

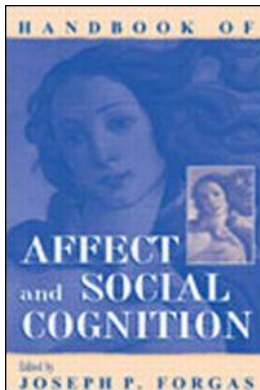
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Handbook of Affect and Social Cognition

Joseph P. Forgas

Affect and Health-Relevant Cognition

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Affect and Health-Relevant Cognition

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Hippocrates, the first physician, posited four body fluids (“humors”) that when imbalanced produced various physical maladies. Hippocrates’s theory, however, was more than just one that linked body fluids to diseases; it also included a role for emotion. The humoral imbalances thought to cause illness also, in his view, created characteristic and chronic emotional states—black bile led to sorrow, phlegm to sleepiness, blood to sanguine feelings, and yellow bile to anger—and thus Hippocrates linked affect and disease by virtue of their common antecedents. Hippocrates no doubt had the particulars wrong. Yet if we ignore the devil in the details and, instead, focus on the big picture, Hippocrates provides prescient guidance: He motivates us to look for connections between emotion and health.

Of course, physiologists more modern than Hippocrates have echoed this bit of wisdom. Harvard’s Walter Cannon (1957) spent several decades in the early 20th century documenting what he called *voodoo death*, stories in various cultures about people who, because of some major emotional experience (often fright), suddenly died. Cannon even traced a reasonable pathophysiology that still sensibly provides an explanation for how a person literally could be scared to death.

The purpose of this chapter is to look at more modern research connecting emotional states to health cognition and, at times, to physical health outcomes. Pleasant (or unpleasant) affect may promote healthy (or unhealthy) perceptions, beliefs, and physical well-being. We review studies showing correlations between good moods and subjective health outcomes, and experimental research in which individuals report fewer physical symptoms and more salubrious health beliefs following happy as compared to sad mood induction. To understand these findings and suggest mechanisms linking pleasant feelings, salutary thoughts, and good health, research in other relevant domains is considered, including: (a) direct effects of affect on the immune system; (b) individual difference variables associated with both mood and health; (c) associations among emotional experiences, the focus of attention, and the perception of physical symptoms; (d) the antecedents and consequences of social support; and (e) the use of health-promoting or health-damaging behaviors as affect-regulation strategies. As anticipated by Hippocrates and Cannon, affect, health-relevant cognition, and health itself may be linked through multiple pathways.

INDUCED MOOD AND THOUGHTS ABOUT HEALTH

We start with some observations from our laboratory in which individuals are led to experience different kinds of moods that subsequently affect the way they think about their health. Then, we review various ways in which feelings such as these could be connected to health outcomes.

Individuals suffering from psychological distress also report various physical symptoms (Katon, 1984; Maddox, 1962; Tessler & Mechanic, 1978). It seems rather obvious that the onset of physical illnesses with debilitating symptoms that interfere with pleasurable daily activities or cause considerable pain could result in depressed mood. Associations between illness and negative mood have been obtained in correlational and time-series analyses of daily diaries (Larsen & Kasimatis, 1991; Persson & Sjoberg, 1987), in clinical studies of pain patients who develop depressive disorders (Keefe, Wilkins, Cook, Crisson, & Muhlbaier, 1986; Turk, Rudy, & Stieg, 1987), in observations of individuals with other medical problems (Rodin & Voshart, 1986), and in studies of individuals experiencing academic or job stress (Griffin, Friend, Eitel, & Lobel, 1993; Repetti, 1993). The more interesting direction of causality that has not been explored as systematically concerns how ongoing moods produce changes in the evaluation of physical symptoms and in subsequent judgments about health and illness.

A relevant line of research concerns the induction of mood states in the laboratory followed by opportunities for individuals to report on beliefs about their physical health. The random assignment of participants to mood inductions allows for a more direct test of the hypothesis that mood shifts have an impact on health-related cognition. Croyle and Uretsky (1987), for example, found that perceived health status was mood-congruent; individuals who experienced sad moods reported more physical symptoms than those who experienced happy moods. These kinds of findings appear to be rather robust (e.g., Abele & Hermer, 1993; Knasko, 1992).

