Emotion and Social Judgments

Edited by

JOSEPH P. FORGAS
University of New South Wales, Australia

13

Influence of Mood on Judgments About Health and Illness

PETER SALOVEY
Yale University

ANN O'LEARY
Rutgers University

and

MARTHA S. STRETTON, STEPHANIE A. FISHKIN and CHLOÉ A. DRAKE
Yale University

Contents
Why Study Links Between Mood and Health?
Some Findings from Laboratory Studies of Mood and Health-related Cognitions
- Mood and symptom appraisal
- Mood and judgments of health efficacy
- Mood and judgments of risks and vulnerabilities
Three Possible Mechanisms
- Mood-congruent recall
- Changes in attentional focus
- Mood-induced changes in immune system functioning
Some Implications
- Memory biases on health surveys
- Understanding hypochondriasis
Summary

Recently, one of us had the following experience. He woke up in the morning feeling a bit under the weather, draggy, and had little appetite for breakfast. Heading for work anyway, he recalled the journal article that had been rejected the day before, the fight with his mother on the telephone last weekend, and the editor nagging him for a chapter that was now holding up production on a book to which he had agreed to contribute. These rumina-

241
sad, he especially noticed the aching feelings in his stomach and the tug-of-war in his intestinal tract. He also became aware of the aching in the back of his legs—not enough exercise—and that his hair was slowly but surely turning grey. He recalled the 214 serum cholesterol count reported to him by his physician the week before and cogitated on how his “borderline” high cholesterol was certainly going to send him to an early grave, if his GI tract didn’t quit on him first. In this instance, a sad mood facilitated negative evaluations of physical symptoms and health information.

Imagine, however, that our hero had woken up with similar physical symptoms, but on his drive to the office, he thought about the close game that his softball team had just won (he pitched), the grant proposal for which he had received promising feedback, and the dear friend from childhood who was visiting the next weekend. Perhaps his mood state would be characterized by joyful contentment upon reaching work. Perhaps in such a blissful mood, he would not notice the rumblings in his stomach—or if he did, just dismiss them as mere “butterflies.” Thinking back, in his happy mood, to the results of his cholesterol test—the 214—he might contemplate how lucky he was that his cholesterol was only “borderline” high, after all, he has never been careful about what he eats. After 10 years of daily cheese-stick sandwiches, he actually felt remarkably lucky. “Yes,” he might think to himself, “I’m going to live until a ripe old age.” In this instance, happiness promoted a more positive interpretation of physical symptoms and health information.

In this chapter, we are going to discuss how mood influences the appraisal of physical symptoms and judgments about health and illness. Health information is often ambiguous; its meaning is not always well understood (e.g., how should one understand a 214 cholesterol level?), and hence contextual cues such as mood are likely to influence its interpretation. After describing some recent experiments demonstrating the systematic effects of mood on the experience of physical symptoms and health beliefs, we will then describe three mechanisms that might explain the associations between mood and health-related judgments. The first mechanism concerns mood-congruent recall, the proposal that memories consistent in emotional tone with an ongoing mood state are more likely to come to mind than are memories with a different affective valence. The second mechanism is mood-induced shifts in focus of attention, in particular, the tendency for individuals experiencing sadness to attend selectively to themselves rather than the external environment. Switching levels of analysis from the cognitive to the physiological, the third mechanism to be discussed is the notion that changes in mood lead to actual alterations in endocrine and immunological functioning causing real (not just appraised) changes in health status. We will conclude this chapter with a discussion of the implications of this work for discovering biases in health survey data and understanding hypochondriasis.

Why Study Links Between Mood and Health?

