

Social Cognition and Health

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Abstract and Keywords

Social cognition research has greatly informed health psychology investigations over the last several decades. Social cognition research on attitudes has been an important source for interventions to change health behaviors. Investigations into cognitive biases and message framing have also had considerable impact. Cognitive appraisals are pivotal in the experience of stress. Beliefs about health conditions, including causal attributions, beliefs about control, and illness representations, commonly arise and bear some relation to illness outcomes. Of considerable consequence for well-being and health are affectively-laden cognitions such as negative expectations and positive beliefs. Approach/avoidance frameworks, research on the self, and cognitive and emotional processes involved in disclosure and social support have all been significantly related to well-being and health outcomes. Current social cognition research in health psychology focuses on linking cognitions and cognitive processes to neural and physiological functioning, thereby elucidating the mechanisms by which beliefs and behaviors affect long-term mental and physical health.

Keywords: cognitive appraisals, affective beliefs, social interactions, biological mechanisms, interventions

Introduction

Health has proven to be a fruitful domain in which to explore the ramifications of social cognition. Historically, the study of social cognition in the health domain has moved through several phases. The earliest health-related work in social cognition examined the relation of beliefs to health behaviors, an interface that continues to be productive into the present. Work on message framing and on cognitive biases has also been impactful. In the late 1970's and early 1980's, researchers brought to bear their understanding of cognitive processes, such as causal attribution or beliefs in psychological control, and applied them in the health domain, the idea being that the specific content of such beliefs might predict outcomes such as adjustment to illness or even the course of illness itself. This perspective gave way to a focus on affectively-laden social cognitions in the health domain. Thus, for example, researchers examine optimism, negative affectivity, and related constructs for their ability to predict well-being, adjustment, and health outcomes. Currently, as is true of social cognition more generally, researchers have begun to study the mechanisms underlying social cognitive approaches to health. Thus, for example, researchers are increasingly using such tools as fMRI and biological assays to identify the underlying neural and neuroendocrine processes that may link social, cognitive, and emotional processes to health-related outcomes.

Although social cognition and health psychology evolved over the same time period, there is no over-arching theoretical perspective that links them to each other. Rather, health psychologists have often been opportunistic, seizing upon insights from social cognition to develop interventions or test the relation of particular psychological variables to health outcomes, and social cognition researchers have found the health domain to be a fruitful one within which to test social cognition insights.

The subsequent sections are nonetheless guided by a general framework. Good and poor health result from a broad array of factors, including genetics, exposure to pathogens, and early life experiences. Factors particularly relevant to social cognition include, as will be seen, health beliefs and the construal of events as stressful. Cumulatively, these factors influence psychological and biological health outcomes, but these outcomes are significantly moderated by psychosocial resources that include cognitions such as optimism, a sense of mastery, and the perception that the social environment is supportive. Proximal effects on psychological outcomes, such as distress, and on biological outcomes, such as physiological functioning, are ultimately prognostic for diagnosable health conditions.

Lest one conclude that health is simply a domain to which social cognition is applied, the health arena has also been immensely valuable for uncovering underlying basic theoretically-relevant mechanisms by which mind and body interact. That is, more than any other area of social cognition research, health researchers who have focused on social cognitions have identified the underlying processes whereby beliefs not only influence psychological outcomes, such as well-being, but also autonomic, neural, neuroendocrine, and immunologic processes that may be proximal influences on health outcomes. As such, health research has helped to bring social cognition into integrative science, whereby the contributions of such fields as genetics, molecular biology, and medicine are integrated with the social, cognitive, and emotion research that social cognition has spawned.

(h1) Social Cognition, Health Attitudes and Health Behavior Change

Social psychological research, and in particular, social cognition research on attitudes has been a primary impetus for designing persuasive communications designed to change poor health habits. The rationale underlying the early work was that if one can alert people to health risks

and raise their level of concern, one can motivate them to change their behavior. Current 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 processes 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 outcomes of that action and evaluations of those outcomes. For example, people who believe that exercise will reduce their risk of heart disease will have favorable attitudes towards exercise. 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 exercise 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 contemplated and believes that the action undertaken will have the intended effect. These beliefs combine to produce a behavioral intention and ultimately behavior change.

Despite the success of theories that link beliefs to the modification of health habits, these approaches have some limitations. Cognitive approaches are not always successful in explaining spontaneous behavior change, nor do they necessarily predict long-term behavior change. Moreover, communications designed to change people's cognitions about their health behaviors sometimes evoke defensive or irrational processes (Liberian & Chaiken, 1992; Clarke,

Lovegrove, Williams, & Macpherson, 2000; 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).

Historically, efforts to change health behaviors have emphasized conscious verbal processing. Recently, research from social cognitive neuroscience has found that some successful health behavior change occurs outside of awareness. An important distinction within social cognition research is that between controlled and automatic processing (Petty & Cacioppo, 1986). People can rely on relatively automatic processes or alternatively on more effortful ones, depending on the situation and motivational demands. This dual processing approach has had a profound impact throughout social cognition (Fiske & Taylor, 2008).

Recently, research using fMRI has found that some successful health behavior change can occur outside of awareness, suggesting that automatic processes may sometimes be engaged in producing health behavior change. 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). 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 attitudes and persuasion was, thus, 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 as the impetus for interventions to bring about health behavior change, it continues to provide insights for both understanding and changing health behaviors.

(h2) Message Framing and Cognitive Biases

Much theory and research in social cognition has been devoted to understanding biases in human thought and message framing. This lesson has been imported to health psychology, where it has been employed fruitfully to address health behaviors. 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, such as risk of skin cancers (e.g., McCaul, Johnson, & Rothman, 2002). Messages that emphasize potential costs may work better for inducing people to practice health behaviors that have uncertain outcomes; perhaps the uncertainty undermines commitment to behavior change, which is offset by the impact of the loss frame. Messages that emphasize benefits are 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).