Salovey and Birnbaum (1989) asked college students who were experiencing cold or flu to participate in studies in which moods would be induced in the laboratory. In several different experiments, participants were assigned randomly to happy, sad, or neutral mood-induction conditions. After about 5 min, they were instructed to complete measures of health status. Participants' moods were verified using brief scales at several points during the experimental session. In the first experiment (Salovey & Birnbaum, 1989), 66 sick undergraduates completed a

standard physical symptom questionnaire (Wahler, 1968) and mood scales (McNair, Lorr, & Droppleman, 1971) both prior to and after the mood-induction procedure. These scales were included among a large variety of tasks in order to minimize experimental demand. As expected (because participants were randomly assigned to mood-induction conditions), there were no differences in mood or symptom reports prior to mood induction. However, after experiencing happy, sad, or neutral moods, participants reported symptoms of differing intensity and frequency. Individuals assigned to the sad mood condition reported nearly twice as many aches and pains as those assigned to the happy condition (even though both groups reported the same level of physical symptoms just prior to mood induction). Sad individuals reported more physical symptoms from the previous week, and they attributed greater discomfort to these symptoms than the individuals who were made happy (see Green, Salovey, & Truax, 1999, for further analyses of these data).

Perhaps more important in determining treatment seeking, however, are beliefs about one's capacity to engage successfully in salubrious behaviors and expectations that such behaviors will alleviate illness or maintain health: *self-efficacy* and *outcome efficacy* (Bandura, 1977, 1997). Self-efficacy beliefs are important predictors of diverse health behaviors such as smoking cessation, eating a healthy diet, and engaging in safer sex (reviewed in Salovey, Rothman, & Rodin, 1998). Individuals are unlikely to engage in health behaviors that they feel incapable of carrying out. Similarly, individuals are reluctant to engage in behaviors that they do not believe are health enhancing. These judgments also varied as a function of mood state. As compared with sad individuals, those who were happy perceived themselves as considerably more able to carry out health-promoting behaviors, and they were somewhat more likely to believe that these behaviors would relieve their illness (Salovey & Birnbaum, 1989).

Other important health-related beliefs that usually appear to be precursors of health behaviors are perceptions of vulnerability to future illnesses. Beliefs about risk likelihood and severity have been found to contribute to interest in risk-reducing behavior, such as seeking medical treatment when sick (Becker et al., 1977; Cummings, Jette, Brock, & Haefner, 1979; Kulik & Mahler, 1987; Turk, Rudy, & Salovey, 1984; Weinstein, 1982, 1983; but see also Gerrard, Gibbons, & Bushman, 1996). Individuals appear to be unlikely to take health-protective actions when they do not perceive themselves to be vulnerable to future illnesses (Janz & Becker, 1984). Estimates of the likelihood of future positive and negative events have generally been

among the most mood sensitive of all judgments (e.g., Forgas & Moylan, 1987; Johnson & Tversky, 1983; Mayer, Gaschke, Braverman, & Evans, 1992; Mayer & Volanath, 1985). We asked healthy undergraduates to submit to a happy, sad, or neutral mood induction. They then were administered a 14-item scale containing health-related outcomes, and requested to estimate the likelihood that each might happen in the (a) average student's lifetime and (b) in their own lifetime. For negative health outcomes (future diseases) but not positive health outcomes (maintaining good health), mood had a systematic and linear influence on probability estimates. Happy individuals thought that future diseases were considerably less likely to befall them than their classmates. This bias was almost completely eliminated among students made to feel sad (Salovey & Birnbaum, 1989).

Although this line of mood-induction research has produced some relatively stable and interesting findings, we still must speculate about the mechanisms that might account for such changes in physical symptom reporting and other health beliefs. The remainder of this chapter is devoted to exploring some possible mediators of mood's impact on health cognition. Some of these mechanisms are admittedly speculative and may be far removed from the kinds of studies we have just discussed. However, they are presented here as possible ways of understanding why happy individuals might report feeling good, whereas those experiencing sorrow might report feeling sick, in contexts more general than laboratory mood-induction experiments.

The first mechanism that we explore addresses the idea that pleasant and unpleasant moods may be associated with health outcomes because they have a direct influence on the immune system. Second, we look at whether mood and health are linked through common dispositional "third variables." The idea here is that there are individual difference characteristics that are associated with people's reports of happy or unhappy moods as well as health or illness, respectively. Thirdly, we delineate the associations among one's mood, focus of attention, and subjectively perceived health status. We then go on to discuss whether people who tend to express happier moods are better at eliciting social support from others which, in turn, may have positive health consequences. Finally, we explore whether chronic differences in mood are related to health-protective or health-damaging behaviors and, in particular, whether individuals prone to sad moods use health-damaging behaviors to regulate their moods. These alternative paths connecting feelings states to health beliefs and outcomes are illustrated in Fig. 16.1.

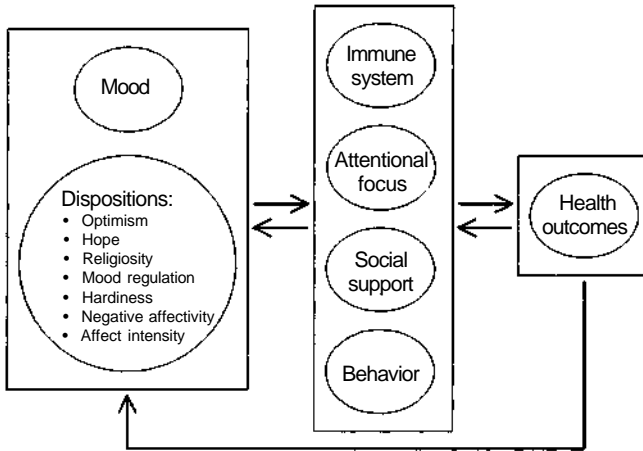


FIG. 16.1. Possible links among affective experiences, health cognition, and behavior.

