Social Cognition and Health

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Abstract

The mutual influence between social cognition and health psychology has been profitable for both fields. Research on health attitudes and health behavior change has flourished with the insights provided by social cognition and social cognitive neuroscience. Stress and the ability to cope with it depend critically on cognitive construals. Psychological resources, such as optimism, mastery, and self-esteem, as well as insights from the self, including self-affirmation, have origins in social cognition and have been shown to affect both psychological and biological outcomes, with implications for health. Social relationships and the support they provide have been established as the strongest psychosocial predictors of health and mortality, yet it is the cognitive and emotional construal of support and not necessarily its reality that often show these outcomes. In recent decades, intergroup relations, including racism and prejudice, have absorbed many social cognition researchers, and health psychology perspectives have begun to uncover the health implications of such destructive beliefs and behaviors. Even pain management has profited from recent work in social cognitive neuroscience, showing the overlap between physical and social pain. Where the fields are headed and potential future points of intersection are described.

Social cognition addresses how people make sense of the world, the events that befall them, other people, and themselves (Fiske & Taylor, 2008). It also characterizes the underlying conscious and unconscious processes by which these constructions occur and change over time, focusing on cognitions, affective processes, and corresponding patterns of brain activation. Health psychology is a relatively new field devoted to understanding psychological and social influences on how people stay healthy, why they become ill, and how they respond when they do get ill. As will be evident in the forthcoming sections, these processes depend critically on how people construe their environments, the stressfulness of the events they encounter, the people around them, and their own role in these processes. Thus, there is a natural marriage between social cognition and health psychology, because social cognition gives structure and analytic focus to how health-relevant processes unfold over time and the psychological factors that influence health. But the direction of influence does not flow solely in one direction. Certain aspects of health psychology actually predated their corresponding developments in social cognition and gave rise to some of the earliest insights to the field, such as the importance of psychological control for good psychological and physical adjustment. Consequently, the exchange has always been a two-way street and will likely continue to be so.

This chapter addresses the areas in which the mutual influence between social cognition and health psychology has been most evident and profitable. It begins with research on health attitudes and health behavior change, including insights that have been provided by social cognitive neuroscience. We address stress and coping, the processes by which people perceive events to tax or exceed their resources and manage the demands of the environment; these processes depend critically on cognitive construal. We examine the psychological resources that enable people to manage stress more successfully, including optimism, mastery, and self-esteem,

as well as other insights that research on the self, including self-affirmation processes, has provided. Social relationships and the support they provide are the most important psychosocial resources that people possess, but it is the cognitive construal of support from others that is critical to these benefits.

Social cognition research has importantly addressed culture in recent decades, which is having an impact in health psychology. Intergroup relations, including racism, prejudice, and discrimination, have been a central feature of social psychology generally and social cognition research as well, and increasingly, researchers are understanding the health implications of these problems. Few topics in health psychology are more significant than the management of pain, and social cognition has proven invaluable to understanding when and how people experience pain and what its consequences are. The chapter concludes with a brief discussion of where the fields are headed and what points of intersection might be anticipated in the future.

Health Attitudes and Health Behavior Change

Health behaviors are central to the field of health psychology. In the past century, patterns of diseases in the United States have changed substantially, with a decrease in acute, infectious disease, due to treatment innovations and changes in public health standards, and an increase in what have been called the preventable disorders, including the chronic diseases of cardiovascular disease, lung cancer, alcohol and drug abuse, and vehicular accidents. The leading causes of death in the United States, namely heart disease, cancers, and stroke, are all heavily influenced by health habits. Health psychology addresses how health habits develop, why people practice health habits that threaten their health and mortality, and how people can be induced to change their health habits (Taylor, 2012). Health habit change has assumed increasing urgency, as it has become clear that health disparities due to social class, race, and ethnicity do not appear

to be due primarily to disparities in access to health care, but to disparities in health habits (House, 2012).

Social psychology has always been the primary impetus for constructing persuasive communications designed to change poor health habits. From the very earliest work on fear appeals (Janis, 1958; Leventhal, 1970) to current work using fMRI to understand processes underlying behavior change, the technology of attitude change has been an inspiration for health psychologists. The rationale underlying the early work is that if one can alert people to health risks and raise their level of concern, one can motivate them to change their behavior. Approaches to changing health attitudes and behavior continue to draw on these insights, especially those guided by the health belief model (Rosenstock, 1966), the protection motivation model (Rogers, 1975), and the theory of planned behavior (Ajzen, 2002).

The central role of social cognition to these models is particularly well-illustrated by Ajzen's theory of planned behavior (Ajzen & Madden, 1986; Fishbein & Ajzen, 1975). According to the theory, a health behavior is the direct result of a behavioral intention. Behavioral intentions are themselves made up of three components: attitudes toward a specific action, subjective norms regarding the action, and perceived behavioral control. Attitudes toward the action stem from beliefs about the likely outcome of that action and evaluations of those outcomes. For example, people who believe that sunscreen will reduce their risk of skin cancer will have favorable attitudes towards using sunscreen. Subjective norms are what a person believes others think that person should do (normative beliefs) and the motivation to comply with those normative beliefs. Believing that others think one should use sunscreen and being motivated to comply with those normative beliefs would further induce a person to practice sunscreen use. Perceived behavioral control occurs when a person feels able to perform the

health behavior and believes that the action undertaken will have the intended effect. These factors combine to produce a behavioral intention and ultimately behavior change.

Ajzen's theory of planned behavior has been the most influential recent theoretical approach to understanding health behaviors for several reasons. First, it provides a model that links social cognitions directly to behavior. Second, it provides a fine-grained picture of intentions with respect to a particular health habit. Third, it predicts a broad array of health behaviors, including condom use, sunscreen use, use of oral contraceptives, among many other health behaviors, as well as the intention to change health behaviors (Ajzen, 2002; Taylor, 2012). And finally, it provides guidelines for the development of interventions to change health habits, as by targeting particular cognitions for modification.

Despite the success of theories that link beliefs to the modification of health habits, these approaches have some limitations. Attitudinal approaches are not always successful for explaining spontaneous behavior change, nor do they necessarily predict long-term behavior change. Moreover, communications designed to change people's attitudes about their health behaviors sometimes evoke defensive or irrational processes. People may perceive a health threat to be less relevant than it is (Liberman & Chaiken, 1992), they may falsely see themselves as less vulnerable than others (Clarke, Lovegrove, Williams, & Macpherson, 2000), and they may seem themselves as dissimilar to people who have succumbed to a particular health risk by virtue of practicing the same health behaviors (Thornton, Gibbons, & Gerrard, 2002). Continuing to practice a risky behavior can, itself, sustain false perceptions of risk, inducing a sense of complacency (Halpern-Felsher et al., 2001). Moreover, thinking about adverse outcomes such as disease can produce a negative mood (Millar & Millar, 1995), which may feed back into ignoring or defensively interpreting risk-related information. Thus, affective processes are also

key to understanding health behaviors and behavior change. Although traditional approaches to changing health attitudes have emphasized augmenting perceptions of fear, threat, and risk, making people feel good rather than bad may help them to confront threats more realistically. For example, as will be described shortly, research on optimism (Aspinwall & Brunhart, 2000) and on self-affirmation processes (see Sherman & Cohen, 2006) indicate that a shoring up a sense of self can make people more receptive to personally relevant risk-related information.

Implicit, Automatic Cognition and Behavior Change

Historically, efforts to change health behaviors have emphasized conscious verbal processing. However, an important distinction within social cognition research is that between controlled and automatic processing. People can rely on effortful cognitive processes or alternatively on relatively automatic processes, depending on the situation and motivational demands. This dual processing approach has had a profound impact on a broad array of specific topic areas in social cognition (Fiske & Taylor, 2008). Typically, people do not consciously choose between automatic and controlled processes, but rather alternate between the two as it becomes necessary to meet the demands of the environment.

However, in keeping with this distinction, a general limitation of health behavior change models is the fact that they heavily emphasize conscious deliberative processes in practicing health behaviors; there is an important role for implicit automatic processes as well (Bargh & Morsella, 2008). Perhaps the most obvious example concerns health habits that are accomplished automatically in response to a minimal cue. One finds oneself walking the dog after breakfast, because that is what happens after breakfast. Putting seatbelts on automatically upon entering one's automobile, brushing teeth at the same times every day, and for some people, even putting

on sunscreen, may all be habits that occur not because of conscious deliberate processes, but instead due to environmental or internal cues that automatically prime the behavior.

Moreover, although models such as the Theory of Planned Behavior predict behavioral intentions, they do not necessarily bridge the gap to behavior. A theoretical model that emphasizes implementation intentions (Gollwitzer, 1999) integrates conscious processing with automatic behavioral enactment nicely, with important implications for health (Gollwitzer & Oettingen, 1998). When a person desires to practice a health behavior, it can be achieved by making a simple plan that links critical situations or environmental cues to goal-directed responses. (For example, "when I finish breakfast, I will take out the dog's leash and walk her"). Forming an explicit implementation intention can delegate the control of such goal-directed responses to the situational cues (e.g., completing breakfast), which may then elicit automatically the action of taking out the leash and walking the dog. Over time, the link from the implementation to the goal-directed response becomes automatic and need not be brought into conscious awareness to be enacted. Considerable evidence supports the idea that changes in intentions leads to changes in behavior, as, for example, condom use and cervical cancer screening (Sheeran & Orbell, 2000; Sheeran & Webb, 1998).

Recently, research using fMRI has found that some successful health behavior change that occurs outside of awareness can be reflected in patterns of brain activation. In a recent investigation (Falk, Berkman, Mann, Harrison, & Lieberman, 2010), participants were exposed to persuasive messages promoting sunscreen use. Those who showed significant activation in the medial prefrontal cortex (mPFC) and posterior cingulate cortex (pCC) in response to the messages showed behavior change in their sunscreen use. Most important, although individual differences in behavior were weakly predicted by participants' behavioral intentions to use

sunscreen, activity in mPFC and pCC accounted for an additional 25% of the variance in behavior, on top of that explained by self-reported attitudes and behavioral intentions. In other words, processes apparently not accessible to consciousness nonetheless significantly predicted the health behavior of sunscreen use.