Knowledge concerning errors and biases and their effects on psychological functioning has come not only from social cognition research, but also from health psychology. 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. The theory maintained that these cognitions center around the making of meaning, mastery, and self-enhancement. From these observations, 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 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 in the health domain, it led to a full-blown theory in social cognition, which has generated many dozens of experimental studies, yielding findings suggestive of biological buffering by exaggerated positive cognitions that has fed back into health psychology theory and research.

(h3) Social Cognitive Approaches to Stress

The idea that social cognition is vital to understanding stress was a very early insight in health psychology research. For example, Richard Lazarus and colleagues (Lazarus & Folkman, 1984; Lazarus & Launier, 1978), who initially formulated psychological research on stress and coping, recognized how critical cognitive appraisals are to experiencing stress and mustering the resources for combating it (Lazarus, 1968; Lazarus & Folkman, 1984). These researchers maintained that when people encounter a potentially stressful event, they engage in a process of primary appraisal whereby the event is evaluated to be positive, neutral, or negative in its consequences. Negative or potentially negative events are further appraised for their possible harm, threat, or challenge. Harm is the assessment of the damage that has already been done. Threat is the assessment of possible future damage that may be brought about by the event. Challenge perceptions represent the potential to overcome or even profit from an event (cf. Tomaka, Blascovich, Kelsey, & Leitten, 1993). Thus, stressful events are not intrinsically harmful or threatening, but are rather influenced by the cognitive appraisals that are made.

The importance of primary appraisal in the experience of stress was well illustrated in an early classic study of stress (Speisman, Lazarus, Mordkoff, & Davison, 1964). College students viewed a gruesome film depicting unpleasant tribal initiation rites that included genital

mutilation. Before viewing the film, they were exposed to one of four experimental conditions. One group listened to an anthropological account of the meaning of the rites. Another group heard a lecture that de-emphasized the pain the initiates were experiencing and emphasized their excitement over arriving at manhood. A third group heard a description that emphasized the pain and trauma that the initiates were undergoing, and a fourth group was given no introductory context. Measures of autonomic arousal and self-reports indicated that the first two groups experienced considerably less stress than did the group whose attention was focused on the trauma and pain. Thus, beliefs about the meaning of the event were critical not only to its impact on psychological reactions but also to physiological responses to the gruesome stimuli.

As primary appraisals are taking place, secondary appraisals are initiated as well. Secondary appraisals involve the assessment of one's abilities and resources and whether they will be sufficient to meet the harm, threat, or challenge of a stressful event. The person thinks through what can be done, comes up with plans and responses (or not), and develops a sense of whether the potentially stressful event can be managed. Ultimately, the subjective experience of stress is a balance between primary and secondary appraisals. When harm and threat are high, and the perception of one's coping abilities and resources is low, substantial stress is experienced, whereas when coping abilities and resources are high, stress may be minimal.

Beliefs About Illness

Many of the early applications of social cognition research to health involved relating specific social cognitions to problems faced by people with chronic conditions or illnesses. Chronic illness is an important topic in health psychology for a number of reasons. At any given time, 50% of the population has a chronic condition that involves medical management (Taylor, 2012). These conditions may range from relatively mild ones such as a partial hearing loss to

severe and life-threatening disorders, such as cancer, coronary artery disease, and diabetes. These are conditions with which people may live for decades, yet medical facilities are much better designed for dealing with acute disorders that can be cured than they are for dealing with chronic illnesses that can only be managed. Thus, people who have chronic conditions must engage in a great deal of self-management, and so the ways in which they construe their disorders can influence their health behaviors, sense of well-being, and ultimately, the course of illness.

Beliefs About Causes. People with both acute and chronic disorders often develop theories about where their illnesses or disorders came from (Costanzo, Lutgendorf, Bradley, Rose, & Anderson, 2005). For example, researchers have explored how patients place blame for their disorders: Do they blame themselves, another person, the environment, a quirk of fate, or some other factor?

Self-blame for chronic conditions is common. People frequently perceive themselves as having brought on their disorders through their own actions. In some cases, these perceptions are to a degree correct. Poor health habits, such as smoking and a poor diet or lack of exercise, can contribute to heart disease, stroke, and cancer. But in many cases, self-blame is ill placed, as when a disease is brought on primarily by a genetically-based defect or exposure to an infectious or toxic agent. What are the consequences of self-blame? Despite substantial efforts to arrive at a definitive answer to this question, none has been found. Using correlational methods that relate cognitions to distress, some researchers have found that self-blame can lead to guilt, self-recrimination, or depression (Bennett, Compas, Beckjord, & Glinder, 2005). For example, Frazier, Mortensen, and Steward (2005) found that self-blame for a physical assault prompted coping through social withdrawal, which in turn predicted heightened psychological distress. But perceiving the cause of one's disorder as self-generated can also represent an effort to assume

control over the disorder. Such feelings can be adaptive in coming to terms with the disorder. It may be that self-blame is adaptive under some circumstances but not others (Schulz & Decker, 1985; Taylor, Lichtman, & Wood, 1984).

Research uniformly suggests, however, that blaming another person for one's disorder is maladaptive (e.g., Affleck, Tennen, Pfeiffer, & Fifield, 1987, Taylor et al., 1984). For example, some patients believe that their disorder was brought on by stress caused by family members, ex-spouses, or colleagues at work. The direction of causality in the observational studies is, however, unclear. Blame of others may be tied to unresolved hostility, which can itself interfere with adjustment to the disease and potentially exacerbate its course.

