (Heckhausen et al., 2010). At this stage in the action cycle, the predecisional phase, individuals are in a motivational mindset. This mindset is reality oriented (i.e., not optimistic) and uses non-biased information to choose the most adaptive goal to pursue given the opportunities and constraints in the environment. Individuals accurately assess the amount of control they have over the goal and the potential likelihood of attaining the goal in order to choose a goal that is realistically attainable. In this way, individuals are receptive to any information that helps them make an informed decision. By weighing the positive and negative aspects of different goal possibilities, individuals judiciously consider a multitude of possible goals to pursue. The end of this stage culminates in the decision to pursue a goal, which thrusts the individual into the next stage of the action phase model: goal engagement.

After a developmental goal is decided upon, the individual passes into a volitional or implemental mindset (Achtziger & Gollwitzer, 2010; Gollwitzer, Heckhausen, & Steller, 1990). That is, during this stage, the individual should use the most effective behavioral and motivational strategies to achieve the goal, adjusting for temporary setbacks and other anticipations such as developmental deadlines. In terms of goal engagement strategies, the individual should use appropriate selective primary and secondary control strategies to pursue the goal. Rather than being broad and realistically oriented, individuals become biased toward information that is needed to implement the goal (Gollwitzer, 2003).

For example, if individuals' control perceptions are enhanced and optimistic (Gollwitzer & Kinney, 1989), they may believe they have considerably more control over an outcome than they actually do. In addition, they should experience an increased sense of focus and commitment to the goal such that alternative actions and goal pursuits should be avoided or ignored. This biased and overly optimistic perception of control during the volitional stage contrasts sharply with the reality-oriented perceptions of control during the motivational phase of decision-making (Heckhausen, 2007).

The goal engagement stage of the action phase model is divided into two substages: nonurgent and urgent goal pursuit. Goal pursuit becomes urgent as individuals approach a developmental deadline. A developmental deadline reflects a substantial loss of opportunities for pursuing a goal. Generally, opportunities to pursue a goal decline with age. The classic example of a biological deadline for women to have children is menopause. The closer an individual gets to a deadline, the faster the opportunities to pursue the goal decline. As opportunities decrease, a sense of time urgency arises, and the individual invests additional resources in a final effort to attain the goal (Heckhausen et al., 2010). Thus, goal engagement strategies are intensified and new strategies may be used to attain the goal. The developmental deadline refers to the tipping point in this process; continuing to pursue the goal after the deadline has passed is too costly and nearly impossible to attain. Thus, continuing to invest resources beyond this point is detrimental to the individual's development.

In the third phase of the model, the individual has either successfully attained or has failed to attain the developmental goal, or it is no longer possible to pursue the goal. If the goal was successfully attained, the individual begins a new action cycle corresponding to a different developmental goal. If failure has occurred or the goal is no longer attainable, the individual should disengage from the goal and pursue a new goal. Perceptions of control are thought to play a role in the disengagement process. When faced with continued setbacks or failures, individuals' perceptions of control may decline. A limited sense of control over the goal may prompt the individual to disengage from the goal and invest motivational resources elsewhere. Individuals who disengage from unattainable goals report positive physical and mental health outcomes and are more likely to use compensatory secondary control strategies to ensure future goal pursuit (Wrosch et al., 2007). Thus, it is adaptive for individuals to disengage from goals that are too costly or unattainable in order to pursue goals that match opportunities in the environment.

Goal disengagement requires a cognitive awareness and realization that it has become too costly or otherwise impossible to attain the goal. In this process, the individual makes a decision to disengage from the goal and then creates distance between the self and the disengaged goal. The individual shifts away from a volitional mindset and returns to a motivational mindset. That is, the individual should become realistic or even pessimistic in his or her control perceptions and begin to devalue and loosen commitment to the previous goal. At the same time, alternative goals should become more attractive.

The process of self-evaluating goal pursuit while still actively pursuing a goal is an interesting one that is not yet fully understood. In order to regulate development, it is necessary to periodically evaluate the benefits of staying goal-engaged versus disengaging from a goal. The difficulty of this process lies in the different mindsets associated with goal engagement and evaluation. When an individual is goal-engaged, he or she is in a volitional mindset which necessitates a certain degree of bias to remain committed to the goal (Heckhausen et al., 2010). Contemplating the continued pursuit of a goal, however, requires a switch to a motivational or

reality-oriented mindset. Only in a motivational mindset can an individual evaluate whether a goal can successfully be met or if resources should be invested elsewhere. During this evaluation, the individual may realize he or she does not have enough control over the goal and may actively decide to disengage from the goal.

The MTD posits that the transition between goal engagement and goal disengagement ideally is a discrete event, even though it may be preceded by a gradual deterioration of goal commitment. Other theorists, beginning with Eric Klinger (1975), view goal disengagement more as a gradual process that begins well before the individual actively disengages from a goal.

In an effort to integrate these two different perspectives on goal disengagement, Brandstätter, Herrmann, and Schüler (2013) have introduced the idea of an *action-crisis*. An action-crisis is a period of substantial goal engagement combined with intense setbacks or obstacles in pursuing the goal. During the crisis phase, it is not clear to the individual whether the goal is still desirable or whether goal pursuit should persist (Brandstätter, 2003; Brandstätter & Schüler, 2013). This period of intrapsychic conflict is associated with negative affect, physiological symptoms, and cognitive processes. Brandstätter and colleagues found evidence that action-crises are related to shifts in mindsets, particularly the shift from a volitional to a motivational mindset. Thus, action-crises can trigger specific cognitive processes to distance the individual from the original goal, such as reduced desirability and perceived attainability of the goal. Overall, goal disengagement indicates the end of an action cycle and necessitates the beginning of a new action cycle in adaptive developmental regulation.

THE MTD

The MTD combines the three models just outlined to integrate various control constructs (actual control, perceived control, control striving, and control strategies) into a life span development model. Although the theory addresses perceived and actual control as well as the dynamic

relationship between the two, actual control is really at the front and center of the theory as an indicator of successful development. As outlined in the previous sections, perceived control acts as a facilitator of goal choice, a tool in control striving, an additional motivator of goal engagement, and a demotivator in the goal disengagement process.

It is important to recognize the bidirectional relationship between control beliefs (perceptions of control) on the one hand and control strivings that maximize primary control on the other hand. In one direction, perceptions of control can influence striving for control over the environment and developmental goals in a positive or a negative way. In other words, high perceived control can enhance actual control, especially during periods of the life span when opportunities to control the environment are high, as in young and middle adulthood. Conversely, low perceptions of control may lead to a withdrawal of motivational and behavioral resources or active disengagement from goal pursuit. Disengagement may or may not be adaptive depending on the actual opportunities and constraints in the environment and the potential for control.

In terms of individual developmental goals, control beliefs may not only direct striving for goals, but they may also be essential for sustaining control striving during goal pursuit. As discussed in the action phase model, high perceptions of control are an example of selective secondary control strategies that provide additional motivational resources as needed to continue goal pursuit after encountering difficulties. If perceptions of control are low and difficulties arise, they are likely to facilitate disengagement from the goal. In either scenario, the close connection between control beliefs and control striving may be especially important when obstacles arise in goal pursuit.

Investigating the other direction of the relationship, control strivings may have an influence on perceptions of control. If control strivings are high, for example, this may trigger boosted levels of perceived control. An individual who is actively pursuing a goal and making progress toward that goal will likely feel increased perceptions of control as the outcome becomes more and more likely. This results in a feedback

loop in which high control strivings strengthen control perceptions and beliefs, which further enhances control strivings and the likelihood of goal attainment.

Optimal conditions for pursuing developmental goals across the life span involve high levels of both perceived and actual control. Yet it is also important to consider the congruence between control beliefs (perceived control) and actual control. Whereas congruence between perceived and actual control of the environment is likely to lead to adaptive developmental outcomes, the same may not be true for incongruence. An example of incongruence is a young adult who has high actual control over the environment yet perceives low control as a result of a prolonged depressive episode or learned helplessness. In this scenario, the young adult will likely miss opportunities to pursue important developmental goals and fail to maximize primary control striving. In line with this reasoning, incongruence is expected to be associated with worse well-being and physical health outcomes.

In another example of incongruence, an older adult might have low actual control over the environment but perceive high control. Older adults increasingly experience uncontrollable biological and/or social constraints, such as health issues. Some health issues are chronic and uncontrollable, such as arthritis or heart disease, while others are acute and controllable, such as a heart attack or stroke. High perceived control of an uncontrollable chronic condition may increase effort expenditure but produce no change in condition. In other words, the older adult would be wasting limited resources by pursuing an impossible goal. Revisiting the study by Hall et al. (2010), older adults who reported incongruence between their engagement level with health goals and the controllability of their health condition (acute or chronic) were less likely to be alive after nine years than were those who reported congruence.

However, incongruence may not necessarily be associated with worse mental and physical health outcomes. In some instances, namely those where the outcome is at least under some control, slightly optimistic but still realistic perceptions of control may help individuals stay committed

to a frustrating but attainable goal. In this example, slightly higher perceived than actual control may increase the likelihood that the goal will ultimately be attained. Because higher perceived control acts as a volitional strategy (selective secondary control) to increase motivation and encourage persistence during goal engagement, perceptions of control may become more in line with actual control, ultimately supporting congruence. Thus, slight incongruence between perceived and actual control may not be as debilitating to goal pursuit and well-being as larger incongruences.

Individual Differences

As specified in the MTD, perceived control and control strivings vary between and within people. In addition to the complex, bidirectional relationship between control beliefs and strivings just discussed, individuals also differ in their ability to translate personal control beliefs into strivings for control. Individual differences here are similar to those found in action versus state orientations regarding personal goals (Beckmann & Kuhl, 1984; Kuhl, 1981). Individuals with action orientations effectively regulate their thoughts, emotions, and behaviors, which allows them to progress from intentions to striving. Individuals with a state orientation, on the other hand, become stuck in their current thoughts, emotions, and behaviors and are not able to act in a way that promotes adaptive goal pursuit. For example, these individuals may not be able to disengage from a goal when necessary or use the appropriate control strategies to enhance goal engagement. State-oriented individuals not only squander motivational resources, but they may also experience decreased well-being and other negative consequences (Hall, Perry, Ruthig, Hladkyj, & Chipperfield, 2006; Heckhausen et al., 2001; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). Thus, individuals who can more effectively translate control perceptions into actual control strivings are likely to experience the most adaptive developmental outcomes.

Individual differences in one's ability to navigate action phase cycles also play a role in adaptive developmental regulation. Some individuals are able to seamlessly switch between motivational and volitional mindsets to optimize goal pursuit. In other words, they are able to easily change from a nonbiased to biased mindset and back again to support different phases of the action cycle. Others have a more difficult time navigating between the different phases. For example, individuals may have difficulty deciding to disengage from a goal or may be unable to disengage from a goal altogether (e.g., Wrosch et al., 2007).

Within an action cycle phase, some individuals are more adept at knowing when and how to use different primary and secondary control strategies to reach their developmental goals. There are several times when goal engagement should be intensified, such as when one approaches a developmental deadline or encounters difficulties in goal pursuit. At these times, individuals who are able to use selective secondary and primary compensatory control strategies, such as increasing perceived control or asking for assistance, are more likely to attain their goal. Although individuals differ in their use of control strategies, these strategies are also amenable to change, making it possible to learn to optimize adaptive control behaviors. Researchers have developed interventions to help individuals set goals as well as optimize primary and secondary control strategies to meet these goals. For example, primary and secondary control enhancement training has been effective in treating children with moderate depression (Weisz, Southam-Gerow, Gordis, & Connor-Smith, 2003).

The MTD hypothesizes that individual differences in motivation and self-regulation strategies lead some individuals to pursue goals and recover from setbacks more effectively than others through the use of control strivings (Heckhausen et al., 2010). For example, some individuals experience a loss of control after failure, whereas others use proactive strategies, like compensatory secondary control strategies, to minimize the negative consequences of failure and continue to pursue developmental goals. Here, the use of interventions to modify control can also aid in adaptive developmental regulation after experiencing setbacks or failures.

FUTURE RESEARCH

The area of individual differences in adaptive developmental regulation is ripe for additional theoretical testing and application. A few of the most promising areas for future research are interventions that bring perceptions of control in line with reality through the use of optimism, interventions that coach congruence between control perceptions and strivings, and interventions that promote efficient switching between action phases. These interventions have the goal of maximizing individuals' motivation and self-regulation across the life span by addressing challenges that negatively affect the likelihood of attaining developmental goals.

Across the life span, individuals experience challenges to motivation and self-regulation that illuminate differences in developmental regulation. During significant life challenges (e.g., a major loss of control, changes in age-graded opportunities for goal pursuit, and developmental transitions), the effects of individual difference variables are enhanced. In a recent article, Heckhausen and Wrosch (2015) identify the following promising individual difference variables for developmental regulation: optimism, action versus state orientation, and goal disengagement capacities.