What this pattern means is not yet fully known. One possibility is that activity in mPFC and pCC signals behavioral intentions at an implicit level that is not consciously accessible (Falk et al., 2010). Alternatively, activity in mPFC may reflect self-referential processes and be related to behavior change primarily because participants have linked a persuasive communication to the self (cf., Chua, Liberzon, Welsh, & Strecher, 2009). Consistent with this idea, persuasion efforts that successfully modify a person's sense of self appear to be most successful in modifying behavior and helping people form specific behavioral intentions (Rise, Sheeran, & Hukkelberg, 2010).

Social cognition research on attitude change has, thus, been one of the first sources of influence on health psychology, and it is also one of the most enduring. As the origin of the very earliest models for understanding health behaviors and impetus for interventions to bring about health behavior change, it continues to provide insights for both understanding and changing health behaviors.

Message Framing and Cognitive Biases

Much theory and research in social cognition has been devoted to understanding biases in human thought and the ways in which these may be addressed through message framing. This lesson has been imported to health psychology, where it has been employed fruitfully to address health behaviors. Specifically, health messages can be framed in terms of gains and losses. For example, a reminder to use sunscreen can emphasize the benefits of sunscreen to appearance, or

alternatively emphasize the costs of not using sunscreen (e.g., McCaul, Johnson, & Rothman, 2002). The research thus far suggests that messages that emphasize potential costs may work better for inducing people to practice health behaviors that have uncertain outcomes, whereas messages that emphasize benefits may be more persuasive for behaviors that have certain outcomes (Apanovitch, McCarthy, & Salovey, 2003). Recommendations regarding exactly how to take action increase effectiveness as well (McCaul et al., 2002).

Messages are differentially effective depending on how they are framed vis à vis a person's own psychological orientation. People who have a BAS (promotion or approach) orientation that emphasizes maximizing opportunities are more influenced by messages that are phrased in terms of benefits ("Sunscreen will protect your skin"), whereas people who have a BIS (prevention or avoidance orientation) that emphasizes minimizing risks are more influenced by messages that stress the risks of not performing a health behavior ("Not using sunscreen increases your risk of skin cancer") (Mann, Sherman, & Updegraff, 2005).

The study of errors and biases and their effects on psychological functioning has come not only from social cognition research, but also from health psychology. In 1983, Taylor (1983) developed a theory of cognitive adaptation, in which she argued that following a major health threat, people may develop "positive illusions," that is, illusions that protect them psychologically from the threats they face and enable them to cope and make progress toward restoring good psychological functioning. Taylor (1983) maintained that these cognitions center around the making of meaning, mastery, and self-enhancement. Subsequently, Taylor and Brown (1988) developed a more general model of social cognition suggesting that unrealistic optimism, an exaggerated sense of personal control, and self enhancement not only characterize people's responses to intensely threatening events, but may commonly be found in normal, everyday

thought. They argued that rather than being maladaptive, these mild, positive distortions are associated with the criteria indicative of mental health, including a positive sense of self, the ability to make progress toward goals, the ability to deal effectively with threats, the capacity for developing and maintaining positive social relationships, and other criteria associated with mental health. Subsequently, Taylor and colleagues (2003) found that these positive illusions were associated with lesser biological reactivity and lower baseline levels of stress hormones, suggesting that they may have protective benefits on health (Taylor, Lerner, Sherman, Sage, & McDowell, 2003). As such, the work on positive illusions has come full circle: Originating in observations from the health domain, it led to a full-blown theory in social cognition, which has generated many dozens of studies, yielding findings suggestive of biological buffering by exaggerated positive cognitions that has fed back into health psychology theory and research.

As knowledge about the errors and biases associated with normal thinking becomes widely dispersed (e.g., Kahneman, 2011), the construction of health communications as well as research on how people think about their health and illnesses will increasingly be influenced by this body of work.

Stress and Coping

Psychologists have been studying stress and its impact on psychological and physical health for decades. Stress is a negative emotional experience accompanied by predictable biochemical, physiological, cognitive, and behavioral changes, typically directed toward either altering the stressful event or accommodating to its effects (Baum, 1990). Distractibility and the inability to concentrate, disruptions in performance on other cognitive tasks, and intrusive, repetitive, or morbid thoughts in response to stressful events may also occur and reflect the fact that stress and efforts to cope with it can create cognitive load or overload, thus diminishing

cognitive resources for other tasks. Emotional responses such as fear, anxiety, embarrassment, anger, or depression may also contribute to these processes, prompting, for example, rumination over stressful events (e.g., Glynn, Christenfeld, & Gerin, 2002). Although researchers initially focused on specific stressful events, such as money problems, issues related to work, and family responsibilities, it has become clear that how a person construes events critically determines how much stress that person will experience.

Coping is defined as action-oriented and intrapsychic efforts to manage stress. For many years, coping was a vague term that referred to the many efforts that people undertake to deal with stressful events. But 1964 marked the beginning of theory to formalize psychological understanding of the stress and coping experience. This theoretical approach focused on psychological appraisal processes. In a classic study by Speisman and colleagues (Speisman, Lazarus, Mordkoff, & Davidson, 1964), college students viewed a gruesome film depicting unpleasant tribal initiation rites that included genital mutilation. Before viewing the film, they heard one of four explanations for the film: one group heard an anthropological account about the meaning of the event. Another group heard a lecture that de-emphasized the pain the initiates were experiencing and emphasized their excitement over reaching maturity. A third group heard a description that emphasized the pain and trauma the initiates were experiencing, and a fourth group received no information about the film. Measures of arousal including heart rate and self-reported stress indicated that the first two groups experienced considerably less stress while watching the film than did the group whose attention was focused on trauma and pain. This was the earliest known demonstration of the important role that social cognition plays in how people think about stressful events.

Subsequently, Lazarus, Folkman, and their colleagues (Lazarus & Folkman, 1984b) formalized the stress and coping process in terms of primary and secondary appraisals. Primary appraisal refers to the meaning a person construes from a stressful event, and such appraisals may be positive, neutral, or negative. Negative or potentially negative events are further appraised for their possible harm, threat, or challenge. Harm is the assessment of threat that has already been done, threat is the harm that may occur in the future, and challenge refers to the potential to overcome and even profit from the event. Thus, for example, in the Speisman et al. (1964) study just described, appraisals that focused on the anthropological significance of the rites or the excitement that the initiates were experiencing over reaching maturity substantially reduced the experience of stress that was reported.

At the same time that primary appraisals of stressful circumstances occur, secondary appraisals are initiated. Secondary appraisal refers to the assessment of one's coping abilities and resources and whether they will be sufficient to meet the harm, threat, or challenge of a stressful event. From a social cognition standpoint, secondary appraisals include beliefs about the causes or controllability of stressful events and personal resources that can be enlisted to combat the stressor, such as optimism, self-esteem, or other people's help.

A number of coping frameworks have been advanced, but one that is especially gaining traction emphasizes the approach-avoidance continuum (Solberg Nes & Segerstrom, 2006). Approach-avoidance reflects a core motivational construct in social cognition and in psychology more generally (Davidson, Jackson, & Kalin, 2000), and it has been applied widely across multiple domains within psychology. Approach-oriented coping involves active efforts such as problem solving, seeking social support from others, and creating outlets for emotional expression. As such, it maps onto the behavioral activation system (BAS; Gray, 1990). Coping

through avoidance includes both cognitive and behavioral strategies, such as distracting oneself from stressful circumstances, minimizing threatening events, avoiding thinking about them, and substance abuse. As such, it maps onto the behavioral inhibition system (BIS).

Generally speaking, research shows that approach-related coping is tied to positive psychological states and to better health outcomes (Billings, Folkman, Acree, & Moskowitz, 2000; Sharkansky et al., 2000). Approach-oriented coping has also been tied to biological processes that may beneficially affect health, thus suggesting how approach-oriented coping's effects on health may be mediated (Stowell, Kiecolt-Glaser, & Glaser, 2001; Aschbacher et al., 2005; Tsenkova, Love, Singer, & Ryff, 2008). Although coping via avoidance is sometimes associated with good adjustment to stressful events in the short term, over the long term, trying to avoid the thoughts and feelings around chronic persistent stressors can lead to elevated psychological distress and physiological reactivity (see Taylor & Stanton, 2007 for a review). Avoidance coping has also been tied to poor health habits, the progression of certain chronic diseases, and a heighted risk of mortality in several patient groups (Taylor & Stanton, 2007). Moreover, as research on social cognition suggests (Wegner, Schneider, Carter, & White, 1987), avoidance is often unsuccessful, with the result that stress-related thoughts and emotions intrude into consciousness.

Psychological Resources

Health psychology research that has been influenced by social cognition has focused heavily on psychological beliefs that act as resources for combating stress. In particular, meaning-related beliefs, optimism, mastery or perceived control, and self-related resources such as self-esteem are thought to moderate the stress experience by enabling people to cope more successfully.

Making meaning. As noted, Taylor's (1983) theory of cognitive adaptation maintained that following a stressful event such as a health trauma, people commonly make active efforts to shore up their sense of self and their circumstances. In many cases, these efforts assume the form of finding benefits in adverse circumstances (Bower, Moskowitz, & Epel, 2009). For example, as people strive to overcome the challenges posed by chronic illnesses, they experience positive as well as negative outcomes. Many people report positive emotional states connected to joy, optimism, and benefit-finding. Benefits typically reported include changes in people's perceptions of their ability to cope with stress, changes in the perception of future stressors, changes in relationships, and re-evaluation of priorities and goals. Recent research has suggested that finding benefits in adverse circumstances may lead to improvements in physical health (Bower et al., 2009). The exact biological pathways by which these changes occur are not as yet known, but one possibility is that the ability to find benefits in a current stressor leads to more adaptive responses to future stressors, limiting stress reactivity and cumulative exposure to stress hormones that can have adverse effects on health (Bower et al., 2009).

One common form that finding benefits can take is making meaning out of in the event (Taylor, 1983). People have cognitive frameworks within which they interpret their experiences, and when they encounter a situation that challenges their global understanding of themselves and their place in the world, they appraise the situation in an effort to find meaning in it. Psychological distress results to the extent that the appraised meaning is discrepant with the initial cognitive framework; this distress, in turn, initiates a process to find meaning in the event, which in turn leads to better adjustment (Park, 2010). Considerable research suggests that the ability to make meaning from distressing circumstances aids in adjustment to threatening events and may also have biological benefits. For example, Bower and colleagues found that among

men who were HIV-seropositive, those who had found meaning in the experience were more likely to have maintained high levels of CD 4 T helper cells, which are critical for staving off AIDS, than men who had not made meaning out of the experience (Bower, Kemeny, Taylor,, & Fahey, 1997). The ability to find meaning in the experience also predicted a lesser likelihood of AIDS-related mortality (Bower et al., 1997).