On the whole though, causal attributions for one's disorder have not been found to have substantial explanatory value in understanding either psychological adjustment to a disorder or its course. Indeed the focus on causal attributions may simply be misplaced. Although for many disorders, people do come up with causal explanations, 98% in one study (Taylor et al., 1984), ultimately people move on and other types of cognitions may become more important.

Research on causal attributions that has focused on underlying dimensions of attribution, rather than their specific content, has produced more robust conclusions. In a meta-analysis of 27 studies on causal attributions and coping with illness, Roesch and Weiner (2001) found that internal, unstable, or controllable attributions were associated with positive adjustment through greater association with adaptive coping efforts; stable and uncontrollable illness attributions were associated with maladjustment through avoidant coping.

Beliefs about Control. Psychological control is the belief that one can determine one's own behavior, influence one's environment, and bring about desired health outcomes (Fiske & Taylor, 1991). It is closely related to self-efficacy, which is the more narrow perception that one

has the ability to take the necessary actions to obtain a specific outcome in a specific situation (Bandura, 1977). Both types of beliefs help people manage a wide variety of stressful events (Wrosch, Schultz, Miller, Lupien, & Dunne, 2007). In both experimental studies that manipulate perceived control, as well as studies that examine the relation of spontaneous feelings of control to adjustment, psychological control has been found to be typically associated with better adjustment to stressful events and to physiological outcomes. For example, adolescents with asthma who experience a high sense of control have better immune responses related to their disease (Chen, Fisher, Bacharier & Strunk, 2003). A high sense of control has been linked to lower risk for mortality as well (Surtees, Wainwright, Luben, Khaw, & Day, 2006).

Control appears to be especially important for people, such as medical patients, children, and the elderly, who are at risk for health problems (Wrosch et al., 2007). For example, in an experimental study with institutionalized elderly participants, Langer and Rodin (1976) assigned half of the participants to a control enhancing intervention, which involved encouraging them to make choices and decisions and to care for a plant; the other half were assigned to a comparison condition. Those in the control-enhancing group subsequently participated in more group activities, had a greater sense of well being, and were more alert; moreover, 18 months later they were judged to be in better health (Rodin & Langer, 1977). Thus, a quite modest intervention to enhance control had enduring, self-sustaining effects in this control-challenged population.

So powerful are the effects of psychological control beliefs that they are now used extensively in interventions to promote good health habits and to help people cope with difficult medical procedures, such as surgery, gastroendoscopic examinations (Johnson & Leventhal, 1974), childbirth (Leventhal, Leventhal, Shacham, & Easterling, 1989), and the management of many other chronic conditions (Ludwick-Rosenthal, & Neufeld, 1988 for a review). When

people are given even modest steps they can take during such an event, such as controlled breathing or rethinking the meaning of a procedure, they cope more successfully with it (Taylor, 2012).

Researchers have also examined whether people who believe they can control their disorders are better off than those who do not see their disorders as under personal control. Indeed, people develop a number of control-related beliefs with respect to disorders. They may believe, as do many cancer patients, that they can prevent a recurrence of a disease through good health habits or even sheer force of will. They may believe that by complying with treatments and physician recommendations, they achieve vicarious control over their illnesses (Helgeson, 1992). They may believe that they have control over illness through self-administration of a treatment regimen. In some cases, these control-related beliefs are true or hold a kernel of truth. For example, if patients faithfully follow a treatment regimen, they may very well exercise real control over the course of their illness. On the other hand, some beliefs, such as the belief that one's illness can be controlled through a positive attitude, may or may not be correct.

Nonetheless, a belief in control and a sense of self-efficacy with respect to a disorder and its treatment are generally adaptive (Thompson, Nanni, & Levine, 1994). Beliefs in control are related to improved adjustment among patients with a broad array of chronic conditions including cancer (Taylor et al., 1984), rheumatoid arthritis (Tennen, Affleck, Urrows, Higgins, & Mendola, 1992), sickle cell disease (Edwards, Telfair, Cecil, & Lenoci, 2001), chronic obstructive pulmonary disease (Kohler, Fish, & Greene, 2002), AIDS (Taylor, Helgeson, Reed, & Skokan, 1991), and many others. Even for patients who are physically or psychologically doing poorly, adjustment is facilitated by beliefs in control (McQuillen, Licht, & Licht, 2003). Thus, perceptions of control appear to be helpful for managing both acute disorders and

treatments as well as the long-term management issues that may arise from chronic or advancing illness (Schiaffino & Revenson, 1992). In fact, a sense of control may actually help to prolong life. For example, a study of patients with chronic obstructive pulmonary disease found that those with high self-efficacy expectations lived longer than those without such expectations (Kaplan, Ries, Prewitt, & Eakin, 1994).

Psychological control is a pivotal concept in health psychology. Much of the research is experimental, manipulating perceived control to the psychological and the biological benefit of the target group, whereas other studies have focused more on self-generated feelings of control. In both cases, the positive relationship between perceptions of control and adjustment has been clear, and evidence continues to mount that biological outcomes are beneficially affected as well.

Illness Representations

People hold cognitive schemas of their illnesses that influence how they manage them (Henderson, Hagger, & Orbell, 2007; Leventhal, Weinman, Leventhal & Phillips, 2008). Termed illness representations, these organized conceptions of illness are acquired through the media, through personal experience, and from family and friends (see Croyle & Barger, 1993, for a review). Illness representations can range from being quite sketchy and inaccurate to extensive, technical, and fairly complete. They lend coherence to a person's understanding of the illness experience, and as such, can influence preventive health behaviors, interpretations of symptoms or diagnosis, adherence to treatment and expectations for future health (Rabin, Leventhal, & Goodin, 2004).