Dispositional optimism, or the tendency to expect positive versus negative outcomes in different areas of life (Scheier & Carver, 1985), is conceptually similar to enhanced perceptions of control. In general, optimism is related to persistence and the use of problem-focused coping strategies when difficulties arise. During the goal-engaged phase of the action phase model, individuals are in a biased and optimistically oriented mindset. As a result, they should experience positive perceptions of control and be hopeful about the likelihood of goal attainment. When minimal challenges are present, this biased mindset ensures progress toward the goal. When challenges in goal pursuit occur, individuals with relatively higher levels of dispositional optimism may be more likely to stay goal-engaged and attain the goal (Heckhausen & Wrosch, 2015).

Although optimism has been extensively studied in terms of its benefits for physical and mental health, it has rarely been investigated with respect to control striving. A fascinating population for future research on the

relationship between optimism and control beliefs and strivings is young adults, especially during the transition from college to work life. As young adults strive for career goals, expectations may initially be unrealistic and in need of adjustment. However, given the relationship between optimism, perceived control, and control strivings, optimistic control perceptions may open up new paths for the individual, thus causing the initial overambitiousness to become reality (Heckhausen, Chang, Greenberger, & Chen, 2013).

In another example of the importance of individual differences during this time, two young adults may experience the same setbacks when searching for a job. One of the young adults may have a tendency to perceive a high level of control in any environment, even when control opportunities are not very favorable. This dispositional characteristic would lead the individual to be more optimistic and goal-engaged while searching for a job compared to the other individual, who may settle for a less-than-ideal position or disengage from the job search altogether. Whether the unflappable optimist or the more cautious individual is the more adaptive would depend on whether, in the long run, primary control striving for the ambitious goal has any chance of being successful as well as considering the corresponding costs of pursuing the ambitious goal for other life domains. However, in a different situation, where both young adults had high control over the job search, individual differences in dispositional optimism may not have an effect. A study investigating the costs and benefits of dispositional optimism on control striving is especially timely as young adults are graduating from college and searching for jobs in the aftermath of the global recession.

One important consideration to keep in mind is the specific social and institutional context of control striving. If we consider the current higher educational system in the United States, young adults have a substantial degree of control over their lives and academics. In this context, where individuals have control over educational outcomes, it is beneficial for individuals to have high perceptions of control (Heckhausen & Chang, 2009). This may not be the case in a high-competition or otherwise taxing environment, such as medical school or the educational system of another country. In this type of environment, students who are not competent may not benefit from illusory perceptions of control. Instead, they may

benefit from disengaging from the costly and unattainable goal in order to pursue a more feasible one (Wrosch et al., 2007).

Developmental transitions, as mentioned earlier in this section, are specific times in the life span when perceptions of control are especially vulnerable (Heckhausen et al., 2001; Schulz & Heckhausen, 1999). One such transition that presents new opportunities and autonomy for young adults, as well as new challenges and responsibilities, is the transition from high school to college (Perry, Hladkyj, Pekrun, & Pelletier, 2001). For example, first-year college students typically experience social, academic, personal, and/or financial challenges (Perry, Hall, & Ruthig, 2007). Students may experience difficulties as a result of moving away from home and living with a roommate, as well as difficulties adapting to a more challenging educational environment. For these reasons, the college environment is ripe for short-term setbacks and obstacles. At such a critical period, an individual's ability to maintain perceived and actual control plays a crucial role in the student's ultimate success or failure.

A control construct specific to the educational domain, perceived academic control, has shown promise in its ability to increase college students' academic motivation and achievement as well as help them bounce back after failure (Perry et al., 2007; Perry, Hechter, Menec, & Weinberg, 1993). Perceived academic control is the student's belief in his or her ability to influence and/or predict academic performance and outcomes. Of interest to researchers, this construct can be directly manipulated through cognitive interventions (e.g., Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006).

Perry et al. (2007) created a control-enhancing intervention, Attributional Retraining (AR), to increase perceived academic control by modifying attributional schemas. By reducing uncontrollable attributions and increasing controllable ones, AR increases the number of students who perceive college as a high-control environment. The intervention encourages students to attribute poor academic performance to effort and strategy rather than to natural talent or ability (Stupnisky et al., 2007).

Unlike other psychosocial predictors of academic achievement and well-being that are trait-like in nature (e.g., dispositional optimism) or difficult to change (e.g., social support), AR is a brief, easily implemented

intervention that can make a substantial difference in college students' academic performance and psychological well-being (Ruthig, Haynes, Stupnisky, & Perry, 2009). AR has been especially helpful for freshmen as they transition to the college environment.

Interventions that aim to directly or indirectly influence perceptions of control and control strivings are a promising avenue for future research. Unlike traditional interventions, these strategies can be implemented at little to no cost and have a significant influence on the success of individuals in life domains that extend beyond education. Although specific interventions like AR have been successful in encouraging adaptive motivational behaviors, several questions remain unanswered and open to future inquiry, such as their ability to modify maladaptive motivational and self-regulation strategies that may be more resistant to change. All in all, individual differences in control beliefs and strivings and their effects on adaptive developmental regulation are only beginning to be understood by researchers but offer exciting possibilities for the application of control constructs to everyday life.

CONCLUSION

For the past 50 years, the construct of perceived control has had a substantial influence on the field of psychology. An early differentiation of control by Rothbaum et al. (1982) between primary and secondary control set the groundwork for later theories of control, such as the life span theory of control (Heckhausen & Schulz, 1993, 1995; Schulz & Heckhausen, 1996).

As a theory of development, the MTD addresses both individual and situational determinants of control as well as their interaction (Heckhausen et al., 2010). The theory integrates constructs of actual control (primary control capacity), perceived control (its role in optimization and in selective secondary control when enhancing control perception to promote goal engagement), control striving, and control strategies. Striving for expanded, or at least maintained, control across the life span is a central component of the theory, especially as individuals experience increased biological and social constraints associated with aging.

When pursuing a goal, individuals enact various behavioral and motivational resources in the form of control strivings. Importantly, some individuals are more adept at knowing when to use these strategies and are more efficient in using them than are others. The extent to which individuals successfully overcome temporary setbacks and challenges is dependent on their adaptive use of motivational and self-regulatory control processes over the life span. Individual differences in control beliefs and perceptions, and interventions to address them, is a promising future direction for control-related research. As a construct, perceived control is amenable to change, giving it potential as a key component in interventions and training that seek to maximize adaptive developmental regulation across the life span.

As we move forward as a field, we need to investigate the unique role of perceived and actual control in regulating development across the life span while also recognizing that the two constructs inevitably influence one another in ways that cannot be pulled apart. We need to focus on individual and situational aspects of control perceptions and strivings to generate a complete understanding of how control influences development and adaptive outcomes.

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12

Control Strategies for Managing Physical Health Problems in Old Age

Evidence for the Motivational Theory of Life Span Development

MEAGHAN BARLOW, CARSTEN WROSCH, JUTTA HECKHAUSEN, AND RICHARD SCHULZ ■

INTRODUCTION

How can older adults avoid the adverse psychological and physical consequences associated with the onset and development of physical health declines? A body of theory and research that may be useful in answering this question relates to the motivational theory of life span development (Heckhausen & Schulz, 1995; Heckhausen, Wrosch, & Schulz,

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2010; Schulz & Heckhausen, 1996). This theory was developed to explain how individuals adapt to age-related challenges across the life span and maintain their psychological and physical health. It postulates that specific control strategies associated with goal engagement and goal disengagement processes represent important motivational responses that can facilitate an individual's adaptation to the occurrence of age-related challenges. These control strategies are adaptive if they are used in close correspondence to a person's opportunities for attaining a personal goal or overcoming a problem. On the basis of these assumptions, we review in this chapter the literature on the use of control strategies for managing physical health declines in older adulthood.

Control Striving and Successful Development Across the Life Span

A central tenet in the life span developmental literature is that the interplay between individual agency and contextual factors shape people's development across the life course (Baltes, 1987, 1997; Brandtstädter & Renner, 1990; Heckhausen, 1999; Lerner & Busch-Rossnagel, 1981). On the one hand, individuals actively influence their development by identifying, pursuing, and regulating personal goals. From this perspective, goals represent the building blocks of successful life span development. On the other hand, individuals' actions are embedded in their developmental context and can be constrained or facilitated by biological, sociocultural, and age-normative factors (Heckhausen, 1999; Schulz & Heckhausen, 1996).

The motivational theory of life span development (MTD) addresses the interplay between individual agency and contextual factors to explain life-long patterns of successful development (Heckhausen & Schulz, 1995; Heckhausen et al., 2010; Schulz & Heckhausen, 1996). This theory postulates that age-normative fluctuations in developmental constraints, opportunities, and personal resources result in age-graded changes in an individual's control capacity across the life course (i.e., a person's ability to

produce desired effects in the environment; Heckhausen, 1999). Overall, biological maturation, societal norms and scaffolding, and variable personal resources create an inverted U-shaped trajectory of control capacity across an individual's life span (Heckhausen & Schulz, 1995; Schulz & Heckhausen, 1996). During early childhood and through young adulthood, individuals typically experience a marked increase in their control capacity as biological maturation and social structures enable them to achieve a number of developmental tasks and overcome constraints on the pursuit of their personal goals. For many individuals, control capacity peaks in midlife when constraints on controlling the environment are reduced due to relatively rich personal and social resources (Lachman, 2004). Finally, control capacity declines steeply in older adulthood based on increasing constraints placed on goal attainment by a limited lifetime (Carstensen, Isaacowitz, & Charles, 1999; Schulz & Heckhausen, 1996) and age-related decreases in biological, social, and motivational resources (Heckhausen & Schulz, 1995).

The MTD further explains how individuals can adapt to age-related changes in control capacity across the life span and maintain their psychological well-being and physical health. This approach provides a general theory of motivation focused on explaining human development. Within this context, MTD views control as a fundamental motivational force driving specific behaviors that shape individuals' developmental trajectories. It further states that developmental outcomes can be optimized if individuals adjust their behavioral and cognitive control strategies to age-related changes in control capacity (e.g., by investing effort in attainable goals or by reducing commitment to unfeasible goals; Heckhausen & Schulz, 1995). This perspective on control is different from models of perceived control that take an individual difference approach by focusing on how relatively stable interindividual variations in control beliefs shape behavior across life circumstances (see research on self-mastery or internal vs. external locus of control, Pearlin & Schooler, 1978; Rotter, 1966). Note, however, that there may be functional associations between both conceptualizations of control. Since generalized perceived control can influence the way people appraise and respond across situations

(Rotter, 1966), it could also play a role in the use of specific control strategies (Wrosch, Heckhausen, & Lachman, 2006). For example, whereas high levels of perceived control may facilitate the use of control strategies needed to attain a desired goal, a low sense of control may result in the withdrawal of commitment and efforts from the pursuit of a goal (for a more comprehensive discussion, including different aspects of perceived control, see Villarreal & Heckhausen in Chapter 11 of this volume).

The MTD has conceptualized different types of control strategies that individuals can use to regulate their development (Heckhausen & Schulz, 1995). These strategies map theoretically and empirically onto two broader categories of control striving: goal engagement and goal disengagement (Haase, Heckhausen, & Wrosch, 2013). Goal engagement refers to strategies aimed at attaining personal goals and overcoming goal-related problems, such as the investment of time and effort (selective primary control), maintenance or enhancement of motivational commitment (selective secondary control), and enlistment of external resources (compensatory primary control; Heckhausen & Schulz, 1995). Goal disengagement, by contrast, refers to compensatory secondary control strategies aimed at abandoning a personal goal (e.g., the devaluation of the importance of a goal). Compensatory secondary control strategies further entail self-protective strategies, such as positive reappraisals, strategic social comparisons, or external attributions of failure (Heckhausen & Schulz, 1995). These strategies are thought to preserve an individual's emotional and motivational resources in the context of failure and to support adaptive goal disengagement.

The MTD assumes that goal engagement- and goal disengagement-related strategies are essential for attaining desired goals and adjusting to goal constraints that are impossible or too costly to overcome (Heckhausen et al., 2010). Consider, for example, a person with a goal of running a marathon in six months. Once this goal has been selected, training five hours a week (selective primary control), increasing motivational commitment (selective secondary control), and seeking out the help of a running coach (compensatory primary control) are likely to optimize this individual's chances of running the marathon. However, imagine that this person has a chronic injury that prevents the person

from engaging in necessary training. In this circumstance, all of the efforts aimed at getting ready for the marathon are futile and are therefore likely to result in wasted resources and the experience of failure. In this situation, positively reappraising the situation, using strategic social comparisons, or avoiding self-blame (compensatory secondary control) may be adaptive because this could enable a person to accept the fact that the goal can no longer be attained and protect the person's psychological well-being from the experience of failure.