The ancient Greek humoral system of medicine incorporated personal factors thought to be associated with excessive quantities of each of the four essential humors, and was thus perhaps the first systematic (if erroneous) description of personality–health interactions. During the 1940s and 1950s, investigation into this topic was restricted to speculation concerning the role of unconscious conflict in determining the specific symptomatology of the classic “psychosomatic” diseases, such as asthma, rheumatoid arthritis, and ulcer, but these formulations have fallen out of favor in recent years. Scientific research on the topic of psychological influences on health gained momentum with the advent of interest in “stress,” thanks largely to the work of Hans Selye (1956). Much of the early work in this area concerned the stresses associated with the accumulation of “life change” (reviewed in Minter and Kimball, 1978). In these studies, subjects reported which of the common life events provided in a checklist had occurred in their lives within the recent past, and the prevalence of these events was related to subsequent health outcomes. Methodological criticisms concerning the use of retrospective self-report, the failure of the stress measure to account for the appraisal of events by individuals and to assess chronic and minor stressors, and confounding of stressor and outcome assessments in these studies ultimately resulted in the waning of interest in research on global stressors.

For many years, psychotherapists and practicing physicians have noticed that individuals suffering from psychological distress, such as depression and anxiety, often also report various physical symptoms—typically back pain, headaches, dizziness, bowel and bladder irregularities, gastric distress, and the like. A challenge for both practitioners is to disentangle the psychological versus physiological roots of somatic complaints. At times, patients need care for both psychological and physical complaints. In other cases, however, the relief of psychological distresses, such as depression, eliminates the need for more expensive medical care.

In a review of the literature on mood and physical symptoms, Katon (1984) noted that depressed individuals do report somatic ailments in greater numbers than nondepressed individuals. Similarly, health status is appraised less positively among the depressed (Maddox, 1962; Tessler and Mechanic, 1978). And when hospitals offer psychological services, by which individuals presumably can have their psychological distresses attended to, utilization of medical services for relief of physical symptoms is reduced (Cummings and Follette, 1976; Follette and Cummings, 1967; Jones and Viscidi, 1979).

Although it has not been difficult to document the comorbidity of depressed mood and increased reports of physical complaints, the direction of causality is less certain. Intuitively, it seems obvious that the onset of physical illnesses with debilitating symptoms that interfere with pleasurable
daily activities or cause considerable pain should result in depressed mood. Findings supporting an association between illness and depression have been obtained in correlational and time-series analyses of physical symptoms and mood (Hancock, 1987; Persson and Sjoberg, 1987), in clinical studies of pain patients who develop depressive disorders (Keefe et al., 1986; Turk et al., 1987), and in observation of individuals with other medical problems (Rodin and Voshart, 1986).

However, the more interesting direction of causality that has not been explored as systematically is the hypothesis that changes in ongoing moods produce changes in the evaluation of physical symptoms and in subsequent judgments about health and illness. Consistent with this view are theories that various physical health problems are the manifestation of underlying depressive disorders. Such an argument has been made for various conditions, especially chronic pain (Blumer and Heilbronn, 1982; but see Turk and Salovey, 1984).

The direction of causality in understanding links between mood and physical symptoms, however, is not easily addressed by existing research. Most studies reported in the literature have used cross-sectional, correlational designs. Longitudinal studies are virtually nonexistent. One promising line of research concerns the laboratory induction of mood states followed by opportunities for subjects to report upon beliefs about their physical health. The random assignment of subjects to mood inductions allows for a direct test of the hypothesis that mood shifts have consequences for health-related cognitions. In an experiment involving the induction of moods, Croyle and Uretsky (1987) found that perceived health status varied in a mood-congruent direction, and that subjects who experienced sad moods reported more physical symptoms than those induced to experience happy moods. Of course, increased symptom reporting may reflect biased reporting, vigilance, or, in fact, the actual experience of more symptoms. Several mood-induction studies in this tradition were reported by Salovey and Birnbaum (1989), and it is to these findings we now turn.