DIRECT EFFECTS OF MOOD ON ILLNESS: FINDINGS FROM PSYCHONEUROIMMUNOLOGY

Induced Mood and Immunologic Parameters

A growing number of investigators have looked at whether mood can influence the immune system and disease susceptibility directly. In some studies, induced pleasant and unpleasant affective states are both associated with poorer immune function (Futterman, Kemeny, Shapiro, & Fahey, 1994; Knapp et al., 1992). However, the proliferative response to the mitogen phytohemagglutinin appears to be sensitive to the valence of the induced mood; it increases after positive moods and decreases after negative moods (Futterman et al., 1994; but see Futterman, Kemeny, Shapiro, Polonsky, & Fahey, 1992).

Other findings have been obtained by focusing on secretory immunoglobulin A (S-IgA), the antibody considered the first line of defense against the common cold, as the indicator of immune system functioning. Labott and colleagues (Labott, Ahleman, Wolever, & Martin, 1990) asked healthy college women to view two videos, one funny and one sad, and either to suppress their emotional reactions or to express their feelings as overtly as possible. Mood affected the release of S-IgA; levels increased after watching the humorous video, suggesting enhanced immune system

activity. In contrast, they dropped after viewing the sad video, indicating suppressed immune system activity. These differences, however, were only found if participants had been instructed to express their mood overtly. Women who actively suppressed their moods showed little change in S-IgA levels. Although this study indicated that the expression of emotions can have immediate effects on some aspects of the immune system, it was not clear how long such effects might last and whether differences in chronic mood might lead to notable differences in disease resistance. Labott and Martin (1990) attempted to answer some of these questions by correlating coping styles with health outcomes. Older women who indicated that they frequently cried as a coping mechanism also reported a greater number of health problems than did older women who indicated that they cried less often.

Laughter and Immunity

There has long been popular belief in the health-enhancing effects of laughter (e.g., King Solomon suggested that “a merry heart doeth good like a medicine,” Proverbs 17:22; Cousins, 1979, attributed his recovery from a life-threatening collagen disease to his active use of laughter). Research is now providing support for the idea that expressed humor has a positive impact on health. Recall that women who viewed a humorous video after being encouraged to laugh openly showed increased levels of S-IgA (Labott, Ahleman, Wolever, & Martin, 1990). Similarly, Dillon, Minchoff, and Baker (1985–1986) asked men and women to view two videos, one humorous and one with emotionally neutral content. These participants also showed enhanced levels of S-IgA after viewing the humorous video. In addition, initial levels of S-IgA were correlated with day-to-day coping through humor. Participants who indicated they more frequently used humor as a coping mechanism tended to show higher initial levels of S-IgA.

Humor may also enable a person to deal better with life stressors. Expression of humor appears to moderate associations between negative life events and mood disorders (Martin & Lefcourt, 1983; Nezu, Nezu, & Blisset, 1988). Similar findings have been reported for acute stressors; listening to a 20-min, laughter-inducing monolog enabled participants subsequently to tolerate higher levels of physical discomfort caused by increasing pressure from a blood-pressure cuff (Cogan, Cogan, Waltz, & McCue, 1987). Frequent laughing has also been associated with improved coping abilities (Keller, Shiflett, Schleifer, & Bartlett, 1994; Scheier et al.,

1989) and increased perceptions of control (Fitzgerald, Tennen, Affleck, & Pransky, 1993). The physical act of laughter increases respiration, heart rate, and digestion, which could potentially lead to better health outcomes (Hafen, Karren, Frandsen, & Smith, 1996).

DISPOSITIONAL LINKS BETWEEN MOOD AND HEALTH

Several individual difference-level variables may be associated both with chronic moods and affective styles as well as with health beliefs and outcomes. These include optimism, hope, religiosity, mood regulatory skills, negative affectivity, hardiness, and affect intensity.