A corollary of the previous example is that, to be adaptive, individuals' use of control strategies must be tailored to their opportunities for attaining a goal or overcoming a problem (Heckhausen, Wrosch, & Fleeson, 2001; Wrosch & Heckhausen, 1999). When an individual has sufficient opportunities and resources to attain a goal or overcome a problem, goal engagement strategies should be particularly effective and therefore adaptive. However, if individuals' opportunities for goal attainment are scarce, goal engagement may become futile and result in the experience of failure. In such circumstances, withdrawing commitment from the goal and abandoning goal-related effort is the most adaptive path, ideally coupled with self-protective control strategies to conserve an individual's emotional and motivational resources for future action (Heckhausen et al., 2010).

The occurrence of age-related declines in individuals' control capacity further implies that the adaptive value of control strategies can change as a function of age. MTD postulates that goal engagement strategies should generally be more adaptive at younger ages, when opportunities for goal attainment are plentiful, whereas goal disengagement strategies are thought to become paramount in older adulthood, when individuals typically confront increasing constraints on the attainment of their goals. From this perspective, it seems essential for older adults to limit goal engagement to those important domains for which they still have sufficient opportunities (Baltes & Baltes, 1990; Schulz & Heckhausen, 1996). In addition, older adults may have to recognize with increasing frequency that some goals have become difficult to attain, and they need to abandon those goals that are unattainable or too costly to pursue (Brandtstädter & Renner, 1990; Heckhausen,

1999). This age-related shift in the use of control strategies allows older adults to conserve their limited resources for the pursuit of attainable goals and to protect their physiological resources and psychological well-being from the experience of failure. In this way, an effective use of control strategies could explain individuals' impressive capacity to optimize development across the life span by regulating motivational processes in the context of waxing and waning opportunities for goal attainment (Heckhausen et al., 2010).

A plethora of research has supported the main assumptions of MTD (for reviews, see Heckhausen et al., 2010; Wrosch, Dunne, Scheier, & Schulz, 2006). For example, it has been shown that perceived controllability of life circumstances decreases with advancing age (Heckhausen & Baltes, 1991), whereas developmental losses are typically experienced particularly frequently in later adulthood (Heckhausen, Dixon, & Baltes, 1989). Furthermore, numerous studies have demonstrated evidence for the adaptive value of age- and opportunity-adjusted control striving across various life domains (Heckhausen et al., 2001; Wrosch & Heckhausen, 1999; Wrosch, Heckhausen, & Lachman, 2000). For example, a study examining how individuals can maintain their subjective well-being in the context of pressing demands (e.g., financial problems) showed that goal engagement prevented the adverse psychological consequences of these problems, particularly in young adulthood, whereas goal disengagement-related strategies (i.e., positive reappraisals) became more important in older adulthood (Wrosch et al., 2000). In a similar vein, emotional benefits resulting from opportunity-adjusted control striving have been demonstrated for regulating age-related challenges in other life domains, such as passing the biological deadline for childbearing or finding a new romantic partner in late midlife (Heckhausen et al., 2001; Wrosch & Heckhausen, 1999). Consistent with the assumptions of MTD, these studies suggest that the controllability of life circumstances often declines during the later phases of the adult life span. In addition, they demonstrate that a general shift from using goal engagement to goal disengagement strategies enables older individuals to effectively manage age-related constraints on the pursuit of their personal goals.

Control Striving and Physical Disease in Older Adulthood

A growing body of research has applied the assumptions of the MTD to the management of older adults' physical health problems (for early contributions, see Schulz, Heckhausen, & O'Brien, 1994; Wrosch, Schulz, & Heckhausen, 2002). This line of work is based, in part, on the premise that age-related opportunities for overcoming health-related problems generally decline in the later phases of adulthood and thus may require older individuals to engage more frequently in self-protective and goal disengagement strategies (Heckhausen et al., 2010). Although such a shift in control striving likely benefits older adults who confront severe and uncontrollable physical health threats (e.g., Barlow, Liu, & Wrosch, 2015; Hall, Chipperfield, Heckhausen, & Perry, 2010), our theoretical approach also recognizes that health problems can provide a unique challenge for older adults because a loss of health has wide-reaching implications. Consider, for example, an older adult with severe arthritis. This person may not only be limited in her or his personal activities (e.g., exercise or self-care), but these limitations may put additional constraints on the person's opportunities for pursuing a number of other goals (e.g., visiting friends and family or pursuing leisure activities). Said differently, health problems can lead to particularly severe consequences for quality of life if they reduce control capacity across multiple important life domains. Thus, although physical decline is an inherent part of the aging process (Canadian Institute for Health Information, 2011), abandoning health-related goals should be postponed for as long as possible, as without sufficient health it may be impossible to pursue a variety of goals across life domains (Heckhausen, Wrosch, & Schulz, 2013).

An important implication of the latter discussion is that it may not always be adaptive for older adults who confront health-related threats to shift their control strategies from goal engagement to goal disengagement. In fact, considering that there is much variability in the controllability of older adults' physical health problems, goal engagement can be as adaptive as goal disengagement for managing health-related threats. This may be the case because some health problems could potentially be managed

through investments of time, energy, and professional treatment, while other health problems may be chronic or uncontrollable. For example, in the earlier stages of age-related declines, individuals frequently confront acute or subclinical health threats that are relatively transient (e.g., stomach pain, headaches, or shortness of breath). Such acute physical symptoms may be successfully addressed by active goal engagements, such as exercise, diet change, or seeking advice from a physician (Wrosch et al., 2002). Over time, however, older adults' health problems may become less controllable, and acute health threats may turn into relatively intractable chronic disease (e.g., cancer and subsequent functional disability; for disablement processes, see Verbrugge & Jette, 1994). In the latter circumstances, control strategies aimed at overcoming the health problem are often no longer effective, and goal engagement may become futile. In these situations, individuals need to adjust their health-related goals and engage in self-protective strategies to avoid the adverse psychological consequences of chronic disease (Barlow et al., 2015; Heckhausen et al., 2013).

A recently proposed theoretical model sheds further light on how an adaptive adjustment of health-related goals may be accomplished in the context of declining and less controllable health: the lines-of-defense model (Heckhausen et al., 2013). This model postulates that older adults can manage progressive health declines effectively by organizing their control strategies in cycles of goal engagement and goal disengagement, representing sequentially organized "lines of defense." These organized cycles of control striving are thought to allow individuals to defend feasible levels of physical health for as long as possible. Only if it becomes impossible for a person to maintain a certain level of health should the person step behind the next line of defense to prevent further health declines. An implication of this proposition is that even if older individuals confront health problems that have become increasingly less controllable, they should not necessarily disengage from all health-related goals. For example, a person with arthritis who experiences pain during vigorous physical activity may need to disengage from those activities that are impossible to accomplish (e.g., going on a strenuous hike), whereas

maintaining other forms of physical activity should be important and adaptive for this person (e.g., going for regular walks). In a similar vein, it may be necessary for an individual who suffers from a progressive illness (e.g., osteoarthritis, macular degeneration, or Parkinson's disease), after all medical treatments have been exhausted, to "retreat" behind the next line of defense by disengaging from the goal of overcoming the illness and instead engage in the management of the disease by, for example, reorganizing the home environment to maintain as much quality of life as possible despite worsening health (for a more comprehensive discussion, see Heckhausen et al., 2013).

A Theoretical Model of Managing Physical Disease in Older Adulthood

Figure 12.1 summarizes our theoretical approach by illustrating a simplified model of the role of control strategies in the management of older adults' physical health problems (adapted from Wrosch, Schulz, & Heckhausen, 2004). This model addresses that effective self-regulation of health-related threats is of utmost importance for older adults' quality of life and that individuals can confront health-related problems that differ in terms of their controllability. In addition, it postulates that an opportunity-adjusted use of control strategies may enable older individuals to effectively manage the experience of physical health declines.

Figure 12.1 suggests that older adults may experience physical health problems that can be located on a continuous dimension from being controllable (e.g., acute symptoms such as pain) to becoming uncontrollable (e.g., functional disability, such as not being able to move around independently). It further illustrates that the occurrence of such health problems can trigger emotional distress (Figure 12.1, paths a–b), subsequently influencing health-compromising cognitive/behavioral, motivational, and physiological processes (Figure 12.1, paths b–c). For example, the experience of a variety of health conditions has been linked to increases in older adults' depression (Lenze et al., 2005). Furthermore, depressed individuals

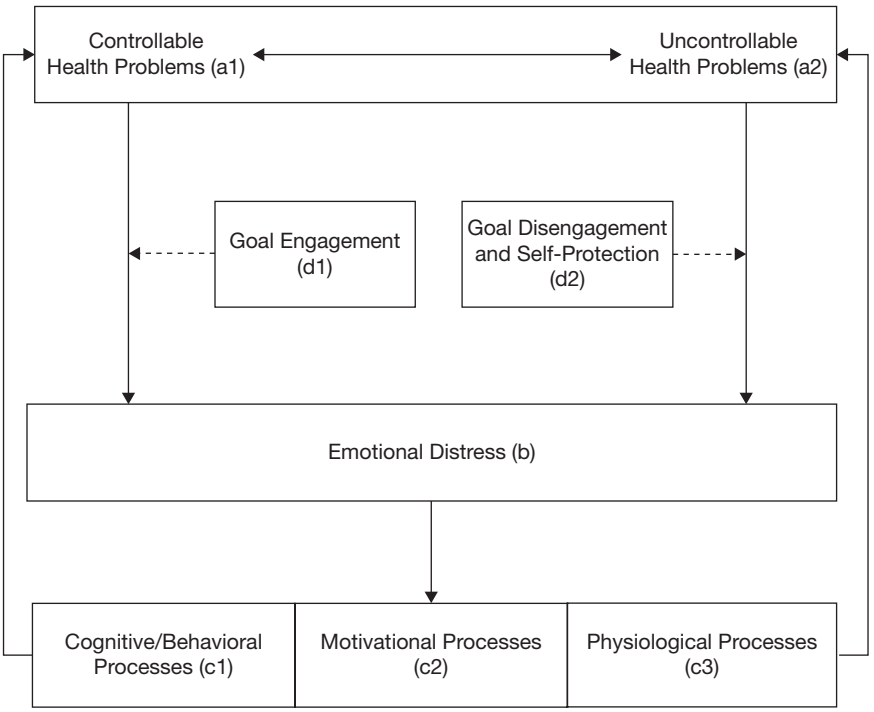

Figure 12.1 Theoretical model of opportunity-adjusted management of physical health problems in older adulthood (adapted from Wrosch, Schulz, & Heckhausen, 2004). Dotted lines represent adaptive motivational mechanisms that buffer the adverse emotional consequences of physical health problems.

may lose their motivation to overcome health-related problems, engage in health-compromising behaviors, or experience cognitive deficits and disturbances (Bruce, Seeman, Merrill, & Blazer, 1994 Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Yaffe et al., 1999). Finally, the experience of emotional distress can cause a dysregulation of health-relevant physiological systems (e.g., hormonal and immune system; see Cohen, Janicki-Deverts, & Miller, 2007; Dantzer, O'Connor, Freund, Johnson, & Kelley, 2008; Folkman & Lazarus, 1986; Kiecolt-Glaser & Glaser, 1991).

Figure 12.1 further shows that distress-related alterations in motivational, cognitive/behavioral, and physiological processes can loop back, resulting in the development of new or more severe health problems (Figure 12.1, paths c–a). For example, motivational problems may undermine adherence to medical regimens (Rubak, Sandbaek, Lauritzen, &

Christensen, 2005), and behavioral and cognitive disturbances can influence a variety of health conditions, including coronary heart disease (e.g., Ayas et al., 2003; Brosschot, Gerin, & Thayer, 2006). Moreover, research has demonstrated that disturbances in individuals' hormonal or immune systems can cause a variety of aging-related diseases (Figure 12.1, paths c–a; Cohen et al., 2007; Ridker, Rifai, Rose, Buring, & Cook, 2002). The presence of these feedback loops highlights the possibility for older adults to enter a downward spiral such that a disruption at any point in this process can lead to perpetuating declines in physical and psychological health (Wrosch, Dunne, Scheier, & Schulz, 2006; Wrosch et al., 2004).

Finally, the dotted paths in Figure 12.1 illustrate that an opportunity-adjusted use of control strategies may prevent the adverse psychological and physical consequences of confronting physical health threats. More specifically, if older adults confront potentially manageable physical health threats (e.g., acute symptoms), goal engagement strategies should be conducive to overcoming the respective problem and thus buffer the associated emotional distress (Figure 12.1, path a1-d1-b). By contrast, to the extent that individuals' health problems become less controllable (e.g., development of chronic illness and functional disability), the use of goal disengagement-related control strategies should become increasingly adaptive because these strategies are likely to ameliorate emotional distress in the context of insurmountable health problems (Figure 12.1, path a2-d2-b). In this way, the emotional benefits deriving from the use of opportunity-adjusted control strategies may protect older adults' physical health by preventing a disturbance of health-relevant cognitive/behavioral, motivational, and physiological processes (Wrosch et al., 2004).