Most people have at least three conceptions of illness: An acute illness, caused by specific agents that is short in duration with no long-term consequences (e.g., the flu); chronic illness, caused by health habits, possibly genetic predispositions, and environmental factors,

which is long in duration, often with long-term and/or severe consequences (e.g., heart disease); and cyclic illness, marked by alternating symptomatic and symptom-free periods (e.g., herpes).

People vary in how they interpret the same disorder. For example, diabetes may be regarded as a cyclical condition by one patient but as a chronic condition by another. One person with hypertension may consider it to be an episodic disorder, whereas another person may recognize its chronic nature. Clearly the person who understands the chronic nature of a serious condition is predisposed to show more appropriate self-management, including following medication regimens, generating appropriate expectations about the future, and interpreting new symptom-related information. Conceptions of illness, thus, have the potential to influence health behavior and long-term health in important ways (Leventhal et al., 2008).

(h4) Affective Cognition

In recent years, health psychology research has explored emotion-laden cognitions that may have special relevance in the health domain. This shift in emphasis coincides roughly with a broader change within social cognition, specifically the movement away from an emphasis on cold, non-motivational processes of inference to more motivational and affective processes (Fiske & Taylor, 1991). Health-related social cognition research has, thus, especially focused on cognitions that have an emotional component, such as pessimistic and optimistic expectations regarding health conditions.

One of the reasons for focusing on cognitions with an affective component stems from the fact that such beliefs often engage physiological and neuroendocrine activity. Under conditions of threat or stress, at least two important systems of the body are engaged. The first is the sympathetic nervous system, which includes indicators such as heart rate and blood pressure. The second is the hypothalamic pituitary adrenal system, which engages stress hormones such as

cortisol. Together, these two systems mobilize the body to fend off threats or stress. Over the short term, these are highly protective responses. Over the long term, however, researchers believe that underlying biological damage accumulates (McEwen, 1998). As these biological stress systems are repeatedly engaged in response to challenging or stressful circumstances, the systems may lose their elasticity and ability to respond adaptively to changing circumstances. These systems may develop new higher set points with adverse health consequences, or they may simply lose their resiliency. An example is high blood pressure: In response to repeated engagement of the sympathetic nervous system, blood pressure level may edge up, with the result that over time, a risk for disease, such as hypertension and heart disease, increases. These changes are typically associated with aging, and so to the extent that they occur in younger people who are coping with chronically stressful events, these changes may be thought of as representing accelerated aging of biological systems. Adverse changes in immune functioning as a result of chronic exposure to stressful events may also occur. The following sections will often refer to such outcome variables as elevated neuroendocrine activity and elevated cortisol as markers of stress exposure. Elevation or loss of elasticity in these processes does not necessarily mean that disease will result, but it does indicate a likely increased risk of certain health disorders.

Negative Expectations

Certain people are dispositionally predisposed to experience events as particularly stressful, which in turn exacerbates their psychological distress, their physical symptoms, the likelihood of illness, and even whether the illness progresses. This line of research began with exploration of the psychological state, negative affectivity (Watson & Clark, 1984), a pervasive negative mood marked by anxiety, depression, and hostility. People high in negative affectivity

(or neuroticism) hold negative expectations about a variety of potential outcomes in their lives, and they express distress, discomfort, and dissatisfaction across a wide range of situations (Gunthert, Cohen, & Armeli, 1999). People high in negative affectivity are more likely to report and experience unpleasant physical symptoms (Watson & Pennebaker, 1989; Cohen, Doyle, Turner, Alper, & Skoner, 2003). Some of this tendency appears to be because they are inwardly focused and catastrophize even minor symptomatic experiences.

But negative affectivity and neuroticism are also related to poor health (e.g., Friedman & Booth-Kewley, 1987). In prospective correlational studies, negative beliefs about the self and the future have been tied to a decline in helper T-cells (CD4), an indicator of immune functioning, and the onset of AIDS in people with HIV (Segerstrom, Taylor, Kemeny, Reed, & Visscher, 1996). Negative expectations have also been related to an accelerated course of disease (Ironson et al., 2005; Reed, Kemeny, Taylor, & Visscher, 1999; Reed, Kemeny, Taylor, Wang, & Visscher, 1994). Negative affectivity is associated with elevated cortisol (a stress hormone), and high levels of adrenocortical activity may provide a biopsychosocial pathway that links negative expectations to at least some adverse health outcomes (Polk, Cohen, Doyle, Skoner, & Kirschbaum, 2005). Although these studies are correlation in nature, they are typically prospective over time and demonstrate that the changes in negative beliefs precede, often substantially precede, changes in health markers. As such, the evidence implies that these beliefs may cause changes in disease status.

Positive Beliefs

Although research has focused somewhat disproportionately on the negative beliefs that exacerbate or result from medical conditions, many people experience positive reactions, such as joy, optimism, or personal growth as they confront the challenging health events in their lives.

Typically these studies identify cognitions that have arisen spontaneously in people dealing with threatening events and examine their relation to adjustment and, in some cases, biological and illness-related outcomes as well. For example, one study (Collins, Taylor, & Skokan, 1990) found that more than 90% of cancer patients reported at least some beneficial changes in their lives as a result of cancer. Similarly in a study of heart attack patients, more than a third reported that their lives had improved overall (Mohr et al., 1999). Typically, these reported changes include an increased ability to appreciate each day and the inspiration to do things now rather than postpone them. Many people say that they are putting in more effort into their relationships and believe that they have acquired more awareness of others' feelings and more empathy and compassion for others. They report feeling stronger and more self-assured as well. Benefit finding has been tied not only to better psychological and social functioning, but to better health outcomes as well (e.g., Aspinwall & MacNamara, 2005; Danoff-Burg & Revensen, 2005; Low, Stanton, & Danoff-Burg, 2006). For example, in prospective, correlational studies, the ability to find meaning in one's challenging experiences appears to slow declines in CD4 levels among HIV-seropositive men and has been related to a lower likelihood of AIDS-related mortality among people with HIV infection (Bower, Kemeny, Taylor, & Fahey, 1997; Bower, Moskowitz, & Epel, 2009).