Optimism. A widely studied psychological resource is optimism, which reflects the extent to which people hold favorable expectations about the future (Scheier & Carver, 1992). Derived initially from the cybernetic model of self-attention processes (Carver, 1979), Carver and Scheier's work on optimism focuses on the expectations that people form about their futures and how those guide movement toward goals. As a dispositional variable, it consists of generalized favorable expectations about the future; situational optimism reflects favorable expectations in specific stressful situations. Scheier, Carver, and Bridges (1994) developed a scale, the Life Orientation Test (LOT-R), that measures optimism as a pervasive set of beliefs that includes items such as, "in uncertain times I usually expect the best," and the reverse coded, "if something can go wrong for me, it will."

Considerable research indicates that people who are dispositionally optimistic or optimistic in a specific stressful situation cope more successfully, as reflected in their self-reported distress and physiological responses to stress (Carver, Scheier, & Segerstrom, 2010; Taylor & Broffman, 2011). On the longer term, optimism has been tied to beneficial health outcomes, including a lesser risk of heart disease, reduced pain experience, and a lower likelihood of cancer mortality, among other effects (Carver et al., 2010). Optimism appears to achieve these beneficial effects largely by fostering active coping efforts. Some of these coping efforts are behavioral, as in seeking emotional support or advice from another person, whereas

others involve cognitive restructuring, such as the ability to think more positively about stressful events. Optimism has also been tied to a stronger sense of personal control, better mood, and better health behaviors (e.g., Carver et al., 2010).

Sometimes the optimistic expectations that people generate are overly optimistic. Social cognition research has addressed whether unrealistic optimism is beneficial or whether it incurs potential risks such as disappointment or unrealistic goal setting. A review by Armor and Taylor (1998) concluded that although people who are unrealistically optimistic may fall short of their overly optimistic goals, they nonetheless appear to achieve more than they would have, had they maintained more pessimistic assessments. Research also suggests that optimism does not blind people to the realistic risks to which they should be attentive. For example, Aspinwall and Brunhart (2000) found that optimistic beliefs were linked to greater, not lesser, processing of risk-related information as the level of self-relevant threat increased (see also Geers, Wellman, Seligman, Wuyek, & Neff, 2010). Optimists appear to be more confident than pessimists that their efforts to cope with stressful events will be successful and thus may be more likely to engage in such behavioral efforts than pessimists (Carver et al., 2010).

The short term striving that is fostered by optimism can, however, lead to short term physiological costs, which on the long term appear to be largely offset by long-term benefits. People also maintain a strategic optimism by perceiving outcomes to be consistent with initial expectations; by reserving optimism for outcomes that are not easily verified; and by being more optimistic at the beginning than at the end of a project (when lack of progress toward goals may be dispiriting). As such, optimism can be maintained even in the face of potential setbacks.

Mastery/Psychological control. One of the earliest literatures in social cognition maintained that feelings of mastery or control over the environment enable people to cope with

stressful aspects of that environment and make more progress toward personal goals than is true for people who lack a sense of mastery or control (e.g., Thompson, 1981; Fiske & Taylor, 1984). In actuality, though, the origins of thinking on psychological control came from early research conducted in hospitals by Irving Janis (1958). Janis had noted that some hospital patients cope with the aftermath of surgery quite well, whereas other patients cope with it poorly, requiring substantial medication and long hospital stays. He reasoned that the control-related expectations people had formed about their surgeries and hospital experiences might be key factors that moderate adjustment. He found that patients who were poorly prepared for surgery and had unrealistic expectations about how easily and quickly their surgery and recovery would go coped especially poorly, as did those patients who had highly pessimistic expectations. By contrast, patients who had formed realistic expectations about their hospitalization, surgeries, and what they needed to do personally to further their own progress, coped significantly better. Subsequently, many studies employed these principles of psychological control uncovered by Janis to manipulate control-related beliefs with respect to surgery and noxious medical procedures (e.g., Johnson, Christman, & Stitt, 1985)

Psychological control or mastery, as it is often called, involves beliefs that one can determine one's own behavior, influence one's environment, and bring about desired outcomes. As a dispositional factor, mastery is often assessed by the Pearlin Mastery Scale (Pearlin & Schooler, 1978) which contains such items as, "I can just do about just anything I set my mind to." Mastery or control may also be assessed or manipulated as the perception that one's efforts will enable progress towards or the achievement of a specific desired outcome.

Perceived control is conceptually related to self-efficacy, which is the more narrow perception that one can take a specific action necessary to bring about a specific outcome in a

specific situation (Bandura, 1977), and to the concept of perceived behavioral control (Ajzen, 2002); perceived behavioral control combines beliefs in mastery/controllability and beliefs about self-efficacy, but is typically treated as a unitary concept (Ajzen, 2002).

A large and consistent early literature in social cognition demonstrates that when people are going through unpleasant experiences, a manipulated sense of control enables them to cope more successfully with those experimental stressors, both psychologically and physiologically (Thompson, 1981). For example, an experimental study (Pham, Taylor, & Seeman, 2001) exposed college student participants to an experimental priming manipulation that made salient the unpredictable/uncontrollable aspects of college, the predictable/controllable aspects of college, or neutral features of the college environment. Participants then completed a thought listing task about college. Those who had been exposed to the predictable/controllable manipulation made more references to the future and more references to personal goals in their thought listing protocols than did those in the neutral or uncontrollable situation. Moreover, participants had lower systolic blood pressure and heart rate reactivity in response to the "controllable" task, compared to those in the neutral condition and in the uncontrollable condition.

Psychological control or mastery has proven to be important in many areas of health psychology. For example, the belief that one can control situations has been tied to successful adjustment to stressful events, good health behaviors, emotional well-being, good performance on cognitive tasks, and good mental health (Gale, Batty, & Deary, 2008; Thompson & Spacapan, 1991). Mastery is a protective factor against depression in response to stress (e.g., Badger, 2001; Dunkle, Roberts, & Haug, 2001). On the physical health side, a sense of control or mastery has been linked to lower mortality, particularly due to cardiovascular disease (Surtees, Wainwright,

Luben, Khaw, & Day, 2006), and to lower levels of cardiovascular risk factors (Mausbach et al., 2008; Paquet, Dube, Gauvin, Kestens, & Daniel, 2010).

The health psychology literature has also uncovered the fact that feelings of control are often spontaneously generated by people, as they make efforts to cope with the stressful events that they face. For example, medical patients with chronic or advancing diseases often generate perceptions that they can control aspects of their disease, such as its symptoms, course, and treatment (Taylor, 1983). Generally speaking, these perceptions are adaptive (Helgeson, 1992; Michela, 1987), even when they are not particularly realistic (Taylor, 1983).

Control is not a panacea for stress. People who desire it may benefit from interventions that manipulate it (Thompson, Cheek, & Graham, 1988), but control can be aversive when it gives people more responsibility than they want (Chipperfield & Perry, 2006). Too much information and too many choices may be stressful and exacerbate rather than ameliorate distress (Iyengar, 2010; Schwartz, 2004). Nonetheless, on the whole psychological control, which has its origins in both early health psychology and a broad social cognition literature, is a beneficial psychosocial resource for dealing with health threats.

The Self. Self-related processes have long occupied a central position in social cognition theory and research (Brown, 1998). This work ranges widely from early research on self-concept and self-esteem (e.g., Campbell, 1990), to the role of the self in organizing self-relevant cognition, to the study of processes that directly engage the self, such as self-affirmation (Steele, 1988), to the most recent work examining the involvement of the medial prefrontal cortex (mPFC) in self-related processes. Self-related resources have also been widely examined for their effects on well-being and health, representing an area in which health psychology research has been directly informed by current social cognition theory and research.

The relation of self-esteem to well-being is virtually definitional and central to a positive sense of self. For example, research using longitudinal data sets involving more than 4,000 people aged 18-96 years found that low self-esteem predicts depression (and not the reverse) (Ort, Robins, Trzesniewski, Maes, & Schmitt, 2009). Robust relations between self-esteem and coping have been found in the health psychology literature. For example, people with high self-esteem use less avoidant-coping and more approach-coping (Aspinwall & Taylor, 1992). Self-esteem also predicts biological reactivity to stress (Pruessner, Lord, Meaney, & Lupien, 2004), which may be a route that connects self-esteem to physical health outcomes (Taylor, 2012).

Another route by which self processes may affect health outcomes is via health habits. In a longitudinal investigation, Friedman et al. (1995) found that people who were high in "ego strength" as children lived longer as adults; one reason was that those with high ego strength were less likely to smoke and use alcohol to excess (Friedman et al., 1995; Temcheff et al., 2011).

The self concept, namely the beliefs people hold about their personal attributes, may also play an important role in coping. For example, people who have multiple roles and have multiple sources of reward in their lives are better buffered against setbacks than people who do not (Chrouser Ahrens & Ryff, 2006; Linville, 1987; Waldron, Weiss, & Hughes, 1998). As a result, when the self is threatened, people with multiple important components of the self concept may refocus their efforts on other central self-relevant life domains that are not threatened (Sherman & Cohen, 2006). However, when domains central to the self, such as the work role or marriage role, are threatened, defensive responses to threat may result instead (Sherman & Cohen, 2006).

Self-affirmation (Steele, 1988) represents an area in which theory developed in social cognition has had a direct and significant impact on health psychology. Self-affirmation theory

asserts that the goal of the self system is to protect a positive self-image, and when the self is threatened, people respond to restore self-worth. They may affirm alternative resources, as by reflecting on important aspects of the self that are not relevant to the threat or by engaging in an activity that makes an important personal value salient, such as religion, the importance of family and friends, or artistic endeavors. In the typical self-affirmation study, people rank-order their values and then focus either on a value that ranks high for them (versus one that is less important, i.e., low self-affirmation) and then they are exposed to tasks or information that potentially threatens them. Consistently, research demonstrates that people who have self-affirmed important personal values are buffered against threatening self-relevant information (Sherman & Cohen, 2006). For self-affirmation to be successful in reducing defensive responses, though, the value affirmed must be in a domain different from that which is threatened and must also occur prior to the threat (Sherman & Cohen, 2006; Critcher, Dunning, & Armor, 2010).