EMPIRICAL EVIDENCE

Measurement of Health-Related Control Striving

Approximately 15 years ago, we started examining our theoretical model by creating a measurement instrument to assess individual differences in

health-related control striving. This instrument consists of a self-report scale designed to measure different types of control strategies that individuals can use to manage their health problems. The items of this scale were based on a generic version of the optimization with primary and secondary control scales (Heckhausen, Schulz, & Wrosch, 1998) and a primary and secondary control scale used in an American national probability sample (MIDUS; Wrosch et al., 2000).

Our early work on the management of older adults' health threats focused on goal engagement strategies, labeled as "health engagement control strategies" (HECS; Wrosch et al., 2002). The items of the HECS scale reflect the use of selective primary control (e.g., I invest as much time and energy as possible to improve my health), compensatory primary control (e.g., When a treatment doesn't work for a health problem I have, I try hard to find out about other treatments), and selective secondary control strategies (e.g., I often think about how important good health is to me). The HECS scale has shown appropriate reliability across studies and predicted important outcomes (e.g., depressive mood, cortisol dysregulation, or physical health declines; Wrosch & Schulz, 2008; Wrosch et al., 2002, Wrosch, Schulz, Miller, Lupien, & Dunne, 2007).

We subsequently completed this measurement instrument by devising additional items that reflect health-specific compensatory secondary control strategies, which are thought to protect individuals' motivational and emotional resources in the context of health problems and facilitate disengagement from unfeasible health goals. The latter subscale of health-related self-protection has also shown appropriate psychometric characteristics and predicted adaptive emotional and physiological outcomes (e.g., Barlow et al., 2015; Castonguay, Wrosch, & Sabiston, 2014). It includes items associated with positive reappraisals (e.g., When I am faced with a bad health problem, I try to look at the bright side of things) and the avoidance of self-blame (e.g., When I find it impossible to overcome a health problem, I try not to blame myself).

Note that not all studies reviewed here used this measure of health-related control striving. Some research has developed its own constructs of goal engagement and goal disengagement-related control strategies.

For example, Hall and colleagues (2010) asked older adults with serious health problems to indicate in which domain they suffered the most activity restrictions due to their health problem. Control strategies of goal engagement and disengagement were then rated with reference to those activity restrictions. In addition, other research on the management of older adults' health problems stems from personality psychology and operationalized goal disengagement as a relatively stable individual tendency that people apply across life domains (Dunne, Wrosch, & Miller, 2011).

Psychological and Physical Consequences of Health-Related Control Striving

Research examining the influence of health-related control striving has provided substantial empirical support for the proposed theoretical model. A first study of 127 older adults tested whether HECS would buffer the association between different types of health problems (more controllable acute physical symptoms and less controllable functional disability) and depressive symptoms (Wrosch et al., 2002). The results of this study showed that levels of acute physical symptoms were associated with depressive symptoms but only among older adults who did not engage in HECS. By contrast, older adults who reported high levels of HECS were entirely protected from experiencing the adverse effect of acute physical symptoms on depressive symptomatology. Of importance, this buffering effect of HECS was not observed in the context of relatively intractable functional disability. These findings support our theoretical model by documenting that control strategies aimed at overcoming health problems (i.e., HECS) are particularly adaptive if older adults confront potentially manageable health problems, such as acute physical symptoms (see Figure 12.1, path a1-d1-b), but may reduce their adaptive value in the context of chronic health problems, such as functional disability (Wrosch et al., 2002).

Another study, reporting cross-sectional data from 215 older adults, examined the role of HECS in the associations among participants'

physical health problems, depressive symptoms, and diurnal cortisol secretion (Wrosch, Schulz, Miller, Lupien, & Dunne, 2007). The study's hypotheses predicted that physical health problems (e.g., high blood pressure or diabetes) could be associated with levels of depressive symptoms and cortisol secretion, but only if older adults did not engage in counteracting their health problems (i.e., low HECS). To exclude those portions of variance in the outcome measures that were associated with relatively intractable health problems, the analyses controlled for participants' levels of functional disability. The results of the study showed that physical health problems predicted higher levels of both depressive symptoms and diurnal cortisol secretion. However, these associations were obtained only among participants with low levels of HECS, but not among their counterparts who reported comparatively higher levels of HECS. In addition, the analyses showed that the buffering effect of HECS on cortisol output was completely mediated by individual differences in participants' depressive symptomatology. Of note, this pattern of effects was considerably weaker if the analyses did not control for participants' functional limitations, indicating that the beneficial effects of HECS were due to potentially manageable health problems and not associated with more intractable functional disability (Wrosch, Schulz, Miller, Lupien, & Dunne, 2007). These findings show further evidence for the assumption that goal engagement strategies can ameliorate the adverse effects of relatively controllable health problems on older adults' emotional and physiological health (see Figure 12.1, path a1-d1-b-c). Moreover, they point to the presence of a potential mediation process in which the emotional benefits deriving from opportunity-adjusted control striving contribute to adaptive patterns of physiological processes (i.e., cortisol function; see Figure 12.1, path a-b-c; Cohen et al., 2007).

A two-year longitudinal follow-up of the previous study documented further evidence for the importance of HECS in the management of controllable health problems (Wrosch & Schulz, 2008). This study examined whether HECS can determine the extent to which manageable acute physical symptoms develop into more intractable chronic disease

and functional disability over time. In addition, it addressed potential mediators of this association. The results of the study demonstrated that baseline levels of acute physical symptoms predicted increases in chronic disease and functional disability over time, but only among participants who reported low baseline levels of HECS. By contrast, older adults who reported high levels of HECS were protected from the consequences of acute physical symptoms on increases in chronic disease and functional disability. In addition, the study showed that reduced cortisol levels partially mediated the buffering effect of HECS on the association between acute physical symptoms and subsequent chronic health problems (Wrosch & Schulz, 2008). Consistent with our theoretical model, these findings extend the previous studies by demonstrating in longitudinal analyses that early manifestations of illness can result in more severe and chronic health conditions if older adults do not counteract developing illness through active goal engagements (see Figure 12.1, path a1-d1-a2). In addition, it documents that the buffering effect of active control strivings may be due, in part, to a prevention of physiological disturbances in health-relevant bodily systems (see Figure 12.1, path a1-d1-c-a2).

The studies reported so far focused on the adaptive value of older adults' goal engagement strategies for managing potentially manageable health threats and did not address whether self-protective and goal disengagement processes can be adaptive in the context of less controllable chronic disease. The latter possibility, however, has been addressed in a growing literature on the influence of older adults' control strategies for managing chronic disease. For example, a longitudinal study of older adults with serious health problems addressed both the congruence of goal engagement strategies when the health problem was acute and controllable (e.g., heart attack and stroke patients during rehabilitation) and of goal disengagement strategies when the health problem was chronic and uncontrollable (e.g., arthritis, heart disease) (Hall et al., 2010). The assessment of control striving in this study focused on trying to control (i.e., goal engagement) and giving up on controlling (i.e., goal disengagement) the restrictive influence of physical disease on older adults' everyday activities.

The results of the study demonstrated that older adults who were diagnosed with acute and controllable health problems (e.g., heart attack, stroke, controllable via rehabilitation), but not those who only suffered from common chronic uncontrollable disease (e.g., hypertension or arthritis), benefitted from goal engagement strategies as evidenced by a 39% greater likelihood of survival nine years later. By contrast, older adults who utilized goal engagement strategies even though they had not experienced any acute controllable health event and only dealt with common chronic uncontrollable health problems reported a deterioration of their health status after five years of study. In addition, the results showed that older adults who were suffering only from uncontrollable chronic disease, but not those diagnosed with acute and controllable health problems, benefitted if they disengaged from the goal of overcoming the activity restrictions imposed by their health problems as evidenced by improved health status five years later (Hall et al., 2010). These findings support the proposed model by demonstrating that goal disengagement strategies may prevent a deterioration of physical health among older adults who are confronted with an intractable chronic health problem (see Figure 12.1, path a2-d2-a2). Moreover, they suggest that the use of goal engagement strategies is beneficial in response to relatively controllable health problems, but maladaptive in the context of an intractable chronic disease. The latter process could occur if older adults continue to strive toward overcoming activity restrictions due to intractable health problems and, as a consequence, experience the adverse consequences of repeated failure on their psychological and physical health (cf. Wrosch, Miller, Scheier, & Brun de Pontet, 2007).

In addition to goal disengagement as an adaptive response to uncontrollable health threats, our theoretical model conceptualized self-protective thoughts as important control strategies that enable individuals to maintain their emotional and motivational resources for future action. This proposition has been tested in a long-term longitudinal study of 121 older adults examining the associations among self-protective control strategies, chronic health threats, and feelings of loneliness (Barlow et al., 2015). The theoretical model of this study predicted that chronic

health problems could trigger feelings of loneliness, given that the illness may prevent older individuals from engaging in emotionally relevant social interactions. In such circumstances, however, the use of self-protective control strategies (e.g., positive reappraisals or self-protective attributions) was expected to ameliorate feelings of loneliness (e.g., by facilitating social activities through a more positive appraisal of an individual's health status or through the prevention of depression; Bombardier, D'Amico, & Jordan, 1990).

The results of this study showed that levels of chronic illness predicted a linear increase in loneliness over eight years of study. More specifically, older adults with high baseline levels of chronic illness reported a sharp increase in loneliness over time, whereas their counterparts with lower levels of chronic illness exhibited a low and stable trajectory of loneliness. Further analyses demonstrated among those older adults with high levels of chronic illness that an increase in loneliness was observed only among participants who did not use self-protective control strategies. By contrast, older adults who were able to positively reappraise their health-related circumstances and to avoid blaming themselves for the health problems (i.e., high self-protection) did not experience an illness-related increase in loneliness over time. Of note, the reported study also included goal engagement strategies (i.e., HECS). Different from self-protective control strategies, HECS did not buffer the adverse effect of chronic illness on increases in loneliness (Barlow et al., 2015). Given that it is often difficult or impossible to overcome chronic illness in older adulthood, these findings support our theoretical model by identifying self-protective control strategies (and not goal engagement strategies) as an adaptive motivational response that enables older adults to manage the adverse emotional consequences of relatively intractable physical health problems (see Figure 12.1, path a2-d2-b).

We note that there is also research examining the role of broader individual differences in goal disengagement capacities for managing chronic health problems in older adulthood. Different from the previously reported studies on the use of specific control strategies, research on goal disengagement capacities assesses generalized

individual tendencies to disengage from unattainable goals across different areas of life (Wrosch, Scheier, & Miller, 2013; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). In this regard, a six-year longitudinal study of 135 community-dwelling older adults investigated the associations among goal disengagement capacities, functional disability, and depressive symptoms (Dunne et al., 2011). The study's results showed that the onset of functional disability predicted a steep increase in older adults' depressive symptomatology over six years of study. Moreover, and consistent with the reported findings by Hall and colleagues (2010), this association was observed only among older adults who reported difficulty disengaging from unattainable goals. By contrast, functional disability did not predict an increase in depressive symptoms among older adults who were better able to disengage from unattainable goals (Dunne et al., 2011). This research documents that the adverse emotional consequences of experiencing chronic and relatively intractable disease may be prevented if older adults have developed a general capacity for disengaging from unattainable goals (cf. Figure 12.1, path a2-d2-b). Moreover, considering that this conclusion maps closely onto the discussed literature examining the effects of stressor-specific control strategies (Barlow et al., 2015; Hall et al., 2010), these findings could imply that there are important functional associations between broader individual tendencies in certain control dimensions and the specific control strategies that individuals use to manage health-related challenges (Heckhausen & Wrosch, 2015).

CONCLUSION AND FUTURE RESEARCH

This chapter addressed how older adults can manage the occurrence of physical health problems and protect their psychological and physical health. Based on the motivational theory of life span development (Heckhausen et al., 2010), we discussed a theoretical model of opportunity-adjusted control striving for the management of physical health problems in old age. This model suggests that health-related problems can

compromise older adults' emotional well-being and put individuals at risk for developing subsequent psychological and physical health declines. In addition, it postulates that older adults can prevent the adverse consequences of physical health threats if they adjust their control strategies to the opportunities available for overcoming a health problem. When faced with a health threat that can potentially be addressed (e.g., acute physical symptoms), older adults should invest resources in actively overcoming the health problem by using goal engagement strategies. However, when health problems become less controllable and individuals are faced with more intractable health threats that may not be overcome (e.g., chronic health problems or functional disability), active goal engagements can become futile, and older adults should protect their emotional well-being and adjust their health-related goals by using goal disengagement-related strategies.