One might wonder how people attempting to cope with difficult health-related events manage to achieve a high quality of life and find benefits in their experiences. Some of these experiences reflect an active deploying of certain social cognitions for managing these events. For example, most people perceive some degree of control over what happens to them, hold positive expectations about the future, and have a positive sense of self. These kinds of beliefs are adaptive for mental and physical health much of the time (Taylor, 1983; Taylor & Brown,

1988), but they become especially important when a person first faces a stressful challenge, such as a chronic illness or other major health event. In one investigation, Helgeson (2003) examined these beliefs in men and women treated with angioplasty for coronary artery disease and then followed them over four years. A positive sense of self, perceived control, and optimism about the future not only predicted positive adjustment to the disease, but also a reduced likelihood of sustaining a repeat cardiac event. Other studies have also found positive reactions to be associated with better mental and physical health (Cohen & Pressman, 2006; Pressman & Cohen, 2005). A positive emotional style has been tied to lower cortisol levels (Polk et al., 2005), better immune responses to vaccinations (Marsland, Cohen, Rabin, & Manuck, 2006), resistance to illness following exposure to a flu virus (Cohen, Alper, Doyle, Treanor, & Turner, 2006), and other beneficial health outcomes.

Optimism. Much of the work on positive beliefs has focused on optimism (Scheier, Carver, & Bridges, 1994). Optimism is typically measured using the Life Orientation Task (LOT-R; Scheier et al., 1994), which includes such items as “In uncertain times, I usually expect the best” and the reverse-coded item, “If something can go wrong for me it will.” Research consistently finds that optimism is associated with better well-being and adjustment to adverse health conditions. For example, prospective correlational research reveals that optimism is protective against the risk of coronary heart disease (Kubzansky, Sparrow, Vokonas, & Kawachi, 2001), the side effects of cancer treatment (De Moore et al., 2006), depression (Bromberger & Matthews, 1996), and cancer mortality among the elderly (Schulz, Bookwala, Knapp, Scheier, & Williamson, 1996) among other beneficial outcomes. Recently, some of the underlying mechanisms whereby optimism may affect such positive outcomes have been uncovered. Optimists have a more positive mood, which itself may promote a state of physiological

resilience. Optimism may also promote more active and persistent coping efforts which may improve long-term prospects for well-being and physical health (Segerstrom, Taylor, Kemeny, & Fahey, 1998). Optimists appear to appraise potentially stressful situations more positively and seem especially prone to making favorable appraisals that their resources will be sufficient to overcome any threat (Chang, 1998). In turn, optimists may not only experience lower levels of stress on the psychological level but also experience less wear and tear on the biological systems that underlie stress responses. These processes in turn may improve health.

The health domain has provided a valuable venue for understanding the dynamics of optimism. Specifically, concerns had been expressed as to whether optimism keeps people from confronting negative events and information that would be useful to them (Weinstein & Klein, 1995). In a study that examined this hypothesis, Aspinwall and Brunhart (1996) found that optimistic beliefs about one's health predicted greater, not less, attention to risk-related information than to neutral information and greater recall of risk-related information, especially when the information was self-relevant. Thus, being optimistic may actually increase rather than decrease receptivity to personally-relevant negative threat-related health information.

(h5) Social Cognition and Coping

As the previous sections have suggested, many of the social cognitions that people develop in response to health disorders enable them to cope more effectively, an issue to which we turn more explicitly here.

Approach/Avoidance

Numerous frameworks for understanding coping have been advanced (for a review, see Skinner, Edge, Altman, & Sherwood, 2003), but one central distinction is approach versus avoidance coping. Reflecting a core motivational construct (e.g., Davidson, Jackson, & Kalin,

2000) that is central to social cognition research, the approach/avoidance continuum maps easily onto broader theories of biobehavioral functioning. Approach-oriented coping, sometimes called active, confrontative, or vigilant coping, involves gathering information or taking direct action with respect to stressful events, problem solving, seeking social support, and creating outlets for emotional expression. Avoidant coping involves withdrawing from, minimizing, or avoiding stressful events.

Although neither style is necessarily more effective for managing stressful events, inasmuch as each has advantages and liabilities, on the whole avoidant coping has proven to be generally unsuccessful. The empirical literature suggests that coping through avoidance can be useful in some specific situations, particularly those that are short-term and uncontrollable (Suls & Fletcher, 1985); however, over the long term, avoidance coping is not helpful. Attempting to avoid thoughts and feelings surrounding persistent problems predicts elevated distress across a variety of stressful events (Taylor & Stanton, 2007). And as Wegner's work on ironic processes suggests (e.g., Wegner, Schneider, Carter, & White, 1987), avoidance is not always successful, with reminders of stressful events breaking through into consciousness. Avoidance-oriented coping also predicts lower adherence to medical regimens, greater viral load in HIV seropositive individuals (Weaver et al., 2005), more risky behaviors in HIV seropositive individuals (Avants, Warburton, & Margolin, 2001), increased physical symptoms among caregivers (Billings, Folkman, Acree, & Moskowitz, 2000), compromised recovery from surgery (Stephens, Druley, & Zautra, 2002), and compromised recovery of function (Stephens et al., 2002; see Taylor & Stanton, 2007, for a review). Avoidant behavior under stress has been tied to heightened neuroendocrine activity as well (e.g., Roelofs, Elzinga, & Rotteveel, 2005; Rosenberger, Ickovics, Epel, D'Entremont, & Jokl, 2004); this is important because many medical scientists

and health psychologists believe that exposure to heightened neuroendocrine activity has cumulative adverse effects that may contribute to such disorders as heart disease, hypertension, and cancers. Passive avoidant coping has also been tied to tumor development in animal models. For example, Vegas, Fano, Brain, Alonso, and Azpiroz (2006) found that mice who dealt with aggressive encounters with other mice through absence of attack, subordinate behavior, and little exploration were more likely to develop metastases in response to tumor implantation than were mice who responded more aggressively. Findings such as these suggest a potential role for avoidance in the exacerbation of some illnesses. Although most of this research is correlational, much is prospective, controlling for time 1 levels of the outcome variable. Findings are somewhat less consistent for approach coping, but generally, approach coping leads to better psychological and physical functioning in stressful circumstances (e.g., Billings et al., 2000; Keefe et al., 1997).