Optimism

The relationship between dispositional optimism and health has been studied extensively. Dispositional optimism is defined as the tendency to believe that one will experience good instead of bad outcomes in life, as measured, for example, by the Life Orientation Test (LOT; Scheier & Carver, 1985). Scheier and Carver (1992) reviewed research indicating that optimism can affect health positively in four ways. First, optimism may lead one to feel better about oneself or one's situation. For example, women with breast cancer showed an inverse relationship between distress and optimism (Carver et al., 1993). Second, optimism can also lead to more active, problem-focused coping. In a study of men recovering from coronary artery bypass surgery (Scheier et al., 1989), optimists coped differently from pessimists; optimists focused on postoperative goals whereas pessimists attempted to disengage from these goals. Third, optimism can relate to physical well-being. In the heart surgery study (Scheier et al., 1989), optimists showed fewer signs of perioperative myocardial infarction, achieved various markers of physical recovery more quickly, were judged by members of the cardiac rehabilitation team as evidencing a faster rate of recovery, and had a quicker return to different life activities by the time of the 6-month followup (see also Scheier et al., 1999). Finally, optimism can lead to better health behaviors. In a 5-year follow-up with the patients in the heart surgery study (Scheier et al., 1990), optimists reported healthier habits, such as regular use of vitamins, eating lunches with less fatty foods, and enrollment in a cardiac rehabilitation program. Some of these effects of optimism may be mediated by differences in perceptions of control (Fitzgerald et al., 1993).

Optimism also can have direct effects on immune system variables. Optimism, as measured by the LOT, is associated with higher levels of critical immune cells, including helper T-cells and natural killer cells (Segerstrom, Taylor, Kemeny, & Fahey, 1998). Reed, Kemeny, Taylor, Wang, and Visscher (1994) looked at “realistic acceptance” of death among gay men with AIDS. They found that men who were high in realistic acceptance died an average of 9 months earlier than those with lower levels of realistic acceptance. The authors hypothesized four potential explanations for this finding: Differential use of health behaviors, differential monitoring of health, existing but undetected differences in health, or actual immunological changes. Realistic acceptance may have led these men to become less optimistic about the future and, in turn, to experience fewer positive moods overall.

Hope

Optimistic individuals are also likely to be people who, in the face of aversive circumstances, hold out hope for positive outcomes. According to Snyder (1994, p. 10), “hope reflects a mental set in which we have the perceived willpower [desires] and waypower [pathways] to get to our destination [goal].” Snyder (1989, 1994) distinguishes hope from dispositional optimism in arguing that optimism implies that people possess a style of explaining events such that they minimize the impact of and distance themselves from current and potential failures. In contrast, hope implies that people undergo a process of linking themselves to potential successes. Whereas optimism creates a distance between the person and the potential for failure, according to Snyder, hope lessens the distance between the person and the potential for success.

Snyder and colleagues (1991) conceptualize hope as a stable cognitive set reflecting general expectancies about the future. The relationship between hope and positive mood is relatively straightforward. People who are hopeful tend to experience a more positive emotional state as they move toward goal-relevant activities. In contrast, people who are not as hopeful tend to experience a more negative emotional state when pursuing goals.

There is some support for the idea that experiencing hope leads to superior health outcomes. For instance, compared to those individuals with lower hope, people who have higher hope recover better from physical injury (Elliott, Witty, Herrick, & Hoffman, 1991). In this investigation, people who had experienced traumatic spinal cord injury, but had scored higher on a measure of hope, reported significantly less psychosocial

impairment and lower levels of depression as compared to those low in hope. Furthermore, hope was related to better adjustment in the month following the injury.

Correlational research further suggests that hopeful people may practice superior health-protective and maintaining behaviors than less hopeful people. In an investigation of hope and college women's cancer-related health practices, hopeful people appear to be more aware of the negative health effects of behaviors such as smoking (Irving, Snyder, & Crowson, 1998). Furthermore, hopeful individuals appear to be more willing to visit health professionals and to perform detection behaviors (such as skin cancer exams and breast examinations; Irving, Snyder, & Crowson, 1998). In addition, hopeful people may have more ideas as to how to take care of themselves when they do become sick (Snyder, 1994). Active participation in setting treatment goals and carrying out physicians' recommendations may, in part, be a result of perceived hope about regaining one's health in the future.

Up until this point, we have discussed hope as Snyder and colleagues have conceptualized it—primarily as a dispositional variable that leads people to experience positive moods when attempting to achieve their goals. Before closing our discussion on the relationship between hope, mood, and health, however, we would like to highlight the health-care worker's role as one who can inspire hope in others. Freud described that patients' expectancies, "colored by hope and faith," are "an effective force...in all our attempts at treatment and cure" (1953, p. 289). The link between such hopeful expectations and health outcomes becomes both clear and convincing though the investigation of placebo effects. Frank (1974) concluded that by raising the patient's level of hope, the health-care professional's positive expectations (even when administering a placebo) can influence the health of the patient.

Religiosity

For some, optimism, hopefulness, and positive mood are experienced through regular religious practice. Does religion have a positive impact on health? *Religiosity* is a vague term and is operationalized in a number of ways. Levin and Schiller (1987) reviewed more than 250 empirical studies with generally positive correlations between religiosity and various health outcomes. A study of patients recovering from open-heart surgery (Oxman, Freeman, & Manheimer, 1995) offers a good example. Patients who reported that they derived strength and comfort (positive affect) from

religion and who participated in social groups had a survival rate that was higher than those who lacked both sources of support. Even without social support, religious people were more likely to survive than were nonreligious people.