The reviewed empirical evidence lends strong support to the proposed model. First, the discussed cross-sectional and longitudinal studies showed that the experience of physical health threats can forecast emotional and health-related problems. More specifically, whereas relatively controllable physical health problems exerted adverse effects on older adults' depressive symptomatology, cortisol secretion, and subsequent physical health (e.g., Wrosch & Schulz, 2008; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007), more intractable health problems were associated with increased levels of loneliness, depressive symptomatology, and further health problems (e.g., Barlow et al., 2015; Dunne et al., 2011; Hall et al., 2010). Second, the empirical evidence indicated that the adverse downstream implications of physical health problems on health-relevant physiological systems (i.e., cortisol regulation) can be mediated by older adults' emotional distress (i.e., depressive symptoms; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007) and that such disturbances of physiological systems may contribute to the development of further health problems (Wrosch & Schulz, 2008; for control strategies, cortisol disturbances, and functional disability, see also Wrosch, Miller, & Schulz, 2009). Third, the reported studies support our main theoretical premise by demonstrating that older adults can manage the occurrence of physical health problems

if they use control strategies in close correspondence to the opportunities available for overcoming a health problem. In the context of manageable physical health threats, older adults could avoid the negative consequences on their psychological and physical health if they used high levels of goal engagement strategies (e.g., Hall et al., 2010; Wrosch & Schulz, 2008; Wrosch et al., 2002; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007). By contrast, high levels of self-protective and goal disengagement strategies prevented older adults from encountering the negative psychological and physical consequences of more intractable health problems (e.g., Barlow et al., 2015; Dunne et al., 2011; Hall et al., 2010).

Overall, these findings point to individuals' impressive capacity to regulate their development in the context of severe and pressing demands. In particular, in older adulthood, when a person's capacity to achieve important outcomes undergoes sharp declines, it becomes essential that individuals focus their control resources on managing those challenges that can still be addressed and protect their psychological and motivational resources in the context of more intractable problems. This process of effective developmental regulation requires individuals to activate specific control strategies that facilitate the attainment of feasible goals and contribute to overcoming manageable problems. In addition, it demands from individuals to use goal disengagement-related control strategies to adjust unfeasible goals and buffer the adverse psychological and physical consequences of those goal-related problems that have become too difficult to overcome (Heckhausen et al., 2010).

Although these conclusions clearly support the theoretical claim that using adaptive control strategies plays an important role in successful aging, questions remain that could provide promising avenues for future research. First, we note that the discussed literature focused largely on how older adults can manage specific health threats at discrete points in their lives, and it did not examine the complete process of illness progression from being disease-free to experiencing subclinical and chronic illness and eventually terminal illness (cf. Verbrugge & Jette, 1994). As discussed earlier in this chapter, the recently proposed lines-of-defense model provides a promising theoretical framework for examining the role

of control striving in the process of illness progression (Heckhausen et al., 2013). This model postulates that an organized use of goal engagement- and disengagement-related control strategies may allow older adults to hold sequentially organized lines of defense for as long as possible and to adjust health-related goals if it becomes impossible to prevent further health declines. In addition, the lines-of-defense model can be applied to the reversed processes associated with recovery from certain age-related diseases (Heckhausen et al., 2013). Given that aging is not always a unidirectional, loss-related, process (Baltes, 1987), organized cycles of goal engagement and disengagement could thus also play an important role in the improvement of older adults' physical health. We believe that future research should apply the lines-of-defense model in long-term longitudinal research to track individuals' control strategies and health conditions over extended periods of time. Such research may examine how older adults can maintain quality of life in the process from being disease-free to experiencing terminal illness. It may reveal how adaptive control strategies can slow down, stop, or even reverse progressive health conditions and thus has a great potential to discover new pathways to successful aging.

Second, this chapter focused on the age-normative development of physical disease in old age. However, it seems important to address that individuals of any age can confront physical health threats that are more or less controllable. From our perspective, it seems reasonable to assume that patterns of opportunity-adjusted control striving could also represent an adaptive motivational response in the context of non-normative health threats. In addition, considering that the management of non-normative threats may represent a particularly severe challenge, given that established role models and support systems are often lacking outside of normative tracks, individual differences in adaptive control striving may become paramount in such circumstances (Wrosch & Freund, 2001). Preliminary evidence for the importance of control strategies in the context of non-normative health threats has been reported in a heterogeneous study of breast cancer patients (Castonguay et al., 2014). This study concluded that, regardless of age, a disturbance of health-relevant physiological processes in patients' immune

systems (i.e., patterns of systemic inflammation as indicated by C-reactive protein) may be prevented by the use of self-protective control strategies, particularly if individuals are able to disengage from peripheral goals and redirect resources to managing the pressing demands of the cancer. Future research may build on these findings and recognize that life span developmental principles of adaptive control striving can be applied to the nonnormative occurrence of health threats. Such research should examine the influence of control striving in a variety of populations that confront severe physical health problems across the life span.

Third, although our conclusions suggest that opportunity-adjusted control striving is an important aspect of successful aging, the discussed evidence did not reveal the factors that may facilitate an adaptive use of control strategies. This seems to be an important task given the observed reliable associations between the use of control strategies and psychological and health-related outcomes suggest that some older adults are more successful than others in adjusting their control strategies to changing opportunities for goal attainment. However, empirical research identifying the precursors of adaptive control striving is scarce, and theoretical work has only begun to conceptualize some factors that could determine individual differences in adaptive control striving (Heckhausen & Wrosch, 2015; Wrosch, Heckhausen, & Lachman, 2006). One of the few empirical studies addressing predictors of control responses showed that depressive symptoms can make it easier for individuals to disengage from unattainable goals (Wrosch & Miller, 2009). In addition, experimental research documented that dispositional optimism may predict faster disengagement from unsolvable tasks in the presence of alternatives (Aspinwall & Richter, 1999). Finally, theoretical work suggests that broader individual difference variables related to goal-relevant behavioral tendencies applied across life domains (e.g., dispositional optimism, action vs. state orientation, generalized perceived control, or goal disengagement capacities; Kuhl, 1981; Pearlin & Schooler, 1978; Scheier & Carver, 1985; Wrosch et al., 2003) could determine the extent to which individuals are able to use specific control strategies effectively (Heckhausen & Wrosch, 2015;

Wrosch et al., 2006). In fact, some of the evidence that we discussed in this chapter would be consistent with the latter possibility by suggesting that general goal disengagement capacities and stressor-specific control strategies can produce similar emotional benefits in the context of older adults' chronic disease (e.g., Barlow et al., 2015; Dunne et al., 2011). Such a pattern of matching effects may occur if the general capacity to disengage from unattainable goals facilitates the engagement in specific self-protective and goal disengagement strategies (for a more comprehensive discussion, see Heckhausen & Wrosch, 2015). We believe that research examining the underlying dimensions of adaptive control striving is important and may reveal a more complete picture of the factors involved in successful developmental regulation across the life span.

Finally, we note that motivational processes such as control striving represent malleable psychological dimensions that can be targeted in interventions aimed at improving older adults' quality of life. In fact, previous research examining the implementation of interventions focused at modifying control processes over disease has shown promising results (e.g., Gitlin, Hauck, Winter, Dennis, & Schulz, 2006). If older individuals learn to adjust their control strategies to the controllability of specific health problems, they may experience considerable improvements in their emotional well-being and could prevent subsequent psychological and physical health declines. More research along these lines is warranted because it will contribute to psychological theories of control and successful development, and it may ultimately help improve quality of life in old age.

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13

Seven Guideposts to the Study of Perceived Control Across the Lifespan

ELLEN A. SKINNER ■

When Julian Rotter wrote his now-classic paper on "Generalized Expectancies for Internal versus External Control of Reinforcement" in 1966, he could scarcely have imagined the ensuing tsunami of research that would wash across all of psychology, uncovering the powerful effects of perceived control during every period of the lifespan in multiple life domains and across many cultures (e.g., Cheng, Cheung, Chio, & Chan, 2013). This rising tide was helped along by contemporaries who were studying locus of control in children (Crandall, Katkovsky, & Crandall, 1965) and adults (Lefcourt, 1966), and by other experts in the field who, a decade later, published their key treatises on learned helplessness (Abramson, Seligman, & Teasdale, 1978; Seligman, 1975), self-efficacy (Bandura, 1977), and causal attributions (Weiner, 1979). These theories and their associated constructs helped reshape research and interventions across the social sciences, including in the areas of health (e.g., Ashford, Edmunds, & French, 2010), motivation (e.g., Graham & Williams, 2009),

education (e.g., Schunk & Mullen, 2012), psychopathology (e.g., Gallagher, Bentley, & Barlow, 2014), coping (e.g., Aldwin, 2007), work (e.g., Brown, 2012), parenting (e.g., Clement, Wilkinson, Vimpani, & Reynolds, 2003), and aging (e.g., Baltes & Baltes, 2014).

Taken together, these conceptual and empirical efforts comprise tens of thousands of studies documenting the astonishing power of perceived control: It is one of the most robust influences on whether individuals and groups will take initiative, exert effort, and persist, especially in the face of challenges and obstacles (Weiner, 2010); it is an essential moderator of the effects of stressful experiences, and how people deal with and rebound from hardship (e.g., Folkman, 1984); it is one of the most robust predictors of school achievement and completion of high school and college (e.g., Usher & Pajares, 2008); and it is a decisive factor in whether patients will comply with regimens prescribed to sustain their mental and physical health and so recover from acute and chronic medical conditions (e.g., Korpershoek, van der Bijl, & Hafsteinsdóttir, 2011). In general, when people perceive that they have a high degree of control, they exert effort, try hard, initiate action, and persist in the face of failures and setbacks; they evince interest, optimism, sustained attention, problem solving, and an action orientation. When people believe that control is impossible, they withdraw, retreat, escape, give up, or otherwise become passive; they become fearful, depressed, pessimistic, and distressed. In every suite of measures designed to identify social and psychological factors that foretell well-being, thriving, and resilience, research repeatedly accords perceived control a central place among the top predictors.

Perhaps such a productive and exuberant area of research, fed from so many different theoretical and empirical streams, can be forgiven some of the confusion that marked its heyday in the 1980s and 1990s, when more than 100 different control-related construct terms were in circulation (Chanowitz & Langer, 1980; Rodin, 1990; Skinner, 1996; Thompson & Spacapan, 1991). Since that time, it has become standard practice to insert measures of perceived control into studies exploring the predictors of mental and physical functioning and well-being. In fact, it has becomes so commonplace that it sometimes seems that these measures have

become unmoored from their conceptual foundations and are simply acting as placeholders for a general positive mental state. The goal of this chapter is to pull together some of the lessons learned from five decades of research on perceived control in order to secure these constructs more firmly to their conceptual anchors (Lefcourt, 1982, 1992; Strickland, 1989). These lessons, enumerated in Box 13.1, include the nature of perceived control and its essential features and origins, as well as its mechanisms of effects, dynamics, development, and the inherent limitations of theories of control. The 50th anniversary of a seminal publication in the field is an apt occasion to revisit the roots of constructs of control in order to ensure not only the durability of these constructs, but also to preserve

Box 13.1

Seven Guideposts to the Study of Perceived Control Across the Lifespan

1. Perceived control is more than a perception and less than a personality trait; it is an internal working model of apparent reality.
2. The motivational core of perceived control is the need for competence and the experience of generative transmission.
3. Perceived control exerts its effects through motivational, emotional, cognitive, volitional, and neurophysiological pathways.
4. Perceived control is constructed and updated based on interactions with the physical and social world.
5. Because of its feed-forward and feedback effects, perceived control participates in recursive dynamics that can verify and amplify its conclusions over time.
6. Perceived control develops throughout the lifespan, starting with neonates' early detection of contingency and sensitive responsiveness.
7. Perceived control is not the only (or the most important) psychological need.

their richness and complexity, so that work in this area may continue to flourish for many decades to come.

SEVEN LESSONS LEARNED

1. Perceived control is more than a perception and less than a personality trait; it is an internal working model of apparent reality.

Because work on control arose from many different theoretical traditions, it has been conceptualized alternatively as a situation specific perception, an appraisal, an expectation, a generalized expectancy, a causal attribution, an estimate of contingency, an explanatory style, a cognitive construction, a self-system process, and a personality trait. The first lesson learned about perceived control (and all its cognate constructs, like locus of control or self-efficacy) is that it is probably best represented as a naïve internal working model constructed by an individual to map the potentials for control. This map is a cognitive construction built on implicit expectancies grounded in experiences, but it is not composed of "cool" cognitions about statistical probabilities and procedural rules. It comprises emotionally and motivationally "hot" convictions about one's *personal force*, that create an "apparent reality" (Fridja, 1988) full of threats, dangers, challenges, or opportunities to realize one's desired outcomes and to ward off or terminate undesired outcomes.