The Self and Health Outcomes

The self has been one of the central topics of social cognition research, and not surprisingly, many of the findings have applicability to coping processes. Theories of the self including self-affirmation theory (Steele, 1988) and cognitive adaptation theory (Taylor, 1983) posit that affirmation or enhancement of the self can buffer an individual against the adverse effects of stress. These hypotheses have been widely tested both experimentally through interventions that shore up a sense of self as well as correlationally by looking at differences between people who hold or do not hold self-enhancing cognitions. Consistent with this reasoning, Taylor, Lerner, Sherman, Sage and McDowell (2003) found that relative to their peers, people who enhanced their personal qualities had lower basal cortisol levels and lower cardiovascular responses to a laboratory stress challenge than those who did not (see also Seery,

Blascovich, Weisbuch, & Vick, 2004); these effects are potentially important because they imply a protective effect of self-enhancement on biological stress responses, which, as noted, may have cumulative adverse effect on health

These findings also suggest that self-affirmation might be an effective intervention for helping people deal with stressful events. In a test of this hypothesis, Creswell, Welch, Taylor, Sherman, Gruenewald, and Mann (2005), assigned participants either to complete a self-affirmation task (writing about a personally important value) or to a control task (writing about a less important value) prior to participating in a laboratory stress challenge (counting backwards by 13s as rapidly as possible and delivering a talk to an unresponsive audience). Those who had affirmed their values had significantly lower cortisol responses to stress compared with control participants. Self-esteem moderated the relationship between self-affirmation and psychological stress responses, such that people with high dispositional self-esteem and optimism who affirmed their personal values reported the least stress. Thus, reflecting on personal values through self-affirmation can help to keep neuroendocrine as well as psychological responses to stress at low levels. Similarly, affirmation of personal values can attenuate perceptions of threat (Sherman & Cohen, 2002), reduce ruminative thought after failure (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999), and reduce defensive responses to threatening information (Sherman, Nelson, & Steele, 2000).

The self-affirmation perspective has also been used to construct effective communications to change health behaviors (Sherman et al., 2000). When people have affirmed important self-related values, they are more receptive to health information that might otherwise be threatening. This principle has been used to influence receptivity to communications about

vulnerability to breast cancer, risk for HIV, and risks to oral health (Sherman, Updegraff & Mann, 2008).

(h6) Social Cognition, Social Interaction, and Health

Thus far, the social cognition research discussed has focused heavily on how individuals construe health-related circumstances. This individualistic emphasis is consistent with much early research in social cognition and has persisted even as affectively-based social cognition has become a more central focus of the field. However, social cognitions become especially significant in social interaction, and we now turn to some of the evidence that bears on this issue.

Disclosure/Writing

Considerable research has examined the impact of disclosing emotional experiences, often through talking or writing interventions, and the beneficial effects on health that can result. The rationale for benefits of disclosure stem from several factors. One such factor involves the benefits of clarifying emotional states. This type of coping is called emotional approach coping, and it involves focusing on and working through emotional experiences in conjunction with a stressor (Stanton, Danoff-Burg, Cameron, & Ellis, 1994). Emotional approach coping has been shown to improve adjustment to a broad array of chronic conditions. Even managing the normal stressors of daily life can benefit from emotional approach coping (Stanton, Kirk, Cameron, & Danoff-Burg, 2000).

Writing about or otherwise disclosing personal stressors or traumas may also lend cognitive clarity to the process of working through such events, helping people to organize their thoughts, understand their reactions better and find meaning in them (Lepore, Ragan, & Jones, 2000). Talking with others may allow one to gain information about an event or about effective coping and may also elicit support from others. In an early study, Pennebaker and Beall (1986)

had 46 undergraduates write either about the most traumatic and stressful event of their lives or about a trivial topic. Although people writing about traumas were more upset right after they had written their essays, they showed improvement in their health during the following six months. Generally speaking, these are the findings of writing interventions: Immediate psychological distress but long-term improvements in health and in some cases well-being (Lepore & Smyth, 2002). For example, Pennebaker, Hughes, and O'Heeron (1987) found that when people talked about traumatic events, their skin conductance, heart rate, and blood pressure all decreased. Writing interventions can also have beneficial long-term effects on immune functioning (e.g., Petrie, Booth, Pennebaker, Davison, & Thomas, 1995). So well established is the value of this method that interventions show improved health among AIDS patients (Petrie, Fontanilla, Thomas, Booth, & Pennebaker, 2004), breast cancer patients (Stanton et al., 2002), asthma and rheumatoid arthritis patients, as well as other conditions (Norman, Lumly, Duley, & Diamond, 2004).

The Construal of Social Relationships and Support

How people construe their social relationships and whether or not they regard them as supportive is one of the most important psychosocial resources that protects against the ravages of stress. Social support is defined as information from others that one is loved and cared for, esteemed and valued, and part of a network of communication and mutual obligations (Wills, 1991). The effects of social support on health outcomes are extremely well-established and powerful. Indeed, the effect size of social support in predictive studies of morbidity and mortality is at least as strong as that for smoking and lipid levels, among other well-established risk factors for chronic illness and mortality (House, Landis, & Umberson, 1988).