If there is indeed an association between religion and health, how might this relationship be mediated? Levin (1994, 1996) outlined various paths through which religion could influence health. These include behavior, genetics, social support, ritual, belief, faith, and metaphysical effects such as supernatural blessings. Some of these possibilities obviously lend themselves to scientific investigation, whereas others are, by definition, outside the realm of science. A few of the possible pathways do not involve religious belief directly, but arise from situational characteristics associated with the practice of religion. For instance, certain religions encourage behaviors that promote health or discourage potentially health-damaging behaviors (e.g., alcohol or caffeine use). Religion can also build a supportive social network that would help buffer against stress, as discussed later in this chapter. Additional hypothesized pathways involve the psychological aspects of rituals, beliefs, and faith. Religious rituals may promote health by easing anxiety and inducing positive feelings of comfort and appreciation. Religious beliefs could also enhance health by giving people a sense of inner peace, self-confidence, and purpose. These psychological states may be associated with optimism, hope, and other salubrious feelings and belief systems.

Mood-Regulatory Skills

We now turn our discussion to the relationship between skills relevant to affect regulation and physical health. Affect regulation here refers to the individual's ability to terminate negative mood states and/or prolong positive ones (see also Erber & Erber, chap. 13, this volume, for another perspective on mood-repair processes). In other words, an individual who is inclined to repair or regulate his or her mood would have fewer, less negative thoughts in general, report more positive thoughts over time, and display greater control over negative moods (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). If, indeed, the relationship between positive mood and health is a stable one, we might hypothesize that individuals who are better able to regain and maintain positive mood states would experience better health outcomes than those individuals who are less able to implement such mood regulatory skills.

We believe that one of the more compelling pieces of evidence for the relationship between emotion regulation and health comes from an investigation carried out by Goldman, Kraemer, and Salovey (1996). In this investigation, 134 college students participated in a four-phase prospective study of mood regulatory skills, psychological stress, and illness reporting. The study was conducted over the course of an academic semester, with the objective of collecting health-related data during three relatively stressful periods. Participants in this investigation completed the Trait Meta-Mood Scale (TMMS; a 48-item self-report measure designed to assess a person's general beliefs about attention to mood, clarity of mood experiences, and efforts to repair mood states). Those individuals who said that they generally make an effort to achieve or maintain positive moods were less likely to report illnesses in the face of increasing stress levels than those individuals who described themselves as unlikely to engage in mood repair strategies. Individuals who did not believe that they could repair their moods were more likely to visit the university health center and to report that they had an illness than individuals who believed that they possessed the ability to repair their moods. Mood regulation appears to moderate the effect of stress on illness behaviors.

There are other investigators who have explored the link between emotion regulation and health. Catanzaro and colleagues conducted research investigating individuals' negative mood regulation expectancies. *Negative mood-regulation expectancies* (NMR) refer to individuals' beliefs concerning their ability to alleviate or terminate a negative mood state (Catanzaro & Mearns, 1990). Cross-sectional research suggests that NMR expectancies are positively associated with the use of active coping responses and inversely related to self-reported dysphoria and somatic symptoms, independent of coping behavior and negative life events (Kirsch, Mearns, & Catanzaro, 1990). Catanzaro and Greenwood (1994) hypothesized that individuals who hold an expectation that they can relieve negative moods are able to implement coping skills more effectively and report fewer somatic complaints during times of stress than those individuals who do not hold such expectations. The somatic symptoms that were targeted in this investigation included headaches, acne, and trouble sleeping (among others). NMR expectancies were negatively associated with somatic symptoms, even over the course of 6 to 8 weeks. Overall, individuals who have strong beliefs in their ability to regulate negative moods reported experiencing fewer somatic symptoms as compared to individuals who do not hold these beliefs.

Hardiness

We now turn our discussion to hardiness—another personality characteristic, likely related to the experience of positive affect that may, in fact, protect us from illness (Kobasa, 1979). Hardiness is made up of three specific dispositions: commitment (to one's self, work, and other values), control (over one's life), and challenge (i.e., a belief that change is stimulating). Kobasa hypothesized that this constellation of characteristics should act as a buffer against illness, particularly in times of stress. Several empirical investigations lend support to this hypothesis. Executives who faced stressful life events were less likely to show signs of illness if they were high in hardiness (Kobasa, 1979). In a prospective study, Kobasa, Maddi, and Kahn (1982) reported similar results. Although Kobasa and colleagues do not discuss the role of affect in this buffering process, we speculate that hardy individuals may possess two affective "legs up" in life. First, one's tendency to thrive in the face of challenge may indicate a proclivity toward success, and with this a preponderance of positive mood experiences. Second, a hardy individual's ability to perceive control over his or her life may reflect greater mood regulatory skills. Being able to maximize positive moods and minimize negative moods may have a direct impact on one's overall health status (as just argued). Taken together, these observations lead to a picture of individuals who are not only in charge of their lives, but also in charge of their emotions. We imagine that an individual high in hardiness may be someone who is able to utilize affect through fostering, maintaining, and maximizing positive mood experiences.