Some Findings from Laboratory Studies of Mood and Health-related Cognitions

In a recent series of experiments, Salovey and Birnbaum (1989) asked college students who were experiencing the flu (but nonetheless had to complete their Introductory Psychology subject pool requirement) to participate in a study in which moods would be induced in the laboratory. In several different experiments, subjects were randomly assigned to happy, sad, or neutral mood-induction conditions. Moods were produced by using an Autobiographical Recollections Method (ARM) developed by Wright and Mischel (1982) and refined by Salovey and Singer (1989) (this procedure has also been termed Self-Generated Imagery). In a darkened room, subjects listened to a tape recording over headphones that instructed them to relax, close their eyes, and to imagine vividly incidents from their past that would produce the requisite mood. After about five minutes, the subjects were instructed by the tape to complete various measures of health status located on the desk in front of them. Subjects' moods were verified using brief scales at several points during the experimental session. At the end of the session, subjects were debriefed, and those in the sad condition were offered the opportunity to participate in a happy mood induction.

Mood and symptom appraisal

In the first experiment (Salovey and Birnbaum, 1989, Experiment 1), 66 subjects suffering from the flu (or flu-like symptoms) were induced to feel happy, sad, or neutral moods. They completed a standard physical symptom questionnaire (Wahler, 1968) and mood scales (McNair et al., 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. The cover story for the experiment did not mention mood. Rather, the study was described as an investigation of imagination in college students. As expected, since subjects were randomly assigned to mood-induction conditions, there were no differences in mood or symptom reports prior to mood induction. However, after subjects experienced happy, sad, or neutral moods (which were verified using the mood scale), they reported symptoms of differing intensity and frequency.

As illustrated in Figure 13.1, subjects assigned to the sad mood condition reported nearly twice as many aches and pains, a subset of items from the symptom checklist, as subjects assigned to the happy condition (even though both groups reported the same level of physical symptoms just prior to mood induction). Moreover, sad subjects reported more physical symptoms from

![Figure 13.1 Influence of mood on reporting of physical symptoms among subjects experiencing the flu (data from Salovey and Birnbaum, 1989).](image-url)
the previous week than happy subjects, and they attributed greater discomfort to these symptoms.

The differences among the mood-induction conditions were confirmed by correlating symptom reports and mood scales after mood induction. Indeed, the saddest subjects reported the greatest number of aches and pains ($r = -0.46, p < 0.0001$), the most frequent symptoms of any kind, from nasal congestion to fatigue ($r = -0.30, p < 0.01$), and the most discomfort due to their symptoms ($r = -0.30, p < 0.01$).

**Mood & judgments of health efficacy**

The presence of physical symptoms is but one factor in motivating individuals to attend to their health. Perhaps more important than perceptions of physical symptoms in determining illness behaviors, such as treatment-seeking, are beliefs about one's capacity to engage successfully in salubrious behaviors and expectations that such behaviors will alleviate illness or maintain health. We termed the former set of beliefs *health self-efficacy* and the latter *health outcome efficacy* (after Bandura, 1977). Self-efficacy beliefs are important predictors of diverse health behaviors such as smoking cessation, eating a healthy diet, and engaging in safe sex (McKusick et al., 1986; O'Leary, 1985). 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 (Turk et al., 1984).

Salovey and Birnbaum (1989) constructed two 26-item scales to measure health self-efficacy and outcome efficacy among our subjects with the flu. Each scale presented subjects with behaviors in which they might engage in order to relieve their symptoms (e.g., visit the health center, stay in bed, drink fluids). Subjects rated how able they were to carry out each behavior and how likely each was to improve their health. Ratings from 0 to 100 were solicited for each item, and a mean across the 26 items was calculated for each scale.

Once again, subjects were randomly assigned to happy, sad, and neutral mood-induction conditions and their efficacy ratings requested after the mood-induction procedure was administered. As depicted in Figure 13.2, these judgments varied as a function of mood state. Sad subjects perceived themselves as considerably less able to carry out health-promoting behaviors, and they were somewhat less likely to believe that these behaviors would relieve their illness.

Thus, it appears that mood influences expectations that are thought to be closely linked to performing health behaviors (Bandura, 1986). These connections between mood and efficacy expectations are consistent with findings in other behavioral domains, from romance and athletics (Kavanagh and Bower, 1985) to altruism (Salovey, 1986; Salovey and Rosenhan, 1989). When individuals experience sadness, they feel less capable of carrying out required behaviors (Kanfer and Zeiss, 1983). And even if they perceive themselves as capable, they are not especially confident that such behaviors would relieve their illnesses.