Perceived control is a complex multi-level system that integrates the many components of control proper that have been identified by researchers over the years. As explained by Lefcourt in 1992:

> Although the authors of these various cognate constructs insist on the uniqueness of their contributions, and draw detailed definitions to disentangle theirs from the terminologies of others, it is evident that there is much overlap in the meanings that are dealt with under these diverse rubrics. Though the foci of certain constructs emphasize the situational determinants of causal beliefs and others are cast more in motivational than in expectancy terminology, there is

> enough commonality among these constructs to have allowed researchers to be stimulated by the convergent findings obtained with their widely divergent methodologies, and it is perhaps due to such convergence that this area of concern has evinced such longevity. (pp. 412–413)

At the outside tip of this system are situation-specific appraisals of "personal control," informing an individual about whether she finds herself in a situation where her actions can be effective in realizing her goals. These appraisals (referred to as perceived control, self-efficacy, expectancies of success, and so on) are an essential contributor to action readiness, and they guide subsequent choice, initiative, effort, strategy selection, and persistence. The actions that the competence system urges, when expressed in a specific context, create an experience of control—that is, of the effectiveness (or ineffectiveness) of that action in producing its desired outcome. In the specific situation, this feedback is interpreted and can lead to reappraisals of control that continue to guide subsequent actions, including decisions to exert more effort, disengage, or withdraw.

Underneath this surface layer of situation-specific appraisals of control are a set of assumptive understandings about control that participate (along with specific information about the particular internal and external conditions of action) in the construction of these changing and dynamic moment-to-moment appraisals. This underground machinery, which also appears to be programed into neurophysiological systems (Maier, 2015), has sometimes been described by researchers as a "style," as in attributional style, explanatory style, or personality style. These assumptive understandings seem to be organized around three themes: (1) causality or contingency; (2) competence; and (3) control.

Contingency. The theme of *causality* or *contingency* refers to beliefs about the causal structure of the world (or domain or situation)—that is, the kinds of causes that are likely to be effective in producing desired and preventing undesired outcomes. The usual suspects include causes that are internal (effort, ability), external (task difficulty, powerful others, bureaucratic systems), impersonal (luck, chance, fate), and unknown.

These have been specified and studied by researchers who focus on locus of control, attributions, causal explanations, action–outcome expectancies, universal helplessness, and means–ends or strategy beliefs. These researchers agree that people's causal appraisals and explanations act as filters that fundamentally shape their control experiences. At the same time, however, investigators continue to argue about the active ingredients responsible for the emotional and behavioral effects of causal beliefs; specifically, about the particular dimensions that underlie these causal categories (e.g., their internality, controllability, stability, and globality).

The queen of all causes seems to be our own actions or efforts. Because individuals have the potential to intentionally deploy, empower, and augment them, actions are considered the source of our *personal force*. Hence, some researchers have argued that it is *contingency* beliefs (i.e., beliefs about whether or not contingencies exist between our actions and desired outcomes) that are the first among equals in the causal hierarchy. From this perspective, beliefs about the involvement of all the other causes are important only to the extent that they shed light on this central question—that is, external locus of control is important because it implies that contingencies between actions and outcomes are low, or an attribution of failure to ability is important because it implies that actions will not be effective.

An important message from research on causal explanations is that, although dimensions (like internal and external) are bipolar, beliefs about causal categories are not (e.g., Connell, 1985). That is, just because someone believes that external forces, like powerful others, are important, it does not necessarily follow that they also believe that internal factors, like effort, are not. Working models of contingency and causality are probably best considered as a *profile* of convictions about the balance of causal forces at work in creating outcomes, focusing especially on whether individual actions play a central role in that mix or are eclipsed by external or uncontrollable factors.

Competence. The next theme, namely, that of competence, suggests an important complement to one's internal working model of the reigning causal order. Specifically, these assumptive understandings focus on

whether an individual believes that he or she has access to the causes that are effective in producing desired or preventing undesired outcomes. Because the queen of causes entails actions or efforts, the queen of competencies refers to whether or not one can produce effective responses; these beliefs have most typically been labeled "self-efficacy," but they have also been studied as perceived competence, perceived ability, agency or capacity beliefs, and personal helplessness. At the same time, however, individuals can have access to categories of causes other than actions—for example, they can believe that they possess high ability, can influence powerful others, or are lucky. If individuals believe that they have access to and can influence "external" factors, many of the problems typically caused by beliefs in external causes can be mitigated, and, in fact, a belief in the importance of powerful others, if these others are seen as benevolent, responsive, and acting on the individual's behalf, can actually augment a sense of personal control (Antonovsky, 1979).

Corresponding to the notion that beliefs about causes are loosely organized to create a causal hierarchy with contingency at its apex, so, too, can beliefs about competence be usefully conceived of as a repertoire of capacities that have effective actions at the apex. It is as if beliefs about causality represent a range of keys on the causal "piano," and beliefs about competence represent one's confidence in being able to play (or operate) those keys when needed. Although action–outcome contingencies and competence to enact effective responses are the central themes in the overall concerto of control (Bandura, 1977), the wider the range of keys and the more keys one can play, the greater one's repertoire of control strategies and capacities, and so the greater one's overall potential to exercise control.

Control. Despite the multitude of constructs hovering around the concept of control, the essential elements of perceived control are relatively straightforward. The prototypical question of control is "Can I influence this important outcome in the direction I desire?" In terms of contingency and competence, this can be restated as "Do I have the capacity to produce the actions that are effective in operating existing contingencies?" (or, in everyday language, "Do I have what it takes to get what I

want?"). As can be imagined, if both contingency and competence are necessary conditions for the expectation of control, then the absence of either one would be a sufficient condition for its loss. So any kind of noncontingency (e.g., because outcomes are based on uncontrollable causes, like powerful others, luck, or chance, or are simply unknown) or any kind of incompetence (e.g., based on perceived lack of will or ability or access to other causes) should undermine control. By the same token, sources of contingency and competence spread out over many agents and means can pile up to create a stronger sense of "personal force" or control. It is important to note that the belief systems underlying control are not rational declarative systems in which contingency and competence are cleanly added or multiplied to yield precise estimates of control. Instead, beliefs are loosely coupled, and generally related as would be expected, with high competence and contingency typically connected to a higher sense of control but not always integrated in the ways logic would dictate (e.g., Skinner, Zimmer-Gembeck, & Connell, 1998).

Complex system. Hence, the system is complex, multi-leveled, and dynamic. Any attempt to assert that one theory of control (no matter how elegant) would be sufficient to depict the entire system will inevitably lead to an impoverished or truncated appreciation of its organization and functioning. Since the *absence* of either contingency or competence leads to the loss of control, any single set of beliefs can be sufficient to undermine control and produce helplessness. However, if researchers are interested in promoting a sense of control, then it would be important to attend to *all* of the system's elements—because each offers a window into a source of potential problems as well as into a source of potential remedies for improving this complex system.

When trying to characterize the whole system, it is also important to note two additional features around which much argument has swirled, namely, the level of specificity and the time course of perceived control. *Level of specificity* refers to whether perceptions of control focus on a situation-specific response, a set of responses in similar situations, a domain of outcomes, or a general pan-domain belief system (Rotter, 1975). *Time course* refers to whether perceptions of control summarize past experiences (e.g.,

retrospective control or causal attributions) or are projected into future experiences (e.g., prospective control or causal expectancies). These distinctions are important for making sense of the scope, strength, and mechanisms of effects. As would be expected, the more situation-specific the beliefs, the stronger their effects on situation-specific outcomes and the smaller the scope of their effects across domains; conversely, the more general the beliefs, the wider the range of their effects and the smaller their effects in particular situations. In terms of time course, expectancies about the future are the proximal triggers of action initiation and persistence, whereas retrospective reconstructions are the filters through which experiences derive their meaning for future encounters.

If complex working models organized around themes of control, contingency, and competence are conceived in systems terms, then it becomes clear that these beliefs are not stored as a fixed library of declarative statements. Instead, they may be better thought of as a simmering brew of hot lived experiences, connected by networks of implicit assumptions that are successively organized into more or less explicit islands that comprise the contours of convictions about control. When called upon by the appraisal of threats or opportunities for control in specific situations, this system (in combination with many others) helps to assemble goals and action readiness that shape all the effects of perceived control that have been so well-documented.

2. The motivational core of perceived control is the need for competence and the experience of generative transmission.

One of the reasons cited for the enduring interest of social scientists in constructs of control is that they seem to mark a place where multiple research traditions converge on a fundamental human concern (Brim, 1992; Lefcourt, 1992). Although these questions have been of interest to philosophers, playwrights, and other students of human nature for many centuries, it was Robert White who, in 1959, brought the essential issue to the field in his now classic paper entitled, "Motivation Reconsidered: The Concept of Competence." Reviewing sources of evidence from multiple areas of research (including animal behavior, child development,

cognitive psychology, psychoanalytic ego psychology, and the psychology of personality), the central argument White formulated was that, counter to the prevailing movements of behaviorism and Freudian psychology, all humans come with fundamental psychological needs, in this case, with the need for *competence*.

This innate need, comprising the desire to be effective in one's interactions with the social and physical environment, motivates and energizes humans from birth to search for and to be attracted to opportunities to make things happen—to be motivated to try out their actions with the goal of creating new and interesting sights, sounds, and other effects; to persist in these efforts in the face of obstacles and challenges; to find this process interesting and fun; and to experience joy when these efforts succeed and dejection when they fail. This motivation is posited to account for the predilection of humans (and many other species) to be curious, to be attracted to novelty, to explore and experiment, to engage with the environment, and basically to insist on figuring out how things work—for the sake of the process itself, that is, based on the joy of exercise and discovery even when no other reward or outcome is forthcoming.

This energetic force is sometimes simply called *intrinsic motivation*, but it is probably better referred to as *effectance* (White, 1959), *competence* (Elliot, McGregor, & Thrash, 2002), or *mastery* (Harter, 1981) motivation, since it seems likely that there are additional intrinsic motives guided by needs other than competence (Baumeister & Leary, 1995; Deci & Ryan, 1985). Although intrinsic motivations are difficult to verify empirically, one indication of their functioning can be found in newborns, who seem to arrive with the capacity and will to detect contingencies between their actions and potential effects in the environment (Rovee-Collier & Cuevas, 2009). Sometimes called *statistical learning* (and basic to both classical and operant conditioning), evidence suggests that newborns have the cognitive capacity (using implicit sensorimotor intelligence) to construct generalized expectations of contingencies, perhaps as early as 8–10 weeks of age (Frankenhuis, Gergely, & Watson, 2013; Rovee-Collier, 1999; Sodian, 2011) or even earlier (Sherman, Rice, & Cassidy, 2015). Infants seem primed to attend to specific kinds of contingencies, namely,

those from interactions that are emotional, social, and connected to infants' own signals and actions (Sherman et al., 2015). Compared, for example, to emotionally neutral object-related "event–event" contingencies, infants prioritize, remember, and act on "hot" action–event contingencies (Frankenhuis et al., 2013)—which are exactly the kind that are relevant to control.

Experiences of control. In general, such interactions can be called *experiences of control*, or experiences of effectance, competence, mastery, or personal force. As I have tried to explain in my earlier writings (Skinner, 1996):

> As opposed to actual conditions (objective control) or beliefs (subjective control), the experience of control refers to a person's feelings as he or she is interacting with the environment while attempting to produce a desired or prevent an undesired outcome. For example, Chanowitz and Langer (1980) distinguished between the description of exercised control ("I can do it") and the experience of exercising control ("I am making it happen"). Experiences of control are products of external conditions (e.g., the degree of contingency between actions and outcomes), subjective interpretations (whether a success is believed to indicate ability or luck; Alloy & Tabachnik, 1984), and individual actions (Chanowitz & Langer, 1980; Skinner, 1985). Prototypical experiences of this sort are referred to in the literature on causal reasoning as "generative transmission" (Shultz, Fisher, Pratt, & Rulf, 1986), in which an individual intentionally exerts effort toward a goal and can feel the energy of the effort transmitted into the environment to produce the outcome. (p. 551)

In addition to anchoring perceptions of control to a strong organismic meta-theoretical base (cf., Bandura, 1986), the notion of control experience helps clear up long-standing confusion in the field about whether control has unequivocally positive effects (Burger, 1989). Researchers have long pointed out that an internal locus of control can be a double-edged sword—when things go well, one can take credit, but when things

go badly, one must also bear the weight of responsibility and self-blame (Christensen et al., 1991). To some extent, this confusion reflects some misunderstandings about the interworkings of the components of control. Clearly the presence of (perceived or actual) contingencies between actions and outcomes is not sufficient to produce beneficial effects, if the person is missing the (perceived or actual) competencies to act on them (Bandura, 1977). In a similar vein, all the (perceived or actual) competencies in the world will not be beneficial if they are operating in a world where these competencies do not lead to desired outcomes. In both these cases, the presence of some of its components does not add up to the presence (or perception) of control. Perhaps surprisingly, even perceived control itself may not always mark an advantageous psychological state. High perceived control can create pressures to act in situations in which an individual may not wish to enact the effective response or to exert the effort; and high perceived control, when acted on in circumstances in which control is objectively low may lead to interactions that highlight the salience of failure, helplessness, and powerlessness.