Early in the study of social support, researchers focused heavily on the number of people in a person's network, how interconnected they are, and how emotionally close to the recipient they are. Research by health psychologists also focused heavily on explicit socially supportive exchanges during which one person gives aid, advice, or emotional support to another. What has become increasingly clear, however, is that the construal of social support and not its actuality is most important. In other words, the social cognitions people hold about their relationships play a substantial role in how effective social support is.

Moreover, it has become evident that both attempts to extract social support from others and interpersonal interactions intended to convey social support can backfire. Would-be support providers may fail to provide the kind of support that is needed and may react instead in an unsupportive manner that aggravates stressful events (Rook, 1984). When social support is provided by another person, it may undermine the self-confidence, self-esteem, or the self-perceived resourcefulness of the recipient. Consequently, in some cases, invisible support, namely support that is reported to have been provided by a provider but not perceived by the recipient, may be more effective than support that is conveyed in more obvious form (e.g., Bolger, Zuckerman, and Kessler, 2000). Receiving support from another person without realizing it may provide the benefits of support provided without undermining important self-related cognitions, such as self-confidence or autonomy.

Following from this is the observation that the mere perception of social support, whether or not it is actually present or actually utilized, can be stress-reducing with concomitant benefits for well-being. In fact, beliefs about the availability of support appear to exert stronger effects on mental health outcomes than the actual receipt of social support does (Thoits, 1995). Thus, in important respects, people carry their social support networks around in their heads, as social

cognitions, to buffer them against stress without ever having to recruit their networks in active ways. In so doing, they appear to largely reap the benefits of social support without incurring its potential costs.

Insights such as these have prompted efforts to identify evidence at the neural level to identify the pathways by which social support achieves its beneficial effects. To chart a potential route, Eisenberger and colleagues (Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007) assessed participants' social support as experienced over a 9-day period; at the end of each of the 9 days, participants reported on how socially supportive their experiences had been, and then a measure of social support was created by summing across the 9 days. At a second point in time, their brains were scanned while they participated in a virtual social task in the scanner, during which they were gradually excluded from the social interaction; this paradigm has previously been found to provoke significant social distress that is correlated with activity in the dorsal anterior cingulate cortex (dACC) (Eisenberger, Lieberman, & Williams, 2003), a region of the brain that monitors threat. At a third point in time, participants completed stressful tasks in the laboratory. People who reported more experiences of social support during the preceding nine days had lower dACC activity in response to the virtual social exclusion task and exhibited lower cortisol responses during the stress tasks. Individual differences in dACC during the exclusion task mediated the relationship between social support and cortisol reactivity. These findings are important because they identify an underlying pathway from the construal of daily social support through the brain's response to social interaction to neuroendocrine activity, which, as noted, may be implicated in illness.

In summary, then, how people construe the social environment, specifically, whether they regard it as supportive or not, has strong and consistent effects on health; the neural and

neuroendocrine pathways by which these construals affect health outcomes are becoming increasingly well-understood.

(h7) Linking Cognition to Neural and Physiological Functioning

As may be apparent from the preceding example, just as social cognition research has moved increasingly toward social cognitive neuroscience using such techniques as fMRI (Fiske & Taylor, 2008), so applications to health psychology have also moved in that direction. This has been a productive line of research for several reasons. Knowledge of the neural underpinnings by which social cognitions may exert protective effects on mental and physical health outcomes may not only suggest strategies for interventions but also suggest criteria by which interventions may be evaluated, as by identifying whether activity in particular brain regions is affected by interventions.

Addressing these pathways requires a bit of background regarding brain regions involved in the experience of stress. 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 hypothalamus to promote adaptive responses to stress. The amygdala is especially sensitive to environmental cues signaling danger or novelty (e.g., Hariri, Bookheimer, & Mazziotta, 2000). The dACC serves as a threat detector, responding to conflict in incoming information (Carter et al., 2000) and to social distress (Eisenberger et al., 2003).

Once activated, these neural threat detectors set into motion a cascade of responses through projections to the hypothalamus and the lateral prefrontal cortex aimed at amplifying or attenuating the threat signal and enabling a person to prepare to respond to the threat. For example, links to the hypothalamus are likely to have downstream effects on both sympathetic

and hypothalamic pituitary adrenal responses to threat, both of which are activated in response to stressors.

A neural region that appears critical for regulating the magnitude of these biological and neural responses to stress is the ventrolateral prefrontal cortex (VLPFC; Hariri et al., 2000; Ochsner et al., 2004). Specifically, activation of the right VLPFC can directly down-regulate activation of the amygdala and the dACC, and so it can be thought of, at least in part, as a self-regulatory structure that modulates the reactivity of brain regions that respond to stress.

The neural bases of threat detection and regulation are important to studying health because they provide clues as to how coping processes regulate psychological and biological health-related outcomes. For example, people with strong coping resources may show lower amygdala and/or dACC reactivity to threatening stimuli. Alternatively, they may show stronger VLPFC responses to threatening stimuli. A third possibility is that strong coping resources may be manifested in the relation between the VLPFC and threat responsive regions; specifically, a strong negative correlation would suggest better regulation of threat responsivity by the VLPFC. As already noted, perceived social support influences downstream stress responses by modulating neurocognitive reactivity to stress, which in turn attenuates neuroendocrine stress responses (Eisenberger et al., 2007).