Self affirmation processes have been related to several areas of functioning in health psychology. With respect to coping, self-affirmation can reduce ruminative thinking among people who have been exposed to a personal threat (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999). Self-affirmation can also buffer people biologically against stress. For example, in one study (Creswell et al., 2005), people who had affirmed an important value (versus a less important value) showed lower cortisol responses to stress tasks in the laboratory. (Cortisol is a hormone that increases in response to stress). Self affirmation has also been shown to lead to lower urinary catecholamine levels in response to stress (Sherman, Bunyan, Creswell, & Jaremka, 2009). There are also effects of self-affirmation on health itself. Keough (1998) found that students who wrote self-affirmation essays over winter break were less likely to visit the health services on their return to school, compared with students who did not.

Health behaviors can be beneficially affected by self-affirmation as well (Sherman, Nelson, & Steele, 2000). As alluded to earlier, self-affirmation may foster receptivity to communications designed to modify health habits. When people have affirmed an important value prior to processing personally relevant risk related information, they process that information in a more evenhanded way than is true if they have not (Epton & Harris, 2008; Reed & Aspinwall, 1998; Sherman et al., 2000). Linking health behavior change efforts to personally important values can improve message impact (Dal Cin, MacDonald, Fong, Zanna, & Elton-Marshall, 2006).

Some of the research on coping implies that coping strategies are typically consciously employed to manage stress. However, in many, perhaps most, cases, coping strategies can be spontaneously employed without conscious intent. For example, Bargh and Shalev (2012) have found that people may regulate their emotional responses to stressful circumstances by doing things that will make them feel better, such as taking a long hot shower or bath, without being aware that the application of physical warmth can lead to alleviation of psychological distress as well. More generally, coping efforts may be consciously employed or unconsciously triggered in stressful circumstances.

Neural bases of coping. Social cognitive neuroscience has proven to be a source of both theoretical and methodological insights with respect to coping. This work has been prompted by growing understanding of how threatening and stressful circumstances are processed in the brain. The amygdala and the dorsal anterior cingulate cortex (dACC) are associated with threat detection, serving an alarm function that mobilizes other neural regions such as the lateral prefrontal cortex (LPFC) and the hypothalamus, to promote adaptive responses to stress. The amygdala responds to environmental cues signaling danger or novelty (Hariri, Bookheimer, &

Mazziotta, 2000) and predicts how unpleasant negative stimuli are reported to be (Lane et al., 1997). The dACC responds to conflict in incoming information (e.g., Carter et al., 2000) and to social exclusion and distress (Eisenberger, Lieberman, & Williams, 2003).

The magnitude of threat responses implicates the ventrolateral prefrontal cortex (VLPFC; Hariri et al., 2000; Ochsner et al., 2004). The left ventrolateral prefrontal cortex (and possibly also the dorsolateral prefrontal cortex) appear to be especially implicated in intentional emotion regulation (Berkman & Lieberman, 2009). Activation of the right ventrolateral prefrontal cortex (RVLPFC) can directly down-regulate activity in the amygdala and the dorsal anterior cingulate cortex (Eisenberger et al., 2003; Hariri, Tessitore, Mattay, Fera, & Weinberger, 2002; Lieberman et al., 2006). RVLPFC regulation of stress responses in the dACC and the amygdala may represent less intentional and more automatic responses to stress, as may be engendered in people with strong psychosocial resources, but this issue is still under investigation.

Social cognition research in social cognitive affective neuroscience has also helped to elucidate how psychosocial resources may influence coping. Specifically, do psychosocial resources mute the perception of stress or threat or do they enable people to regulate their responses to threat and stress more effectively? Taylor et al. (2008) examined two hypotheses regarding the relation of resources to patterns of brain activation. The first hypothesis is that strong psychosocial resources are tied to decreased sensitivity to threat, which would be manifested in lower activation of brain regions implicated in stress, such as the amygdala. The second hypothesis is that psychosocial resources, instead, are associated with enhanced prefrontal inhibition of stress responses through VLPFC regulation of regions implicated in threat responses, such as the amygdala. In a three-session investigation to test between these alternatives, participants completed measures of psychosocial resources; they responded to threat

cues (pictures of faces conveying negative emotions) in an fMRI paradigm; and their neuroendocrine responses to stressful laboratory tasks were assessed. In one condition of the neuroimaging task, participants simply observed the threatening faces (observation); in another condition, they labeled the specific emotion that was pictured (threat regulation task); and in the third condition, they indicated the gender of the pictured people (control task). The results indicated that psychosocial resources were associated with greater RVLPFC activation and less amygdala activity during the threat regulation task, but not with lower amygdala activity during observation of threat cues. Psychosocial resources were also tied to lower neuroendocrine stress responses during laboratory stressors, specifically lower cortisol levels. Mediational analyses indicated that the relation of psychosocial resources to low cortisol reactivity was mediated by lower amygdala activity during the threat regulation task. Thus, methods from social cognitive neuroscience clarify that strong psychosocial resources are associated with lower cortisol responses to stress by means of regulating threat responses and not by decreasing sensitivity to threat overall.

The Construal of Social Relationships

Social cognition theory and research reveals that how people construe the social environment is a powerful determinant of their behavior, thoughts, and feelings, often overwhelming objective characteristics of the environment. These assumptions are importantly reflected in the health psychology research on social support.

Social relationships and a common consequence, namely social support, are the best established psychosocial resources for protecting mental and physical health. Social support has been defined as the perception or experience that one is loved and cared for by others, esteemed and valued, and part of a social network of mutual obligations and assistance (Wills, 1984). Early

research on social support emphasized from whom it was received and what form it assumed. Social support can be provided by a partner, relatives, friends, coworkers, social and community ties, and even pets (Allen, Blascovich, & Mendes, 2002). Forms of social support include providing information in times of stress; the provision of tangible assistance (instrumental support); and emotional support involving the provision of warmth and nurturance to another person and reassuring that person that he/she is valuable and cared for by others. This commonly employed taxonomy implies that the benefits of social contact are achieved primarily during or following specific explicit social transactions.

However, consistent with social cognition research, many of the benefits of social support come from the perception that social support is present or available if needed, not necessarily its reality. For example, research by Master and colleagues (Master et al., 2009) found that a simple reminder of a loved one in the form of a photograph of one's partner was sufficient to engender feelings of social support, which, in turn, attenuated an experimentally induced pain stimulus (see also Eisenberger et al., 2011). Perceiving support as available may have a dispositional quality, with origins in genes (Kessler, Kendler, Heath, Neale, & Eaves, 1992) and in the early environment (Gallo & Matthews, 2006). An emphasis on the perception of social support and its benefits is particularly well placed because social support need not be explicit to be effective (e.g., Kim, Sherman, & Taylor, 2009). In fact, explicit support from others can sometimes backfire and complicate or exacerbate reactions to stressful events. Explicit support from others may undermine self-esteem, for example, by implicitly communicating a sense that one is inadequate or inefficacious (Bolger & Amarel, 2007). Thus, perceived social support can be a double-edged sword. On the one hand, the perception that there are people behind you ready to help and provide emotional solace can be a great source of comfort, but on the other hand,

depending on how one construes social support, it may undermine positive self-perceptions, which are important to effective functioning in the social environment.

It is likely that many of the benefits of social support occur without conscious recognition that social support is occurring. Evidence consistent with such a point is the fact that measures of social integration, which involve tallying up the number of social relationships in which an individual is involved, the number of social roles the person occupies, the frequency of contact with network members, and the number, density, and interconnectedness of relationships, directly benefit mental and physical health (Alloway & Bebbington, 1987; Thoits, 1995). Despite the fact that social occasions, such as back-to-school nights, charity fundraisers, neighborhood association meetings, and other such gatherings may sometimes seem onerous, the social contact and interconnectedness that results appears to have health benefits nonetheless.

Overall, perceiving that others can provide support benefits mental and physical health, and also especially buffers people against psychological distress, physiological reactivity, and poor health during threatening or stressful times (Thoits, 1995). Such perceptions appear to benefit health primarily by affecting cardiovascular, neuroendocrine, and immune functioning in beneficial ways (Uchino, 2009).

Social cognitive neuroscience is proving instructive for understanding how social support processes may be related to reduced stress responses as well. For example, Coan, Schaefer, and Davidson (2006) had participants hold the hand of either a spouse or a stranger during anticipation of a threat and found down-regulation of brain regions activated by threat, compared with no hand-holding, especially when holding the hand of one's spouse; regions affected included the ventral anterior cingulate cortex, the dorsolateral prefrontal cortex, the caudate, the superior colliculus, the posterior cingulate, the postcentral gyrus, and the supramarginal gyrus.

Eisenberger and colleagues (Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007) conducted a three-session study that further addressed the relation of perceptions of social support to stress experienced in response to a laboratory threat. They found that people who interacted regularly with people perceived to be supportive (assessed over nine days via experience sampling methodology) showed diminished dACC reactivity to social rejection in an fMRI laboratory task and diminished cortisol reactivity during laboratory stressors. Individual differences in dACC activity mediated the relation between social support and cortisol reactivity. Thus, the mental representation of social relationships and their supportiveness can influence downstream biological stress responses by modulating neurocognitive reactivity to social stressors. Without the theory and methods of social cognitive neuroscience, these underlying mechanisms would have remained elusive.

Culture

One of the most dynamic areas of social cognition in recent years concerns the cultural bases of social cognition (e.g., Nisbett, Peng, Choi, & Norenzavan, 2001). Perhaps the most widely researched aspect of social cognition and culture addresses cultural differences in the construal of the self, namely as relatively independent and autonomous (Westerners) or more interdependent and collectivistic (East Asians) (e.g., Markus & Kitayama, 1991). Markus and Kitayama (1991) contrasted American and Japanese cultures to show how differences in self-conceptions influence how people construe the world. Westerners, particularly European-Americans, emphasize individuality and how they can distinguish themselves from others by making use of unique talents. By contrast, the interdependent self of many East Asian cultures consists of seeing oneself as part of encompassing social relationships with a goal of adjusting

one's behavior to what one perceives to be the thoughts, feelings, and actions of others in the relationship.

This theorizing has led to health psychology research on cultural differences in how social support is construed and experienced. Among the implications of the independent/interdependent distinction is the fact that people who hold an independent sense of self often see other people as resources who can help them achieve their goals and solve their problems. By contrast, people who have an interdependent sense of self view the maintenance of harmony within the social group as an overarching goal. Consequently, any effort to bring personal problems to the attention of others to enlist their help may be seen as undermining that harmony or making inappropriate demands on the social group.