However, if assumptions about effectance motivation are correct, then *experiences* of control are not only powerful affirmations or determinants of changes in perceived control, but they should also be the one aspect of control that is unequivocally positive. No matter how bleak the objective conditions, the experience that one is improving them should produce beneficial psychological (and physiological) consequences. And people appear to be amazingly adept at creating experiences of control even in seemingly uncontrollable circumstances. For example, research on coping with life-threatening illnesses has shown that people who cannot affect the cause or cure of their medical conditions, nevertheless find ways to influence its course and symptoms, their own emotional reactions to it, and the effects of the disease process on their loved ones and relationships (e.g., Thompson et al., 1993). In fact, researchers have been forced to stop calling such situations "uncontrollable," instead labeling them as "low-control circumstances," to acknowledge the fact that people invariably seem to be able to find *something* to control and then concentrate their efforts on that outcome—as would be adaptive in both creating experiences

of control and in dispatching one's limited energetic resources toward outcomes where they can accomplish the most good.

It may be worthwhile to note some disagreement among theorists as to the best label for the need that underlies the power of perceived control. In general, it may be most useful to think of it conceptually as a need for "effectance," "mastery," or "competence" because these labels focus researchers on innate desires to be effective in interactions with the environment, to master the environment, and to experience oneself as competent to effect desired ends. These are the core experiences that produce feelings of efficacy that, in turn, motivate actions of evolutionary value, namely, learning how to make things happen in one's environment.

The drawback of labeling this motivational system as the "need for control" (which seems like the logical moniker) is that the many broad and indiscriminate meanings of "control" may lead researchers away from its more precise focus on personal force and the capacity to produce desired and prevent undesired outcomes, and take them farther afield into conceptual territory that implies the need for power, dominance, authority, control over others, and other superfluous or misleading connotations. In the developmental literature, some researchers argue that, across age and with socialization influences, early experiences of efficacy, mastery, and control are eventually folded into a larger motivational system, one organized around the need for competence broadly defined (Deci & Ryan, 1985; Elliot et al., 2002; Harter, 1978). In this case, the entire spectrum of control- and competence-related beliefs (e.g., perceived competence), actions, and interactions, taken together with the repertoire of actual developing capacities to which these interactions give rise, may fruitfully be referred to as the "competence system" (Skinner, 1995).

3. Perceived control exerts its effects through motivational, emotional, cognitive, volitional, and neurophysiological pathways.

One of the reasons why the effects of perceived control are so pervasive is that they operate through so many channels. Although different theories emphasize different mechanisms of effects, taken together, they suggest at least five interrelated pathways through which perceptions of

control can shape mental and physical functioning and well-being. The mechanisms that have been documented most widely are *motivational* or behavioral, in which perceptions of control have been shown to support readiness and durability of action, as seen in its positive effects on initiation of interactions, preference for challenge, effort exertion, engagement, determination, persistence, and mastery coping. In the same vein, loss of control (or absence of any of its components) exerts downward pressure on motivation, contributing to passivity, preference for easy tasks, withdrawal, disengagement, escape or flight, maladaptive coping, giving up, helplessness, and burnout. The effects of perceived control are also carried via *emotional* mechanisms. Experiences of mastery or feelings of competence result in enjoyment, optimism, enthusiasm, joy, excitement, pride, and satisfaction, whereas experiences of incompetence or helplessness evoke fear, dejection, discouragement, pessimism, embarrassment, shame, frustration, sadness, and disappointment. These negative emotions are aversive in their own right, and they also sap cognitive and volitional resources in ways that undermine task performance.

Effects are also *cognitive,* in that a sense of control allows individuals to retain access to all their existing higher-order cognitive capacities for use in hypothesis testing, strategy generation, and action regulation, even under increasing levels of challenge and difficulty. Lack or loss of control can have the opposite effect, resulting in cognitive confusion and loss of previously demonstrated capacities to generate strategies, test hypotheses, and detect contingencies. According to information processing accounts of learned helplessness, prolonged exposure to noncontingency, because it leads to protracted cognitive effort without any cognitive gain (i.e., progress toward a solution), can eventually result in cognitive exhaustion, defined as generalized impairment of constructive and integrative mental processing and complex problem-solving (e.g., Kofta & Sedek, 1998). Exposure to uncontrollable events has also been found to produce *volitional or functional* deficits (e.g., Kuhl, 1984), which occur when noncontingency triggers a state orientation—defined as a condition in which attention and cognitive activities are focused on the present, past, or future state of the organism. These task-irrelevant thoughts have been found to interfere with

the kind of cognitive processing needed for optimal performance on challenging tasks. Experience with contingent events, in contrast, tends to support an action orientation, in which attention and cognitive capacity are fully focused on generating action alternatives, selecting next strategies, and monitoring the effects of successive efforts.

Some of the most interesting recent research in the area investigates the *neurophysiological* mechanisms through which (un)controllablity exerts its effects (Maier, 2015). Relying largely on animal models, this research follows up on the well-established phenomenon of "learned helplessness," in which exposure to noncontingent aversive events produces subsequent behavioral deficits even in contingent situations (e.g., failure to learn contingent responses, immobility, exaggerated fear conditioning, impaired fear extinction, anxiety, fear of novelty, and other signs of stress; Maier & Watkins, 2005). This newer program of study investigates *immunization* effects, in which exposure to exactly the same set of noxious events when stressors are controllable not only completely blocks these behavioral deficits concurrently, but also prevents these same deficits in future encounters with stressors that actually *are* uncontrollable (Maier & Watkins, 2010).

As reviewed by Maier (2015), these studies show that experience with stressors that are controllable activates the (corticostriatal) act/outcome learning circuit, which subserves the detection and analysis of the kinds of contingency information needed to appraise and act on controllable events. This circuit then engages parts of the prefrontal cortex that exert top-down inhibitory control on stress-responsive brainstem and limbic structures that would otherwise trigger the negative physiological and behavioral responses produced by uncontrollable adverse events. Interestingly, both the occurrence of adverse events *and* the processing of control experience by the act/outcome circuit seem to be necessary to program enduring trans-situational "immunization" effects, in which this top-down inhibitory system is consistently activated in response to subsequent stressors, even if these new events are uncontrollable and quite different from the original controllable events, thereby blunting their impact and promoting stress resistance.

These cascades of physiological, psychological, and behavioral effects of control are consistent with the notion that experiences of control are fundamental to human functioning and well-being. In fact, exposure to uncontrollable adversity is one of the few classes of negative life events that researchers can agree are universally stressful. The effects of prolonged uncontrollability reverberate throughout the neurophysiological stress reactivity system, as seen in elevations of stress hormones, blood pressure, and inflammatory responses, as well as in impairment of immune functioning and deterioration of the brain structures responsible for memory and learning. In fact, early exposure to chronic adverse events (including especially harsh, unpredictable, and uncontrollable parenting) seems to cumulatively program neurophysiological development, tipping systems toward hyperreactive monitoring of threat, exaggerated anxiety and fear reactions, and chronic activation of the endocrine system (Lupien, McEwen, Gunnar, & Heim, 2009). On the positive side, research on immunization suggests that interactions with challenging and controllable events in enriched environments also program the development of the brain, but along a healthier pathway, not only protecting individuals from the deleterious consequences of potentially stressful aversive events, but also buffering them against the effects of future encounters with uncontrollability.

4. Perceived control is constructed and updated based on interactions with the physical and social world.

If an individual's "internal working model" depicting the potential for control (along with available contingencies and capacities) is going to be adaptive, it must be experience-based. That is, control beliefs should initially be constructed from the actual interactions individuals experience with social partners and physical objects in their proximal environments. This is seen most clearly in research during early infancy, which shows that newborns are able to recognize and respond to sensitivity from their caregivers and begin to construct rudimentary implicit appraisals of the extent to which caregivers are responsive to their expressions of distress and other signals (Sherman, Rice, & Cassidy, 2015). Experiences

of contingent responsiveness contribute to subsequent generalized expectancies of control (Frankenhuis et al., 2013; Rovee-Collier, 1999; Watson & Ramey, 1972). These early generalized expectancies are posited to be constructed as "running totals," but also to be available for continuous updating or revision based on subsequent experiences.

Such an account may seem to imply that perceived control is really more like a situation-specific calculation that corresponds exactly to current conditions—and so can vary wildly from moment to moment and event to event. However, starting in the earliest days, these control experiences reach in to shape the development of newborns—their actions, the quality of their engagement with caregivers, and the implicit pictures they are creating of the world into which they were born. In fact, the earliest experiences of caregiver sensitivity (which are at the root of a sense of control) seem to program "experience-expectant" neurophysiological systems to function in concert with a safe and predictable environment, in a process known as *social buffering of stress reactivity* (Hostinar, Sullivan, & Gunnar, 2014). As a result, infants with high generalized (and largely implicit) expectancies of control soon differ from those who experience the world as unresponsive and unpredictable, not only psychologically, but also neurophysiologically. The calmer biology of the stress-buffered infant creates a different platform for interacting with the social and physical worlds. Moreover, this biobehavioral readiness to engage constructively with new and interesting people and things leads to more opportunities to deal with challenging events—which are precisely the experiences that have been found to "toughen" or "steel" individuals in dealing with future stressful encounters.

By the time children's representational capacities come fully on line at the end of the second year of life, resulting in the recognition and representation of a sense of self, they have behind them literally hundreds of thousands of control experiences. These experiences have been generated partly by the child's own goals and behaviors during interactions with people and objects, and the meaning of these experiences has been filtered though the child's initially implicit understandings of control, combined with interpretations offered by caregivers as the child becomes better able

to communicate using language. These interlocking implicit and explicit components of the competence system enable and constrain children's actual experiences of control as well as the messages that they take away from such experiences. Over time, based on this history of objective and subjective control, children's views take on the character of "apparent reality"—creating a durable picture of the world's causal structure and of the role of their own personal force in shaping the events that matter in their lives.

5. Because of its feed-forward and feedback effects, perceived control participates in recursive dynamics that can verify or amplify its conclusions over time.

Perceived control, through all the mechanisms described previously, reaches into the future and shapes individuals' actions, the quality of their engagement, and their actual effectiveness in producing desired and preventing undesired outcomes. These interactions in turn feed back into individuals' internal working models of the potentials for control. As can be imagined, because control experiences are shaped by the very actions that are being directed by control expectancies, these feedback loops have the potential to create a recursive dynamic (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Skinner, 1991, 1995). People who initially expect to be able to exert control are attracted to and select challenging opportunities; they engage with vigor and enthusiasm; they concentrate on the task at hand, attending to and learning from both success and failure; they persist when the going gets tough and try out a variety of constructive ways of coping that expand their options for effective action, including strategizing, information seeking, help-seeking, and negotiation. As a result, they learn more from challenging encounters and, win or lose, build a repertoire of more effective actions and coping strategies. In other words, they become objectively more competent, and so cement their underlying confidence and expectations for control.

In contrast, people who initially doubt their capacity for control tend to avoid difficult tasks or to engage in them half-heartedly, exerting little or no effort, wasting cognitive resources on anxiety and misgivings, and distracting themselves from a focus on the task; they withdraw at the first

sign of problems, preferring to retreat or escape; they show patterns of maladaptive coping, like confusion, rumination, or helplessness that interfere with constructive reengagement with the stressful situation. As a result, they do not benefit from encounters with challenge and difficulty; they forgo opportunities to learn or gain new capabilities. Over time, they become less and less competent objectively. These experiences of failure cement their feelings of incompetence and an external locus of control.

This dynamic, in which those "rich" in mastery and competence become "richer" over time whereas those initially "poor" in confidence become even "poorer," likely contributes to the durability and power of perceived control and self-efficacy. Because the beliefs about control, contingency, and capacity that make up the competence system are internal working models, they tend to are—*in principle*—open to disconfirming experiences. That is, in principle, they are plastic and can be reworked. However, *in practice*, because they generate their own confirming experiences, they are not likely to encounter disconfirming evidence in the normal course of events. Moreover, it turns out that many stressful encounters are murky or ambiguous in nature. As a result, an important determinant of whether stressors will be experienced as controllable or uncontrollable depends on how they are appraised or interpreted (Folkman, 1984). Even obvious successes can be discounted by attributing their occurrence to powerful others, luck, or chance.

In fact, causal concepts like ability and competence are inherently *inferential*, requiring high performance on difficult tasks with little effort where others fail. Few experiences of success provide unambiguous evidence of this kind of control or competence, especially after children develop the capacity to generate complex cognitive inferences about causes—for example, about the inverse compensatory relationship between effort and ability (Nicholls, 1984), which allows them to infer that performances that require high effort provide evidence of low ability. This insight has led motivational researchers to focus on individuals' conceptions of ability as an anchor of the competence system and as a key lever of change.