Negative Affectivity

Negative affectivity (NA) is a general dimension of subjective distress, including a broad range of negative mood states (Watson & Clark, 1984; Watson & Pennebaker, 1989; Watson & Tellegen, 1985). The personality characteristic most readily associated with NA is neuroticism, and as Costa and McCrae (1987) describe, this tendency to experience negative emotions is associated with subjective health complaints. Trait NA reliably correlates with many measures of subjective complaints and symptom reporting (Watson & Pennebaker, 1989). Despite this association, however, there is little evidence that NA leads to objective decrements in the individual's health status. It appears that individuals who are high in trait NA are likely to complain about their health, but do not necessarily experience greater health problems in the long run (Watson, 2000).

Although *trait* NA may be unrelated to actual physical symptoms, this null relationship may not hold for *state* NA. Cohen and colleagues (1995) carried out an investigation of the impact of state and trait NA on people's resilience to exposure to the rhinovirus and influenza virus. Individuals high in state NA (i.e., those people who were experiencing greater negative mood at the time of the investigation) developed a more severe illness in response to exposure to the respiratory viruses than those who were low in state NA (Cohen et al., 1995). Trait NA was unrelated to illness severity. As Cohen and colleagues (1995) suggest, although individuals high in trait NA may be particularly sensitive to the experience of symptoms (and, thus, would be more likely to report such symptoms), the experience of state NA is what drives objective health.

Affect Intensity

In concluding our discussion of the relationship between affective dispositions, health cognition, and illness itself, we would like to turn to the question of temperament. Does the intensity of positive and negative mood experiences—called *affect intensity* and generally thought to be an individual difference rooted in temperament—have an impact on people's health and overall well-being? Affect intensity is described as a stable individual difference in the strength with which people experience their emotions (Larsen & Diener, 1987). This stable characteristic is thought to generalize across emotions, such that individuals high in affect intensity experience very strong positive moods as well as very strong negative moods. Unlike emotionality (i.e., the tendency to move easily into a negative emotional state from a positive or neutral one; see Buss & Plomin, 1975), *affect intensity* refers to the tendency to experience strong emotions on a regular basis, across stimulus conditions and emotional domains (Larsen & Diener, 1987).

There has been some research suggesting a relationship between affect intensity and somatic disturbances (e.g., nausea, headaches, muscle soreness, shortness of breath). In two separate investigations (Diener, 1984; Larsen, Diener, & Emmons, 1985), individuals high in affect intensity reported more somatic problems than those low on the affect intensity dimension. Because the health-related data were subjective (i.e., the participants simply filled out symptom checklists), we cannot determine whether affect intensity is correlated with actual health problems. Interestingly, however, although affect intensity is significantly related to measures of somatic symptoms, it appears to be unrelated to indicators of psychological well-being (Larsen

& Diener, 1987). Individuals who experience their emotions intensely may report a number of somatic and stress symptoms, but unlike the general population (wherein somatic distress is negatively correlated with overall well-being), their lifestyles and life satisfaction do not appear to suffer.

In the larger context of positive mood and health, this line of work is compelling in that it suggests that extremely positive moods may not always be markers of physical health. Individuals who intensely experience their moods (both positive and negative) may encounter more somatic distress throughout their lifetime than their more “mellow” (e.g., low affect intensity) counterparts. Because it is unclear as to whether these somatic symptoms translate into more serious health problems later in life, we feel that continuing to explore the impact of temperament on health is an endeavor well worth undertaking.

MOOD AND ATTENTIONAL FOCUS

Changes in mood are associated with shifts in attentional focus on to or away from oneself. Salovey and Rodin (1985) proposed that during all strong emotional experiences, especially negative ones, there is a tendency for individuals to focus their attention on themselves rather than on the external environment. In a variety of correlational studies, increased attentional focus on to the self has been associated with depressed moods (e.g., Ingram & Smith, 1984; Smith & Greenberg, 1981; for a review of this literature, see Ingram, 1990). Sadness-induced self-focusing has also been demonstrated experimentally (Salovey, 1992; Sedikides, 1992; Wood, Saltzberg, & Goldsamt, 1990). An association between positive states and self-focused attention has been more difficult to demonstrate (but see Fiedler, chap. 8, this volume, for a discussion of conditions under which positive affect might be associated with internally oriented thinking).