This distinction is reflected in theoretical and empirical literature on cultural differences in social support (Kim et al., 2009; Taylor et al., 2004). Across multiple investigations, European-Americans report drawing on their social relationships to help them cope with stressful events, more than is true of Asian-Americans and Asians. Concern over disrupting the harmony of the group, concern over social criticism or losing face, and the belief that one should be self-reliant in solving personal problems appear to largely explain the non-use of social support among those of Asian background.

Social support is a universally helpful resource, however, suggesting that there may be cultural differences in the way that it is used or experienced. Forms of social support that do not risk disturbing relationships may be more sought out and more beneficial for those from Asian cultural backgrounds. Implicit social support refers to the comfort provided by the awareness of a social support network, rather than its active enlistment for reducing stress and solving problems. Implicit social support may be commonly used and experienced by East Asians.

The utility of the distinction between implicit and explicit support was demonstrated experimentally in a study in which Asian-American and European-American participants were primed with either an implicit or explicit social support manipulation (Taylor, Welch, Kim, & Sherman, 2007). Participants in the implicit support condition were told to think about a group they were close to and then write about the aspects of the group that were important to them. Participants in the explicit support condition were told to think about the people they were close to and to write a letter asking for advice and support for upcoming stressful events. Subsequently, participants went through several laboratory stressors. Asian-Americans who had completed the implicit social support task experienced less stress and had lower cortisol responses to stress than those who had completed the explicit social support task, whereas the reverse was true of European-Americans.

The independent/interdependent distinction just described has also been usefully employed in the construction of persuasive messages, specifically, a pair of studies by Han and Shavitt (1994). They examined popular magazines in two countries: the United States, which is an individualist culture, and Korea, a collectivist culture. Product ads from each country were randomly selected from magazines and coded for appeals to individualism versus collectivism. Ads that were coded as reflecting an individualist orientation appealed to self-improvement, self-realization, and the benefits of the product to the individual. Ads that were rated as collectivist in orientation appealed to family integrity, group well-being, and concern for others. Han and Shavitt found that ads in the United States were significantly more likely to use individualist appeals, whereas in Korea, collectivist appeals were more likely to be used. In their second study, students in Korea and the United States were presented with ads that were either collectivist or individualist in orientation. Students in the United States were more persuaded by

ads that emphasized individualist benefits, whereas students in Korea were more persuaded by ads that emphasized collectivist benefits. Although this distinction and these findings have not yet been applied to the construction of health messages, the Han and Shavitt findings suggest that they might well be fruitfully employed to construct health-related messages to different cultures.

As yet, social cognition research on culture has not been fully exploited for its potential to shed light on cultural differences in phenomena related to health psychology. For example, research by Nisbett and colleagues (2001) reveals that, whereas Westerners tend to adopt an analytic mode of thinking, East Asians are more likely to think holistically. The distinction between holistic and analytic thinking might be usefully employed in the construction of persuasive messages or other interventions to induce people of different cultural backgrounds to practice better health behaviors, among other possible interventions.

Stereotyping and Health

As is true of most areas in social psychology, an enduring concern of social cognition theory and research has been with issues of stereotyping and its effects on well-being, performance, and motivation. For example, social cognition research has examined the cognitive side of intergroup bias, namely stereotypes, as well as the affective side, namely prejudice. Like other aspects of social cognition, intergroup bias has both automatic and controlled forms. Extreme and conscious bigotry is now relatively less common than was once true, but instances of automatic stereotyping, often assessed using the Implicit Association Test, are manifold. Affectively-based prejudices often lead to discrimination and mistreatment of social groups, ranging from the disabled, older people, homeless people, and several ethnic and racial groups. Research in health psychology has extended this focus to include the effects of stereotyping and prejudice on health.

Stressful events of all kinds can erode health, and recently, health researchers have explored the effects of prejudice, stereotyping, and racism on health. It has long been known that African-Americans experience greater health risks at all ages than the rest of the population and that life expectancy, especially for African-American men, is shorter than for Whites. Some of these differences can be traced to differences in socio-economic status (Myers, 2009). Poverty, low educational attainment and high unemployment are prevalent in many Black communities, and the grinding discrimination associated with poor housing, poor jobs, poor schools, and violent neighborhoods contribute to stress through chronic exposure to stress and an enduring sense of danger. Racism and racial discrimination appear to contribute to disease risk, especially risk due to the cardiovascular disease (Brondolo, ver Halen, Pencille, Beatty, & Contrada, 2009; Williams & Mohammed, 2009). The perception that one has been treated badly because of one's race, especially when coupled with inhibited angry responses to it, has been tied to high blood pressure, suggesting that perceived racism contributes to the high incidence of hypertension seen among African-Americans (e.g., Richman, Bennett, Pek, Siegler, & Williams, 2007). Typically, blood pressure declines when a person goes to sleep, but in some people, it remains elevated. This non-dipping phenomenon, an indicator of exposure to stress, is found more commonly among African-Americans than Whites, especially African-Americans who have been exposed to violence (Tomfohr, Cooper, Mills, Neleson, & Dimsdale, 2010). Racism has been tied to high levels of depression (Turner & Avison, 2003), to problem drinking, poor sleep quality, and other adverse health habits and problems (e.g., Martin, Tuch, & Roman, 2003; Thomas, Bardwell, Ancoli-Israel, & Dimsdale, 2006).

Members of stereotyped groups are also vulnerable to a phenomenon known as stereotype threat. Stereotype threat derives from expectations about a person's performance that

are based on that person's membership in a particular group. For example, the elderly are vulnerable to the stereotype of poor memory, African-Americans to poor performance on standardized tests, and women to poor performance on mathematical tasks. Stereotype threat occurs when one's category membership is salient, the performance domain is relevant to that category, performance is said to be reflective of underlying ability, and one cares about it (Steele, Spencer, & Aronson, 2002). Thus, for example, when African-Americans are asked to indicate their ethnic identification or when women are asked to indicate their gender, performance suffers in the stereotype-related domain. Because these sorts of reminders occur frequently throughout life, stereotype threat has the potential to affect both psychological and biological functioning. Stereotype threat can be associated with high blood pressure (Blascovich, Spencer, Quinn, & Steele, 2001; Auman, Bosworth, & Hess, 2005) and with heart rate variability (Croizet et al., 2011). These facts suggest that experiences associated with racism and stereotyping may contribute to the disproportionate biological burden and health risks experienced by African-Americans relative to Whites.

Stereotype threat is, by no means, a phenomenon particular to African-Americans. For example, a study by Seacat and Mickelson (2011) found that priming overweight women to think about weight-related stereotypes was tied to significantly diminished exercise and dietary health intentions. Thus, the adverse effects of stereotype threat may extend to health outcomes and health behaviors.

Despite amassing evidence for the importance of racism in health outcomes especially for African-Americans, this is a thorny and difficult topic to pursue empirically. Exposure to prejudice and stereotyping is difficult to measure, and the delay between instances of prejudice and documentable health outcomes is difficult to establish and measure. Consequently, most of

the research that has thus far examined health effects has done so inferentially rather than directly.

Pain and its Management

Pain is one of the most important topics in health psychology because of its cost and the numbers of people it affects. Chronic pain lasting at least six months affects 30-50 million people in the United States, and costs due to disability and lost activity add up to more than 100 billion annually (Lozito, 2004). Moreover, pain typically leads people to change their lives in major ways, often leading to lost employment, strained marriages or divorce, and social isolation.

Although the mainstays of pain control in medicine have typically been pharmacological intervention or surgery, cognitive approaches to pain management and control have also been significant components of interventions for decades. For example, relaxation training, by which people self-induce a state of low arousal through progressively relaxing different parts of the body and controlling breathing, successfully treat modest chronic pain (Taylor, 2012 for a review). Mindfulness interventions that focus people on the present and on acceptance of the pain experience can also produce analgesic effects (e.g., Grant & Rainville, 2009). Cognitive distraction that involves intentionally focusing one's attention on an irrelevant and attention-getting stimulus or distracting oneself with a high level of activity can reduce the pain experience (Dahlquist et al., 2007).

Coping skills training has been a mainstay of pain technology by helping people to distract themselves and focus on the sensory aspects of pain instead of its painful and emotional qualities. Patients may experience reduced pain, improved satisfaction with pain control, and better pain coping skills following coping skills training (Haythornthwaite, Lawrence, & Fauerbach, 2001). Active coping skills can reduce pain for in-patients with a broad array of

chronic pain problems (e.g., Bishop & Warr, 2003). By contrast, avoidant coping has been tied to poor pain control (Walker, Smith, Garber, & Claar, 2005). Finally, guided imagery, in which a person conjures up a picture that he or she holds in mind during a painful experience, has been employed for the treatment of some pains as well (see Taylor, 2012). Cognitive techniques to control pain have been sufficiently successful that they are now typically incorporated into systematic cognitive behavioral interventions (Hoffman, Papas, Chatkoff, & Kerns, 2007) and into pain management programs more generally (Turk & Rudy, 1991).

The pain experience also illustrates the important bidirectional influences that mind and body have on each other. Adverse changes in the body such as those manifested in pain produce a variety of cognitive changes, including catastrophizing, depression, hopelessness, anxiety, and other cognitive and emotional responses. Social cognition research, including cognitive behavioral interventions, can target and modify these cognitions, enabling people to cope more successfully with pain. The management of pain is thus an excellent example of the overarching theme of this chapter: Social cognition and health psychology form a natural liaison by virtue of the powerful impact of thought on psychological and biological responses to threatening health situations.

Recent work from social cognitive neuroscience has shed further light on the pain experience, particularly the ways in which physical pain and social pain overlap. Specifically, the experience of social rejection or exclusion shows broad similarities to the neural, physiological, and even descriptive components of the physical pain experience. Work by Eisenberger and her associates indicates that the dorsal anterior cingulate cortex (dACC), situated on the medial wall of the frontal lobe, is a key neural structure involved in both physical and social pain. The dACC is especially involved in the affective, distressing component of pain, and neuroimaging studies

show that activity in the dACC tracks emotional reactions to the pain experience (Eisenberger, in press). The dACC is also involved in separation distress in nonhuman mammals and is activated in response to social exclusion (Eisenberger et al., 2003).