In an fMRI investigation, Taylor, Burklund, Eisenberger, Lehman, Hilmert, and Lieberman (2008) explored the ways in which health-related cognitions, including optimism, personal control and a positive sense of self, beneficially affect stress responses. Two hypotheses were examined, first, that psychosocial resources are tied to decreased sensitivity to threat, and second, that coping-related resources are associated with enhanced prefrontal inhibition of threat responses during threat regulation. Using fMRI, this study found that these health-related

cognitions were associated with greater right ventrolateral prefrontal cortex activity and less amygdala activity during a threat regulation task. These cognitions were also related to lower cortisol responses to laboratory stressors. Mediation analyses suggested that the relation of these cognitions to lower cortisol reactivity was mediated by lower amygdala activity during threat regulation. Thus, this study suggests that health-related cognitions may be associated with lower biological stress responses (cortisol) by means of enhanced inhibition of threat responses during threat regulation and not by diminished perceptions of threat.

(h8) Interventions

Social cognition research has generated a variety of interventions that have helped people to manage stressful events more successfully, predicting better well-being and better health. The clearest examples of these intervention benefits have perhaps been the writing interventions already referred to. For example, one intervention (Mann, 2001) assigned HIV seropositive women to write about positive events that would happen in the future or to complete a control writing task. Among participants who were initially low in optimism, the writing intervention led to increased optimism, self-reported increases in adherence to medications, and less distress from medication side effects. These findings suggest that a future-oriented positive writing intervention may be a useful technique for decreasing distress and increasing adherence, especially for initially pessimistic people.

Social cognition research on attitudes is likely to be a continuing influence on interventions. 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). As such, it provides guidelines for the development of interventions to change health habits, as by targeting particular cognitions for modification.

Stress management interventions draw significantly on social cognition for their efficacy. In these interventions (Taylor, 2012), participants are first taught to identify and verbalize the stressors in their lives. In the self-monitoring phase that follows, participants monitor their behavior in response to stress to identify emotional and cognitive responses to stress. Participants are then taught how to chart their stress responses, to examine the antecedent conditions under which they experience stress. For example, one person may feel substantial stress is response to a deadline at work, although another individual might regard the same circumstances as challenging. Identifying negative self-talk and modifying these cognitions is an important phase of the stress management process as well. That is, people can undermine their ability to manage their stress by mentally rehearsing failure or dwelling on the prospect of being overwhelmed.

As participants experience a sense of control over their stressors, the antecedents, and how they respond to them, they are able gradually to introduce coping techniques for managing stress. These include re-appraising stressful events as less so, identifying the personal and social resources they can use to combat stressful events, and reassuring themselves that, as persons of worth with skills and talents, they will be able to manage stress more successfully.

Participants then set explicit goals for managing stress, engage in positive self-talk, and use self-instruction to combat the specific stressors that they encounter. Self-instruction involves reminding oneself of specific steps that are required to achieve the goals, and positive self-talk involves providing oneself with specific encouragements. Although stress management

interventions draw on principles of cognitive-behavior therapy, the degree to which these therapies and their implementation in health settings have their basis in social cognition is clear.

(h9) Future Directions

The scope of health psychology issues to which social cognition interventions have been directed has been relatively modest to date, and that the potential to expand such interventions is substantial. For example, one of the biggest problems in patient care is remarkably low levels of adherence to treatment recommendations. Even the most casual exposure to patient-practitioner communication issues, however, suggests that basic principles of social cognition could help to address this problem. Consider the context in which treatment recommendations are dispensed. In traditional medical practice, a patient who is anxious about his or her health and is no doubt distracted as a result is expected to attend to and remember a physician's outline of the details of care. The person may then be sent home, sometimes with a prescription that says no more than "Take as directed." An examination of the literature on patient-practitioner communications indicates that suggestions such as "write down the regimen" and "test the patient for recall" qualify as breakthroughs in this problem area (Taylor, 2012). It seems likely that insights from such social cognition research as busyness (Gilbert, Pelham, & Krull, 1988), memory, dual processing, and the impact of emotion on cognitive processing, could be fruitfully employed to design practitioner communications with patients and the construction of aids to recall for patients. Many health messages are likely to be processed peripherally, in highly busy conditions. What constitutes an effective message may be informed by insights from these literatures. By contrast, if a health care provider has a patient's undivided attention, the message may be processed centrally. To date, these literatures have not been exploited for their health

potential. This is but one example of a potential expanding role for social cognition-based interventions in health psychology.

A second likely direction for future expansion of social cognition perspectives concerns interventions to change health habits. As behaviorally-related conditions such as smoking, obesity, alcoholism, and unsafe sex are increasingly shown to be vital links in growing healthcare costs worldwide, developing persuasive communications, educational programs, and other interventions to alter these conditions before they lead to pathology will assume increasingly importance.

In addition to an expanding role in designing health-related interventions, social cognition perspectives on health-related issues are likely to expand in a growing number of basic research directions. Chief among these will be research on the pathways that connect beliefs, emotions, and behaviors to mental and physical health outcomes via neural, neuroendocrine, and immune pathways. Research has begun to illuminate these links, but much remains to be learned.

Conclusions

Social cognition perspectives have greatly enhanced the understanding of how people manage their health. The benefits go in both directions. Health psychology as a field has been heavily influenced by social cognition perspectives, as the previous sections attest, and, as health psychology research has incorporated new techniques that identify neural underpinnings of health-related phenomena, these insights and methods have moved into social cognition as well. What the health domain gives back to social cognition is knowledge of biological outcomes and the potential psychobiological routes whereby social cognition interventions may exert their effects on biology and ultimately on health. By understanding the neural, neuroendocrine, and immune pathways by which beliefs affect biological functioning, health psychology fleshes out

the pathways by which social cognition affects biology more generally. In so doing, the health domain helps to bring social cognition research into the forefront of integrative science which links social, cognitive, and biological perspectives.

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