Pyszczynski and Greenberg (1987) have proposed that there is a self-focusing style that plays a role in the onset, maintenance, and exacerbation of depression. This theory builds on earlier work (Carver & Scheier, 1981; Duval & Wicklund, 1972) suggesting that allocation of attention on to the self serves a regulatory function and helps the individual to maintain goal-directed behavior (see also Berkowitz, 2000; Berkowitz & Troccoli, 1990). The depressive self-focusing style may in fact help to explain some of the more unusual effects that sadness has on judgments, such as increasing the accuracy of beliefs about the self, reducing self-inflating biases, and eliminating illusions of control (Taylor & Brown, 1988).

Nolen-Hoeksema (1991), who investigated self-focused rumination extensively, regards rumination as a particular style of responding to stressful events that tends to intensify and lengthen periods of depressed mood. Following the 1990 Loma Prieta earthquake in California, for example, Nolen-Hoeksema and Morrow (1991) found that people who had a more ruminative response style before the earthquake were more depressed 10 days after the event. Similarly, newly bereaved men identified as ruminators prior to their loss experienced longer and more severe periods of depression after their partner's death (Nolen-Hoeksema et al., 1997). The deleterious effects of ruminative coping have been corroborated in a number of laboratory studies as well (e.g., Nolen-Hoeksema & Morrow, 1993). Self-focusing attention on the body, in particular, increases perceptions of symptoms and sensations (Pennebaker, 1982; Pennebaker & Lightner, 1980). For example, individuals who live in unstimulating environments—presumably that do not provide enough competition for internal cues—report more physical symptoms than individuals in stimulating environments.

The comorbidity of depression and physical symptoms may be understood because both appear to be related to self-focused attention. Of course, when one is self-focused, attention may be directed toward the mood-congruent ruminations of the conscious mind (as described in Bower & Forgas, chap. 5, this volume), or to the experiences of the body, or to both. We would expect, however, that when sad moods produce body-oriented self-focused attention, symptoms should be more likely noticed and, indeed, experienced more intensely. The greater salience of somatic cues may subsequently influence judgment about present and future health status as well. Likewise, happier individuals should be less likely to notice these somatic cues and should perceive their health more positively (Stretton & Salovey, 1998).

AFFECT, HEALTH-RELEVANT COGNITION, AND SOCIAL SUPPORT

Individuals who have minimal psychosocial resources appear to be more prone to illness and mood disturbances when faced with increased stress levels than individuals with considerable social support (DeLongis, Folkman, & Lazarus, 1988). The impact of social support on health is well established (Cohen & Syme, 1985; Stroebe & Stroebe, 1996). Social support is related to lower mortality (Berkman, 1985), greater resistance to physical diseases (Cohen, 1988), lower prevalence and incidence of coronary heart disease (Seeman & Syme, 1987), and faster recovery from heart disease and heart surgery (Ruberman, Weinblatt, Goldberg, & Chaudhary, 1984),

for example. The relationship between social support and health may exist in part because of the mediating role of positive mood.

In the social support literature, there are two explanations for the relationship between social support and health (Cohen & Syme, 1985; Stroebe & Stroebe, 1996). The buffering hypothesis argues that social support protects people from the negative effects of stress. Social support may come into play by intervening between the stressful event and the stress experience, thus leading the individual to experience a lesser degree of stress in the face of a challenging situation. It may also come between the experience of stress and the negative health outcome by influencing other factors, such as health-relevant behaviors. For instance, social support networks may facilitate healthful behaviors such as exercise and proper nutrition in times of stress.

The direct effect hypothesis argues that social relationships promote health and well-being regardless of the individual's stress level. Social relationships may allow the individual to feel secure that help will be provided when and if necessary. The perception of others' helpfulness can lead to an experience of positive mood, which in turn allows the person to remain resilient to physical illness (Cohen & Syme, 1985). Of course, there are recursive influences of mood on thoughts of this kind as well. The effects of social support are experienced through two mechanisms: social influence and loneliness (Stroebe & Stroebe, 1996). Through social influence, members of the individual's reference group modify the health practices of the individual (regardless of stress levels). Loneliness is generally associated with somatic complaints, depression, and feelings of distress (Peplau, 1985). Medical students who described themselves as lonely had lower natural killer cell activity than less lonely students and responded with a weaker immune response to a hepatitis B vaccine than those with a larger social support network (Glaser et al., 1992; Kiecolt-Glaser & Glaser, 1992).

Social support can take a variety of forms, from friendships to familial relationships. One of the strongest potential sources of social support is marriage. Marital happiness contributes more to measures of overall happiness than friendships and work satisfaction (Glenn & Weaver, 1981), and unhappiness in marriage can lead to severe problems (including physical health problems; Renne, 1971). In an investigation of marital discord and immunological down-regulation, Kiecolt-Glaser et al. (1993) found that couples who were more hostile to one another during a 30-min interaction demonstrated greater immunologic changes relative to the couples who displayed little hostility. In addition, couples who expressed negative

reactions to each other had larger and longer-lasting elevations in blood pressure than compatible couples.