Other evidence for overlap between physical and social pain processes includes the fact that people who feel more rejected in their everyday social interactions also show greater activity in pain-related neural regions in response to social rejection (Eisenberger, Gable, & Lieberman, 2007). Moreover, people who are sensitive to one kind of pain are typically sensitive to another (e.g., Way, Taylor, & Eisenberger, 2009). Regulating physical pain pharmacologically has corresponding effects on the experience of social pain (DeWall et al., 2010), and social pain, namely feeling excluded, leads to increased sensitivity to physical pain (Eisenberger, Jarcho, Lieberman, & Naliboff, 2006). Coping efforts that people initiate in response to either physical or social pain are both associated with significant activity in the right ventral prefrontal cortex (RVPFC), which has been associated with regulating physical pain and negative affect (Hariri et al., 2000; Ochsner & Gross, 2005).

The case for overlap between physical and social pain has clearly been made, as the commonalities extend across multiple psychological and biological systems. As yet, however, this information has not been put to a practical test, that is, whether it will aid in the management of pain. This is a task for future research and interventions.

Social cognition research has also helped to shed light on the placebo effect. A placebo is any procedure that produces an effect because of its therapeutic intent and not its actual nature. As such, it is a cognitively and emotionally mediated and often successful pain amelioration method. People do not improve only because they think they are going to improve, although expectations play an important role (Webb, Hendricks, & Brandon, 2007). Placebos may work,

in part, by stimulating the release of opioids, the body's natural painkillers (Levine, Gordon, & Fields, 1978). Social cognitive neuroscience research using fMRI reveals that patients who report reduced pain after taking a placebo show decreased activity in pain-sensitive regions in the brain (Wager et al., 2004), suggesting that placebos work via some of the same biological pathways that real treatments do (Lieberman et al., 2004).

In summary, research and methods in social cognition, especially social cognitive neuroscience, have been extremely valuable for identifying the cognitive underpinnings of relationship distress and the ways in which physical and social pain overlap. Although specific insights into the management of pain have yet to be made, this is a promising arena for the future.

Directions for the Future

As the previous sections attest, the mutual influence of social cognition and health psychology has been manifold and enduring. Much of that influence has gone from social cognition to health psychology, as evidenced by the impact of the attitude change and persuasion literatures on the construction of health messages, for example. Some of the influence has gone in the opposite direction, from health psychology to social cognition, examples being the breakthrough work on fear and on control by Irving Janis (1958) and work on positive illusions, which began in health settings, but became a dynamic field in social cognition. There are no signs that this two-way street is changing.

Factors likely to augment the influence of social cognition on health, as well as the reverse, include the fact that social cognition researchers are becoming more interested in and knowledgeable about biological outcomes, such as immune functioning and stress responses. The use of fMRI and related techniques in both social cognition and health psychology has

further served to bridge between the two fields. Some ties between the fields remain unexploited. For example, the pain research just described will no doubt yield insights for pain management in the health psychology field, and increasing clarity of the cognitive nature of relationships may provide future insights into the dynamics of social support. Research on the neural underpinnings of coping represents a continuing important and promising line of research for future integration of social cognition research and theory with issues central to health psychology. For example, research has explored the neural underpinnings of BIS and BAS, which have implications for approach and avoidance coping, respectively (see Taylor & Broffman, 2011 for a review). Research has also begun to identify neural underpinnings of specific psychosocial resources such as optimism (e.g., Sharot, Riccardi, Raio, & Phelps, 2007).

Overall, contemporary social cognition researchers are finding the health domain to be a fruitful one in which to examine the psychological and biological implications of their theories. Self-affirmation research is a particularly good example of this point (Sherman & Cohen, 2006). As both fields grow and mature and make use of each other's insights and methods, the initially improbable flirtation between social cognition and health psychology can be expected to blossom and mature.

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References

Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology, 32,* 665-683.

Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology, 22*, 453–474.

Allen, K., Blascovich, J., & Mendes, W. B. (2002). Cardiovascular reactivity and the presence of pets, friends, and spouses: The truth about cats and dogs. *Psychosomatic Medicine, 64,* 727–739.

Alloway, R., & Bebbington, P. (1987). The buffer theory of social support – A review of the literature. *Psychological Medicine, 17,* 91-108.

Apanovitch, A. M., McCarthy, D., & Salovey, P. (2003). Using message framing to motivate HIV testing among low-income, ethnic minority women. *Health Psychology, 22*, 60–67.

Armor, D. A., & Taylor, S. E. (1998). Situated optimism: Specific outcome expectancies and self-regulation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 30, pp. 309-379). New York: Academic Press.

Aschbacher, K., Patterson, T. L., von Känel, R., Dimsdale, J. E., Mills, P. J., Adler, K. A., . . . Grant, M. D. (2005). Coping processes and hemostatic reactivity to acute stress in dementia caregivers. *Psychosomatic Medicine, 67,* 964–971.

Aspinwall, L.G., & Brunhart, S.M. (2000). What I do know won't hurt me: Optimism, attention to negative information, coping, and health. In J.E. Gillham (Ed.), *The science of optimism and hope* (pp. 163-200). Philadelphia: Templeton Foundation.

Aspinwall, L. G., & Taylor, S. E. (1992). Modeling cognitive adaptation: A longitudinal investigation of the impact of individual differences and coping on college adjustment and performance. *Journal of Personality and Social Psychology, 63,* 989-1003.

Auman, C., Bosworth, H. B., & Hess, T. M. (2005). Effect of health-related stereotypes on physiological responses of hypertensive middle-aged and older men. *Journal of Gerontology: Psychological Sciences, 60,* P3-P10.

Badger, T.A. (2001). Depression, psychological resources, and health-related quality of life. *Journal of Clinical Geropsychology, 7,* 189-200.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215.

Bargh, J. A., & Morsella, E. (2008). The unconscious mind. *Perspectives on Psychological Science, 3*(1), 73-79.

Bargh, J. A., & Shaley, I. (2012). The substitutability of physical and social warmth in daily life. *Emotion,* 12(1), 154-62.

Baum, A. (1990). Stress, intrusive imagery, and chronic distress. *Health Psychology, 9,* 653–675.

Berkman, E.T., & Lieberman, M.D. (2009). Using neuroscience to broaden emotion regulation: Theoretical and methodological considerations. *Social and Personality Psychology Compass, 3,* 475-493.

Billings, D.W., Folkman, S., Acree, M., & Moskowitz, J.T. (2000). Coping and physical health during caregiving: The roles of positive and negative affect. *Journal of Personality and Social Psychology, 79,* 131-142.

Bishop, S. R., & Warr, D. (2003). Coping, catastrophizing and chronic pain in breast cancer. *Journal of Behavioral Medicine, 26,* 265–281.

Blascovich, J., Spencer, S. J., Quinn, D., & Steele, C. (2001). African Americans and high blood pressure: The role of stereotype threat. *Psychological Science, 12,* 225-229.

Bolger, N., & Amarel, D. (2007). Effects of social support visibility on adjustment to stress: Experimental evidence. *Journal of Personality and Social Psychology, 92,* 458-475.

Bower, J. E., Kemeny, M. E., Taylor, S. E., & Fahey, J. L. (1997). Cognitive processing, discovery of meaning, CD 4 decline, and AIDS-related mortality among bereaved HIV-seropositive men. *Journal of Consulting and Clinical Psychology, 66,* 979–986.

Bower, J. E., Moskowitz, J. T., & Epel, E. (2009). Is benefit finding good for your health?: Pathways linking positive life changes after stress and physical health outcomes. *Current Directions in Psychological Science, 18,* 337-341.

Brondolo, E., ver Halen, N. B., Pencille, M., Beatty, D., & Contrada, R. J. (2009). Coping with racism: A selective review of the literature and a theoretical and methodological critique. *Journal of Behavioral Medicine, 32,* 64-88.

Brown, J. D. (1998). *The self.* New York: McGraw-Hill.

Campbell, J.D. (1990). Self-esteem and clarity of the self-concept. *Journal of Personality and Social Psychology, 59,* 538-549.

Carter, C. S., MacDonald, A. W., Botvinick, M. M., Ross, L. L., Stenger, V. A., . . . Cohen, J. D. (2000). Parsing executive processes: Strategic vs. evaluative functions of the anterior cingulate cortex. *Proceeding of the National Academy of Sciences USA, 97,* 1944–1948.

Carver, C. S. (1979). A cybernetic model of self-attention processes. *Journal of Personality and Social Psychology, 37,* 1251-1281.

Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30,* 879-889.

Chipperfield, J. G., & Perry, R. P. (2006). Primary- and secondary-control strategies in later life: Predicting hospital outcomes in men and women. *Health Psychology, 25*, 226–236.

Chrouser Ahrens, C.J. & Ryff, C.D. (2006). Multiple roles and well-being: Sociodemographic and psychological moderators. *Sex Roles, 55*, 801-815.

Chua, H.F., Liberzon, I., Welsh, R.C., & Strecher, V.J. (2009). Neural correlates of message tailoring and self-relatedness in smoking cessation programming. *Biological Psychiatry, 65*, 165-168.

Clarke, V. A., Lovegrove, H., Williams, A., & Macpherson, M. (2000). Unrealistic optimism and the health belief model. *Journal of Behavioral Medicine, 23*, 367–376.

Coan, J.A., Schaefer, H.S., & Davidson, R.J. (2006). Lending a hand: Social regulation of the neural response to threat. *Psychological Science, 17*, 1032-1039.

Creswell, J. D., Welch, W. T., Taylor, S. E., Sherman, D. K., Gruenewald, T., & Mann, T. (2005). Affirmation of personal values buffers neuroendocrine and psychological stress responses. *Psychological Science, 16*, 846-851.

Critcher, C.R., Dunning, D., & Armor, D.A. (2010). When self-affirmations reduce defensiveness: Timing is key. *Personality and Social Psychology Bulletin, 36*, 47-959.

Croizet, J. -C., Despres, G., Gauzins, M. -E., Huguet, P., Leyens, J. -P., & Meot, A. (2004). Stereotype threat undermines intellectual performance by triggering a disruptive mental load. *Personality and Social Psychology Bulletin, 30*, 721-731.

Dahlquist, L. M., McKenna, K. D., Jones, K. K., Dillinger, L., Weiss, K. E. & Ackerman, C. S. (2007). Active and passive distraction using a head-mounted display helmet: Effects on cold pressor pain in children. *Health Psychology, 26*, 794-801.

Dal Cin, S., MacDonald, T. K., Fong, G. T., Zanna, M. P. & Elton-Marshall, T. E. (2006). Remembering the message: The use of a reminder cue to increase condom use following a safer sex intervention. *Health Psychology, 25*, 438-443.