In her groundbreaking program of research on learned helplessness, achievement goals, and conceptions of ability, Carol Dweck (1999, 2006) has articulated a first principle of working models of potential control, namely, people's assumptions about the nature of the "personal force" that is exerting control. One option is a conception of "ability" entailing the characteristics ascribed by our culture: as a fixed entity of a certain size which, if it is large, we are in charge of proudly demonstrating whenever possible; or, if it is small, we are in change of preventing its embarrassing exposure. Such a "fixed mindset" leads to all the disadvantages connected to low perceived control; in order to look smart and avoid revealing low ability, individuals sidestep challenges, give up easily in the face of obstacles, see effort as worthless or as signaling a lack of ability, avoid or defend against potentially useful negative feedback, and feel threatened by the success of others.

A second option is to continue to view competence in the same way that most young children do, namely, as an undifferentiated amalgam of "personal force" that combines a positive synergy between inherently intertwined efforts and abilities. This kind of "growth mindset" assumes that competence develops and expands through effortful application, practice, and diligence, and so we are in charge of improving and making progress in our competencies. This leads to a focus on mastery and the desire to learn, and it emboldens individuals to embrace challenges, to persist in the face of setbacks and obstacles, to see effort as the pathway to development, to seek and learn from criticism, and to find lessons and inspiration in the success of others.

6. Perceived control develops throughout the lifespan, starting with neonates' early detection of contingency and sensitive responsiveness.

Any claim that perceived control exerts its effects across the lifespan must immediately be followed by a relatively large disclaimer—it turns out that there is not yet a robust literature systematically documenting developmental changes in how perceived control is organized and functions (Elliot et al., 2002; Flammer, 1995; Skinner, 1991, 1995; Weisz, 1986). In fact, the overwhelming majority of studies target individual differences,

and even when studies do mention "development," the issues on which they focus typically involve the *origins* of these individual differences (i.e., where they come from and the kinds of antecedent experiences that lead people to construct different kinds of internal working models of control).

For a developmentalist, however, the questions central to a developmental account of perceived control focus not only on how individual differences in developmental trajectories are created and maintained or deflected, but also how normative developmental changes produce age-graded transformations in the functioning of the competence system. These include developmental changes in the experiences that contribute to a sense of control, in the causal reasoning that interprets experiences into beliefs, in conceptions of the causes used to explain control experiences (like ability, chance, luck), and in the nature of the self to which control is attributed. Amidst all these changes, however, some constants can be identified, namely, the power of the sense of control to launch action and the unfailingly positive effects of experiences of control.

A lifespan view on control attempts to draw these developments together (e.g., Heckhausen & Schulz, 1995; Rothbaum, Weisz, & Snyder, 1982; Skinner, 1995). One way to think about them wholistically is to conceptualize the development of control during childhood as the progressive realization of the limitations of one's own competence. As children's causal reasoning and conceptions of causes become more differentiated and realistic with age, the toddler's global undifferentiated sense of agency is distinguished from the efforts of other people and the power of his or her own longings and wishes; it becomes successively bounded by an appreciation of the nature of task difficulty and the understanding that chance is not under personal control; and it is humbled by inferences about one's own capacities that now include progressively more challenging normative demands and comparisons to other children's accomplishments.

Adulthood, in contrast, can be conceptualized as a time of increasing recognition of the boundaries of "contingency": a realization of the limits of human control and the narrow range of outcomes that can potentially

be influenced by human action. Adults come to realize that society imposes decisive constraints on the people and competencies that will be rewarded, that history changes contingencies even within our lifetimes, that chance and fate play key roles in all of life's successes and failures, that even our own abilities are to some degree a matter of luck, and that the really important outcomes—death of self and loved ones—have always been out of human control.

Hence, the essential developmental questions for childhood and adulthood can be juxtaposed. During childhood, how can children maintain a sense of control in the face of the developing realization of the limits of their own competence? And, during adulthood, how can people maintain a sense of control in the face of the developing realization of the chaos of the world? The answers to these questions may be complementary. In childhood, children are able to maintain a sense of control only if conceptions of omnipotence are replaced by a view of "personal force" that binds together effort and ability and sees them as highly plastic capacities that can grow with effort, practice, and effective strategies. The construction of this view requires all the social supports needed to develop actual competencies as well as the pervasive experience of effective interactions with the social and physical world, scaffolding that offers good tactical suggestions, and interpretations that maintain focus on the task and approaches to mastering it. If children do not have these experiences, if they do not develop a growth mindset and real competencies, omnipotence is replaced by the development of helplessness.

This efficacious self is a crucial resource that allows adults to meet the increasingly chaotic world and continue to maintain a sense of control. "Coping" is one label for how people create and find control even in aversive circumstances, re-establish control that has been challenged or lost, and, in so doing, discover and nurture a more competent self (Aldwin, 2007). Accommodative processes encompass ways to divert or minimize the harm that comes from losses of control. The resilient competence systems that result from successfully utilizing these processes are ones in which people basically apply the wisdom of the Serenity Prayer: They

acknowledge the forces of powerful others, society, and chance, but do not doubt the strength and efficacy of the self and its allies, and they maintain grace and optimism so that, whatever unexpected events may befall them or their loved ones, they can (eventually) deal with them in ways that allow them to both withstand losses and cherish what remains, and so craft deeply satisfying lives.

7. Perceived control is not the only (or the most important) psychological need.

Perhaps it is no longer so essential, now that perceived control is not the dominant player in research on motivation, coping, and the self, to explicitly acknowledge the limitations of control constructs. Perhaps today it goes without saying that estimates of control are not the only appraisals that matter in stressful situations; that a sense of control is not the only social cognition that shapes initiation, engagement, and persistence; and that loss of control is not the only injury that creates discouragement and sadness. As attachment theory has been extended across the lifespan and as self-determination theory has found widespread acceptance, it is clear that needs for belonging (Baumeister & Leary, 1995) and autonomy (Deci & Ryan, 1985) are equally fundamental as sources of motivation and as supports for physical and mental functioning and well-being.

To be sure, there are still a few last remnants of the field's preoccupation with control, as can be seen in efforts to clarify the proper conceptualization of "secondary control" and to pull research on accommodative processes out from under the umbrella of control and into the aegis of autonomy where it has always belonged (Brandtstädter & Renner, 1990; Morling & Evered, 2007). Clarifying the edges and limits of control is very helpful to the study of its effects and to the study of its interactions with other needs and other kinds of perceptions and internal working models (Deci & Ryan, 1985; Connell & Wellborn, 1991; Skinner, 1996).

The identification of multiple powerful belief systems allows researchers to begin to examine the synergies and tradeoffs among important human commitments and how individuals negotiate among them when

dealing with stressful events or situations in which they are pitted against each other. Our research participants have always known that there are more options for coping with difficult life events than effortful exertion and strategic problem-solving (aka primary control) or giving up and relinquishing control (aka helplessness) (Rothbaum et al., 1982). It would be handy if control researchers would also consider an expanded range of ways of dealing with obstacles and setbacks, including information seeking, instrumental or emotional support seeking, negotiation, willing acceptance, positive reappraisal, distraction, and so on (Aldwin, 2007), even if these ways are not predicted primarily by control, but instead by a sense of belonging or autonomy. In interventions to improve functioning and well-being, the broader and more flexible the repertoire of coping that can be achieved, the better (Cheng, Lau, & Chan, 2014).

FUTURE DIRECTIONS FOR RESEARCH ON PERCEIVED CONTROL

Three areas important to future research on control entail the study of the dynamics, the development, and the intentional optimization of the competence system. The *dynamics* of perceived control refer to the simultaneous study of its feed-forward and feedback effects and how, together, these create cycles that can be self-amplifying (i.e., virtuous or vicious circles) or self-compensating (e.g., when people respond to losses of control by seeking out aspects of the situation where they can have a positive impact). Most investigations in the area focus on the ways that control appraisals shape subsequent motivation, emotion, or coping, but they do not follow these actions into future episodes in order to capture the effects of these experiences on subsequent estimates of control. Studies that capture the entire cycle of functioning of the competence system are rare, but those that do begin to provide pieces of the puzzle that we have not seen before. One strategy that may be helpful in capturing episodes of control is the use of intraindividual time-series designs (e.g., Miró, Martínez,

Sánchez, Prados, & Medina, 2011; Neupert, Almeida, & Charles, 2007; Ong, Bergeman, & Bisconti, 2005; Schmitz & Skinner, 1993). Such daily-diary–type studies have been very useful in "looking under the hood" to discover how perceived control functions in helping people deal with challenging tasks or stressors, and how the outcomes of these efforts feed back to shape subsequent perceptions of control.

Interventions to Improve the Competence System

Research on perceived control suggests a host of intervention levers for improving individual mental and physical health and functioning. However, the yields from these interventions have not always been as great as would be expected. One strategy for improving their impact might be to shift the target of interventions away from simply trying to boost effort (and change attributions of failure to lack of effort) and to refocus more clearly on optimizing participants' "experiences of control." These experiences are admittedly complex, in that they involve "the accumulation of action-outcome episodes that accrue from an individual's actions in a set of objective control conditions that the individual interprets according to his or her subjective control beliefs" (Skinner, 1996, p. 560). However, because experiences of control are at the core of explanations for why objective and subjective control have such powerful effects across the lifespan, it can be argued that improving them should be the target of interventions designed to enhance functioning by fostering a sense of control. Such programs will only be effective to the extent that they actually improve and sustain experiences of control.

For example, this optimization strategy can be fruitfully applied to research in schools, where educators have been understandably eager to help cultivate the development of a "growth mindset" in their students. In this work, there has been some confusion about the messages and experiences that can best accomplish this goal (Dweck, 2015). Just as early attempts made in attributional retraining studies during the

1980s aimed at promoting a sense of control, educators can easily overemphasize their messages focused on the power of effort, essentially encouraging students to "try harder" and to attribute failures to lack of effort. If these messages lead to high levels of exertion with no appreciable gain in academic performance, they can backfire and convince students that their efforts are useless (e.g., Schmitz & Skinner, 1993). Dweck and colleagues (e.g., Paunesku et al., 2015) emphasize students' task-focused search for effective strategies as the intervention most likely to create experiences of competence, progress, and control (for other work aimed at identifying effective strategies, see also research on self-regulated learning and academic achievement; e.g., Winne & Nesbit, 2010; Zimmerman & Schunk, 2011).

Developmental Transformations

The competence system of the newborn does not resemble that of the one-year-old or the toddler or the young child. It begins as a system that is completely dependent on caregivers to deal with the neonate's every need, and, in three short years, it is transmuted into a system that is part of the walking, talking, neurophysiologically reorganized young child's self, guided by an agent who not only wants to but is able to strategize, problem-solve, and reach many goals independently and is beginning to self-regulate its own emotions and actions. From the first days, the motivational engine of the system is visible in infants' interest and insistence on engaging the world of people and objects, and in its capacity and will to learn all about the contingencies and affordances available there. We see incontrovertible evidence of qualitative transformations in these systems in the everyday lives of our children and ourselves, but we still know little about how these developments, and the ones that follow, are accomplished. Future research that explores this terrain will be helpful in guiding interventionists in the creation of programs designed to prevent and ameliorate helplessness and to promote confidence, efficacy, and the development of actual competence.

CONCLUSION

In looking forward to the next 50 years of research on locus of control and its control-related progeny, it may be useful for investigators to take to heart the lessons learned collectively over the past several decades. These include the notion that working models of the potentials for control include both naïve constructions of the causal structure of action–outcome contingencies as well as understandings of competencies and access to other causes. However, these are all anchored by convictions about one's own personal force and experiences of making things happen. These beliefs entail hot potent convictions that are more than situation-specific perceptions but less than traits. They achieve their status as arbiters of "apparent reality" based on the hundreds of thousands of previous interactions that give rise to them, and they achieve their durability by contributing to subsequent experiences that tend to confirm or amplify their sentiments.

Control (both actual experiences of control and a sense of control) exerts a cascade of biological, psychological, and behavioral effects, starting in the first days of life, and continuing to shape motivation, emotion, cognition, volition, and neurophysiological reactions throughout the lifespan, but how it is constructed and expressed is systematically transformed over development, showing regular age-graded shifts in its organization and functioning. Perceived control is the potent tip of the iceberg that is the powerful competence system. As pointed out by leaders in the field, our enduring interest in control reflects its status as a fundamental human concern and as a powerful source of both energy and despair (Rotter, 1990). If researchers can continue to approach its conceptualization and study with the richness and complexity it merits, we may turn out to be deserving beneficiaries of the legacy to which Julian Rotter's pioneering efforts have continued to contribute.

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