Overall, higher levels of social support have been linked to lower negative affect (Cohen & Wills, 1985). There is less support for the relationship between social support and positive affect, however. Eckenrode, Kruger, and Cerkovnik (1986; in Cohen, 1988) demonstrated that positive mood is related to the perceived number of friends and family members who could be counted on and to the actual number of people who had provided help over the course of a year. In addition, neighborhood cohesion is associated with positive mood (Cohen et al., 1982). Although empirical support for the claim that the relationship between social support and health is mediated by positive mood is somewhat difficult to find, we feel confident that positive mood is a critical component of social interactions. We tend to agree with Cohen and Syme's (1985) suggestion that social support, through the stability, predictability, and control that it provides, leads people to feel positively about themselves and their environment. This feeling, in turn, leads people to want to take care of themselves, interact more positively with others, and demonstrate resilience in times of stress. The combined impact of all these variables leads to continued physical and psychological health, which results in further strengthening the individual's social network. Finally, and most relevant to the line of mood-induction experiments with which we opened this chapter, individuals who are happy may find it easier to develop a rich network of social support as compared with those who are more dour. We are likely attracted to people who are pleasant, thus providing them with the health benefits of social support.

CHANGES IN MOOD MOTIVATE HEALTH-RELEVANT BEHAVIORS

Individuals may use behaviors relevant to their health as mood-regulation strategies. Examples of such behaviors might include eating, shopping, or drinking alcohol to cheer oneself after an upsetting event. Indeed, both anecdotal reports (e.g., Baumeister, 1991) and empirical findings (Leith & Baumeister, 1996) support a link between bad moods and behaviors presumably motivated by a desire to improve mood. For example, self-defined chocolate addicts and nonaddicts recorded their chocolate intake and the circumstances surrounding it for a week (Macdiarmid & Hetherington, 1995). The so-called addicts tended to eat more chocolate when reporting depressed moods. However, bad moods were not ameliorated by eating chocolate. Instead, the chocolate addicts experienced increased levels of

guilt following its consumption. Similar results have been reported for alcohol consumption, which, although motivated by bad moods on occasion, does little to improve them (Gustafson, 1991).

If behaviors such eating or drinking do not actually improve mood, why are they used following an upsetting situation? Baumeister (1991) argues that a number of behaviors, including drinking, binge eating, masochistic sex, suicide attempts, and certain religious practices represent an escape from one's self. For example, a person suffering from *bulimia nervosa* may engage in binge eating following an upsetting event that reflects poorly on the self. During the binge, the person does not focus on the problems that led to the binge, nor does the person focus on the consequences of the excessive food consumption. Rather, attention is placed on the actual act of eating itself. For a brief time, eating is devoid of social meaning and thus devoid of the "self." The person only considers the consequences of these actions after the binge is over.

Baumeister (1991) presents evidence suggesting that during an escape from the self, a person also experiences a blunting of emotion, including any unpleasant emotions that elicited the need for escape. Thus, as was suggested by some research findings (e.g., Gustafson, 1991; Macdiarmid & Hetherington, 1995), many behaviors commonly thought to be mood altering do not actually induce new emotions. Instead, these behaviors may feel effective because they allow one to escape temporarily from negative emotions induced by unfavorable reflections on the self.

Although many of the behaviors described by Baumeister (1991) are effective as mood-alteration strategies because they turn off all emotions, including negative ones, other behaviors may work by actually inducing positive feelings. Physical activity can increase positive moods (Dyer & Crouch, 1988; Ewing, Scott, Mendez, & McBride, 1984; Steptoe & Cox, 1988). Measurement of mood changes immediately after exercise suggests that the physical activity only has an effect on positive moods (Ewing, Scott, Mendez, & McBride, 1984; Rudolph & Kim, 1996). However, a longitudinal study of people in exercise classes found a more positive mood profile and reduced negative emotions after several months (Dyer & Crouch, 1988).

CONCLUSION

To understand the links between affect, cognitive activities relevant to health, and health outcomes themselves, it is necessary to place these issues in a broader context than that which circumscribes most of the contributions

to this book. Mood can influence thoughts about health quite directly, as laboratory mood-induction research has revealed. However, the mechanisms needed to explain the impact of mood on health cognition and behavior (and the recursive loops leading back to mood once again), require us to move beyond the domain of social cognition and consider variables at the level of immune system physiology, personality dispositions, social relationships, and consummatory behaviors. The excitement in studying links between affect and health cognition is that such work need not be constrained by laboratory technique or disciplinary thinking. Indeed, the most important discoveries in this field will be made by individuals least confined by these artificial boundaries.

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