Davidson R.J., Jackson, D.C., & Kalin, N.H. (2000). Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. *Psychological Bulletin, 126*, 890–909.

DeWall, C. N., MacDonald, G., Webster, G. D., Masten, C. L., Baumeister, R. F., Powell, C., Combs, D., Schurtz, D. R., Stillman, T. F., Tice, D. M., & Eisenberger, N. I. (2010). Acetaminophen reduces social pain: Behavioral and neural evidence. *Psychological Science, 21*, 931-937.

Dunkle, R.E., Roberts, B., & Haug, M. (2001). *The oldest-old in everyday life: Self-perception, coping with change, and stress.* New York: Springer.

Eisenberger, N.I. (in press). The neural bases of social pain: Evidence for shared representations with physical pain. *Psychosomatic Medicine.*

Eisenberger, N. I., Gable, S. L., & Lieberman, M. D. (2007). fMRI responses relate to differences in real-world social experience. *Emotion, 7*, 745-754.

Eisenberger, N. I., Jarcho, J. M., Lieberman, M. D., & Naliboff, B. (2006). An experimental study of shared sensitivity to physical pain and social rejection. *Pain, 126*, 132-138.

Eisenberger, N.I., Lieberman, M.D., & Williams, K.D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science, 302*, 290–292.

Eisenberger, N. I., Master, S. L., Inagaki, T. K., Taylor, S. E., Shirinyan, D., Lieberman, M. D. & Naliboff, B. (2011). Attachment figures activate safety signal-related neural region and reduce pain experience. *Proceedings of the National Academy of Sciences, 108*, 11721-11726.

Eisenberger, N.I., Taylor, S.E., Gable, S.L., Hilmert, C.J., & Lieberman, M.D. (2007). Neural pathways link social support to attenuated neuroendocrine stress responses. *NeuroImage, 35*, 1601-1612.

Epton, T., & Harris, P. R. (2008). Self-affirmation promotes health behavior change. *Health Psychology, 27,* 746-752.

Falk, E.B., Berkman, E. T., Mann, T., Harrison, B., & Lieberman, M. D. (2010). Predicting persuasion-induced behavior change from the brain. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience, 30*, 8421-8424.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fiske, S. T., & Taylor, S. E. (1984). *Social cognition*. Reading, MA: Addison-Wesley.

Fiske, S. T., & Taylor, S. E. (2008). *Social cognition: From brains to culture*. New York, NY: McGraw-Hill.

Friedman, H. S., Tucker, J. S., Schwartz, J. E., Martin, L. R., Tomlinson-Keasey, C., Wingard, D. L., & Criqui, M. H. (1995). Childhood conscientiousness and longevity: Health behaviors and cause of death. *Journal of Personality and Social Psychology, 68,* 696–703.

Gale, C. R., Batty, G. D., & Deary, I. J. (2008). Locus of control at age 10 years and health outcomes and behaviors at age 30 years: The 1970 British cohort study. *Psychosomatic Medicine, 70,* 397-403.

Gallo, L. C., & Matthews, K. A. (2006). Adolescents' attachment orientation influences ambulatory blood pressure responses to everyday social interactions. *Psychosomatic Medicine, 68,* 253–261.

Geers, A. L., Wellman, J. A., Seligman, L. D., Wuyek, L. A., & Neff, L. A. (2010). Dispositional optimism, goals, and engagement in health treatment programs. *Journal of Behavioral Medicine, 33*(2), 123-34.

Glynn, L. M., Christenfeld, N., & Gerin, W. (2002). The role of rumination in recovery from reactivity: Cardiovascular consequences of emotional states. *Psychosomatic Medicine, 64*, 714-726.

Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*(7), 493-503.

Gollwitzer, P. M., Ottingen, G. (1998). The emergence and implementation of health goals. *Psychology and Health, 13*, 687-715.

Grant, J. A., & Rainville, P. (2009). Pain sensitivity and analgesic effects of mindful states in zen mediators: A cross-sectional study. *Psychosomatic Medicine, 71*, 106-114.

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition Emotion, 4*, 269-288.

Halpern-Felsher, B. L., Millstein, S. G., Ellen, J. M., Adler, N. E., Tschann, J. M., & Biehl, M. (2001). The role of behavioral experience in judging risks. *Health Psychology, 20*, 120–126.

Han, S., & Shavitt, S. (1994). Persuasion and culture: Advertising appeals in individualistic and collectivistic societies. *Journal of Experimental Social Psychology, 30*, 326–350.

Hariri, A.R., Bookheimer, S.Y., & Mazziotta, J.C. (2000). Modulating emotional responses: Effects of a neocortical network on the limbic system. *Neuroreport, 11*, 43–48.

Hariri, A.R., Tessitore, A., Mattay, V.S., Fera, F., & Weinberger, D.R. (2002). The amygdala response to emotional stimuli: A comparison of faces and scenes. *Neuroimage, 17,* 317–323.

Haythornthwaite, J., Lawrence, J., & Fauerbach, J. (2001). Brief cognitive interventions for burn pain. *Annals of Behavioral Medicine, 23*, 42–49.

Helgeson, V.S. (1992). Moderators of the relation between perceived control and adjustment to chronic illness. *Journal of Personality and Social Psychology, 63*, 656-666.

Hoffman, B. M., Papas, R. K., Chatkoff, D. K., & Kerns, R. D. (2007). Meta-analysis of psychological interventions for chronic low back pain. *Health Psychology, 26*, 1–9.

House, J. S. (2012). *Beyond health care reform: Social determinants and disparities in health and America's paradoxical crisis of health care and health.* New York: Russell Sage.

Iyengar, S. (2010). *The art of choosing.* Boston, MA: Little, Brown and Company.

Janis, I. L. (1958). *Psychological stress.* New York, NY: Wiley.

Johnson, J. E., Christman, N., & Stitt, C. (1985). Personal control interventions: Short- and long-term effects on surgical patients. *Research in Nursing and Health, 8*, 131–145.

Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Farrar, Straus and Giroux.

Keough, K.A. (1998). *When the self is at stake: Integrating the self into stress and physical health research* (Doctoral dissertation, Stanford University, 1998).

Kessler, R. C., Kendler, K. S., Heath, A. C., Neale, M. C., & Eaves, L. J. (1992). Social support, depressed mood, and adjustment to stress: A genetic epidemiological investigation. *Journal of Personality and Social Psychology, 62*, 257–272.

Kim, H. S., Sherman, D. K., & Taylor, S. E. (2009). Culture and social support. *American Psychologist, 63*, 518-526.

Koole, S. L., Smeets, K., van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology, 77*, 111-125.

Lane, R. D., Reiman, E. M., Bradley, M. M., Lang, P. J., Ahern, G. L., Davidson, R. J., & Schwartz, G. E. (1997). Neuroanatomical correlates of pleasant and unpleasant emotion. *Neuropsychologia, 35*, 1437–1444.

Lazarus, R. S., & Folkman, S. (1984b). *Stress, appraisal, and coping.* New York, NY: Springer.

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 5, pp. 120–186). New York: Academic Press.

Levine, J. D., Gordon, N. C., & Fields, H. L. (1978). The mechanism of placebo analgesia. *Lancet, 2*, 654–657.

Liberman, A., & Chaiken, S. (1992). Defensive processing of personally relevant health messages. *Personality and Social Psychology Bulletin, 18*, 669–679.

Lieberman, M. D., Eisenberger, N. I., Crockett, M. J., Tom, S., Pfeifer, J. H., & Way, B. M. (2006). Putting feelings into words: Affect labeling disrupts amygdala activity to affective stimuli. *Psychological Science, 18*, 421-428.

Lieberman, M. D., Jarcho, J. M., Berman, S., Naliboff, B. D., Suyenobu, B. Y., Mandelkern, M., & Mayer, E. A. (2004). The neural correlates of placebo effects: A disruption account. *NeuroImage, 22*, 447–455.

Linville, P.W. (1987). Self-complexity as a cognitive buffer against stress-related depression and illness. *Journal of Personality and Social Psychology, 52*, 663-676.

Lozito, M. (2004). Chronic pain: The new workers' comp. *The Case Manager, 15*, 61–63.

Mann, T., Sherman, D., & Updegraff, J. (2005). Dispositional motivations and message framing: A test of the congruency hypothesis in college students. *Health Psychology, 23*, 330–334.

Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*, 224-253.

Master, S. L., Eisenberger, N. I., Taylor, S. E., Naliboff, B. D., Shirinyan, D., & Lieberman, M. D. (2009). A picture's worth: Partner photographs reduce experimentally induced pain. *Psychological Science, 20*, 1316-1318.

Martin, J. K., Tuch, S. A., & Roman, P. M. (2003). Problem drinking patterns among African Americans: The impacts of reports of discrimination, perceptions of prejudice, and "risky" coping strategies. *Journal of Health and Social Behavior, 44*, 408–425.

Mausbach, B. T., von Känel, R., Patterson, T. L., Dimsdale, J. E., Depp, C. A., Aschbacher, K., . . . Grant, I. (2008). The moderating effect of personal mastery on the relations between stress and plasminogen activator inhibitor-1 (PAI-1) antigen. *Health Psychology, 27*, S172-S179.

McCaul, K. D., Johnson, R. J., & Rothman, A. J. (2002). The effects of framing and action instructions on whether older adults obtain flu shots. *Health Psychology, 21*, 624–628.

Michela, J. L. (1987). Interpersonal and individual impacts of a husband's heart attack. In A. Baum & J. E. Singer (Eds.), *Handbook of psychology and health* (Vol. 5, pp. 255–301). Hillsdale, NJ: Erlbaum.

Millar, M. G., & Millar, K. (1995). Negative affective consequences of thinking about disease detection behaviors. *Health Psychology, 14*, 141–146.

Myers, H. F. (2009). Ethnicity- and socio-economic status-related stresses in context: An intergrative review and conceptual model. *Journal of Behavioral Medicine, 32*, 9-19.

Nisbett, R. E., Peng, K., Choi, I., & Norenzavan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review, 108,* 291-310.

Ochsner, K. N. & Gross, J. J. (2008). Cognitive emotion regulation: Insights from social cognitive and affective neuroscience. *Currents Directions in Psychological Science, 17,* 153-158.

Ochsner, K. N., Ray, R. D., Robertson, E. R., Cooper, J. C., Chopra, S., Gabrielli, J. D., & Gross, J. J. (2004). For better or for worse: Neural systems supporting the cognitive down-and-up regulation of negative emotion. *Neuroimage, 23,* 483–499.

Orth, U., Robins, R. W., Trzesniewski, K. H., Maes, J., & Schmitt, M. (2009). Low self-esteem is a risk factor for depressive symptoms from young to old age. *Journal of Abnormal Psychology, 118,* 472-478.

Paquet, C., Dubé, L., Gauvin, L., Kestens, Y., & Daniel, M. (2010). Sense of mastery and metabolic risk: Moderating role of the local fast-food environment. *Psychosomatic Medicine, 72,* 324-331.

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin, 136,* 257-301.

Pearlin, L. I., & Schooler, C. (1978). The structure of coping. *Journal of Health and Social Behavior, 19,* 2–21.

Pham, L. B., Taylor, S. E., & Seeman, T. E. (2001). Effects of environmental predictability and personal mastery on self-regulatory and physiological processes. *Personality and Social Psychology Bulletin, 27,* 611-620.

Pruessner, J. C., Lord, C., Meaney, M., & Lupien, S. (2004). Effects of self-esteem on age-related changes in cognition and the regulation of the hypothalamic-pituitary-adrenal axis. *Annals of the New York Academy of Sciences, 1032*, 186-190.

Reed, M.B., & Aspinwall, L.G. (1998). Self-affirmation reduces biased processing of health-risk information. *Motivation and Emotion, 22*, 99-131.

Richman, L. S., Bennett, G. G., Pek, J., Siegler, I., & Williams, R. B. (2007). Discrimination, dispositions, and cardiovascular responses to stress. *Health Psychology, 26*, 675-683.

Rise, J., Sheeran, P., & Hukkelberg, S. (2010). The role of self-identity in the theory of planned behavior: A meta-analysis. *Journal of Applied Social Psychology, 40*, 1085-1105.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology, 91*, 93-114.

Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly, 44*, 94ff.

Scheier, M. F. & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research, 16*(2), 201-228.

Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology, 67*, 1063–1078.

Schwartz, B. (2004). *The paradox of choice.* New York, NY: Harper Collins Publishers Inc.

Seacat, J. D., & Mickelson, K. D. (2009). Stereotype threat and the exercise/dietary health intentions of overweight women. *Journal of Health Psychology, 14*, 556-567.

Sharkansky, E.J., King, D.W., King, L.A., Wolfe, J., Erickson, D.J., & Stokes, L.R. (2000). Coping with Gulf War combat stress: Mediating and moderating effects. *Journal of Abnormal Psychology, 109,* 188-197.

Sheeran, P., & Orbell, S. (1998). Do intentions predict condom use? Meta-analysis and examination of six moderator variables. *British Journal of Social Psychology, 37,* 231-250.

Sheeran, P., & Orbell, S. (2000). Using implementation intentions to increase attendance for cervical cancer screening. *Health Psychology, 19*(3), 283-289.

Sherman, D. K., Bunyan, D. P., Creswell, J. D., & Jaremka, L. M. (2009). Psychological vulnerability and stress: The effects of self-affirmation on sympathetic nervous system responses to naturalistic stressors. *Health Psychology, 28*, 554-562.

Sherman, D. K., & Cohen, G. L. (2006). The psychology of self-defense: Self-affirmation theory. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, (Vol. 38, pp. 183-242). San Diego, CA: Academic Press.

Sherman, D., Nelson, L. & Steele, C. (2000). Do messages about health risks threaten the self?: Increasing acceptance of threatening health messages via self-affirmation. *Personality and Social Psychology Bulletin, 26*, 1046-1058.

Solberg Nes, L., & Segerstrom, S. (2006). Dispositional optimism and coping: A meta-analytic review. *Personality and Social Psychology Review, 10*, 235-251.

Speisman, J., Lazarus, R. S., Mordkoff, A., & Davidson, L. (1964). Experimental reduction of stress based on ego defense theory. *Journal of Abnormal and Social Psychology, 68,* 367–380.

Sharot, T., Riccardi, A.M., Raio, C.M., & Phelps, E.A. (2007) Neural mechanisms mediating optimism bias. *Nature, 450,* 102–105.

Steele, C. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, (Vol. 21, pp. 181-227). San Diego, CA: Academic Press.

Steele, C. M., Spenscer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. P. Zanna (Eds.), *Advances in experimental social psychology* (Vol. 34, pp. 379-440). San Diego, CA: Academic Press.

Stowell, J. R., Kiecolt-Glaser, J. K., & Glaser, R. (2001). Perceived stress and cellular immunity: When coping counts. *Journal of Behavioral Medicine, 24,* 323–339.

Surtees, P. G., Wainwright, N, W. J., Luben, R., Khaw, K. T., & Day, N. E. (2006). Mastery, sense of coherence and mortality: Evidence of independent associations from the EPIC-Norfolk prospective cohort study. *Health Psychology, 25*, 102-110.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist, 38,* 1161-1173.

Taylor, S. E. (2012). *Health psychology* (8th ed.). New York, NY: McGraw-Hill.

Taylor, S. E., & Broffman, J. I. (2011). Psychosocial resources: Functions, origins, and links to mental and physical health. In J.M. Olson and M.P. Zanna (Eds.), *Advances in experimental social psychology* (pp. 1-57). New York, NY: Academic Press.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103,* 193–210.

Taylor, S. E., Burklund, L. J., Eisenberger, N. I., Lehman, B. J., Hilmert, C. J., & Lieberman, M. D. (2008). Neural bases of moderation of cortisol stress responses by psychosocial resources. *Journal of Personality and Social Psychology, 95,* 197-211.

Taylor, S. E., Lerner, J. S., Sherman, D. K., Sage, R. M., & McDowell, N. K. (2003). Are self-enhancing cognitions associated with healthy or unhealthy biological profiles? *Journal of Personality and Social Psychology, 85,* 605-615.

Taylor, S. E., Sherman, D. K., Kim, H. S, Jarcho, J., Takagi, K., & Dunagan, M. S. (2004). Culture and social support: Who seeks it and why? *Journal of Personality and Social Psychology, 87,* 354-362.

Taylor, S. E. & Stanton, A. L. (2007). Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology, 3*, 377-401.

Taylor, S. E., Welch, W. T., Kim, H. S., & Sherman, D. K. (2007). Cultural differences in the impact of social support on psychological and biological stress responses. *Psychological Science, 18*, 831-837.

Temcheff, C. E., Serbin, L. A., Martin-Storey, A., Stack, D. M., Ledingham, J., & Schwartzman, A. E. (2011). Predicting adult physical health outcomes from childhood aggression, social withdrawal and likeability: A 30-year prospective, longitudinal study. *International Journal of Behavioral Medicine, 18*, 5-12.

Thoits, P. A. (1995). Stress, coping and social support processes: Where are we? What next? *Journal of Health and Social Behavior, (Extra Issue),* 53-79.

Thomas, K. S., Bardwell, W. A., Ancoli-Israel, S., & Dimsdale, J. E. (2006). The toll of ethnic discrimination on sleep architecture and fatigue. *Health Psychology, 25*, 635–642.

Thompson, S. C. (1981). Will it hurt less if I can control it? A complex answer to a simple question. *Psychological Bulletin, 90,* 89–101.

Thompson, S. C., Cheek, P. R., & Graham, M. A. (1988). The other side of perceived control: Disadvantages and negative effects. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health: The Claremont Applied Social Psychology Conference* (Vol. 2, pp. 69–94). Beverly Hills, CA: Sage.

Thompson, S. C., & Spacapan, S. (1991). Perceptions of control in vulnerable populations. *Journal of Social Issues, 47*, 1–22.

Thornton, B., Gibbons, F. X., & Gerrard, M. (2002). Risk perception and prototype perception: Independent processes predicting risk behaviors. *Personality and Social Psychology Bulletin, 28,* 986–999.

Tomfohr, L., Cooper, D. C., Mills, P. J., Nelesen, R. A., & Dimsdale, J. E. (2010). Everyday discrimination and nocturnal blood pressure dipping in black and white Americans. *Psychosomatic Medicine, 72*, 266-272.

Tsenkova, V. K., Love, G. D., Singer, B. H., & Ryff, C. D. (2008). Coping and positive affect predict longitudinal change in glycosylated hemoglobin. *Health Psychology, 27,* S163-S171.

Turk, D. C., & Rudy, T. E. (1991). Neglected topics in the treatment of chronic pain patients—Relapse, noncompliance, and adherence enhancement. *Pain, 44,* 5–28.

Turner, R. J., & Avison, W. R. (2003). Status variations in stress exposure: Implications for the interpretation of research on race, socioeconomic status, and gender. *Journal of Health and Social Behavior, 44,* 488–505.

Uchino, B. N. (2009). Understanding the links between social support and physical health. *Perspectives on Psychological Science, 4,* 236-255.

Wager, T. D., Rilling, J. K., Smith, E. E., Sokolik, A., Casey, K. L., Davidson, R. J., Kosslyn, S. M., Rose, R. M., & Cohen, J. D. (2004, February 20). Placebo-induced changes in fMRI in the anticipation and experience of pain. *Science, 303*, 1162–1167.

Way, B. M., Taylor, S. E., & Eisenberger, N. I. (2009). Variation in the mu-opioid receptor gene (OPRM1) is associated with dispositional and neural sensitivity to social rejection. *Proceedings of the National Academy of Sciences, 106,* 15079-15084.

Waldron, I., Weiss, C. C., & Hughes, M. E. (1998). Interacting effects of multiple roles on women's health. *Journal of Health and Social Behavior, 39,* 216–236.

Walker, L. S., Smith, C. A., Garber, J., & Claar, R. L. (2005). Testing a model of pain appraisal and coping in children with chronic abdominal pain. *Health Psychology, 24*, 364–374.

Webb, M. S., Hendricks, P. S., & Brandon, T. H. (2007). Expectancy priming of smoking cessation messages enhances the placebo effects of tailored interventions. *Health Psychology, 26,* 598-609.

Wegner, D. M., Schneider, D. J., Carter, S. R., & White, T. L. (1987). Paradoxical effects of thought suppression. *Journal of Personality and Social Psychology, 53,* 5-13.

Williams, D. R., & Mohammed, S. A. (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine, 32*, 20-47.

Wills, T. A. (1984). Supportive functions of interpersonal relationships. In S. Cohen & L. Syme (Eds.), *Social support and health* (pp. 61–82). New York, NY: Academic Press.