Individuals experiencing sad moods who are ill may thus be caught in a bit of a bind. On the one hand, they experience their symptoms as more frequent, intense, and discomforting. On the other, they believe there is little they could actually do to make themselves feel better. Such malaise may make the sad individual especially unlikely to adhere to treatment recommendations. "Why bother taking these pills, getting extra rest, or drinking fluids," our sad, sick friend may think to him or herself, "I couldn't do it, and it wouldn't matter anyway."

**Mood & judgments of risks and vulnerabilities**

Other important health-related beliefs that appear to be precursors of health behavior are perceptions of vulnerability to future illnesses. Beliefs about risk likelihood and severity have been found to contribute to interest in risk-reducing behaviors such as seeking medical treatment when sick (Becker et al., 1977; Cummings et al., 1979; Kulik and Mahler, 1987; Weinstein, 1982, 1983). Individuals appear to be unlikely to take health protective actions when they do not perceive themselves to be vulnerable to future illnesses (Janz and Becker, 1984). The cheese-steak sandwich lover among us is unlikely to stop eating them for lunch every day if he continues to believe that contracting heart disease is an extremely low probability event for him.

Estimates of the likelihood of future positive and negative events have generally been among the most mood sensitive of all judgments (e.g., Forgas and Moylan, 1987; Johnson and Tverksy, 1983; Mayer and Volan, 1985). In a recent study, Salovey and Birnbaum, (1989, Experiment 3), asked 33
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 (a) in the average Yale student’s lifetime and (b) in their own lifetime. The items reflected both positive (e.g., regularly maintain an exercise program) and negative (e.g., develop high blood pressure) health outcomes. Perceived vulnerability was operationalized as the difference between subjects’ estimates for the average Yale student and for themselves. Thus, a positive score indicated that the subjects felt the event was more likely to happen to him or her than to other students. A negative score indicated that the subject felt the event was less likely to happen to him or her relative to the peer group. Separate scores were calculated for the positive and negative items.

The most noticeable trend in these data, which are displayed in Figure 13.3, is that subjects, no matter what mood they were induced to experience, always believed that negative health events were less likely to befall them than their peers, and that positive outcomes were more likely to come their way. This tendency to believe that one must be “above average” in future health has been referred to as unrealistic optimism or perceived invulnerability (Perloff and Fetzer, 1986; Weinstein, 1982, 1983, 1984, 1987), and may be included among the biased self-beliefs that help individuals to maintain a positive self-regard (see Taylor, 1989; Taylor and Brown, 1988, for reviews).

Moreover, 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 subjects made to feel sad.

It seems reasonable to ask why mood had a strong impact on estimates of negative health events, such as contracting some form of cancer or developing arthritis, but not positive health events, such as being in great physical shape or maintaining a well-balanced diet. There is probably something fundamentally different about these sets of items. The positive items asked subjects to make estimates about events for which they had current self-knowledge (e.g., their diet or exercise regimen). Negative items, on the other hand, involved speculation about future events for which little relevant self-knowledge could be marshalled (e.g., will I ever have a stroke, heart disease, cancer?). Mood seems to have a stronger impact on judgments that are not well anchored in preexisting knowledge (Forgas and Bower, 1987). Hypothetical judgments are more sensitive to contextual variables such as mood, since moods are likely to be more informative in such judgments—there are few competing sources of information on which to base these inferences (see Salovey and Mayer, 1990; Schwarz, 1989; see also the chapters by Schwarz and Bless, and Clore and Parrott in this volume). Likewise, we could expect mood to be more likely to influence the perception of ambiguous physical symptoms, such as back pain, than those less open to objective interpretation, such as coughing up blood.

Three Possible Mechanisms

Moods clearly affect judgments about one’s health. In the studies just reviewed, subjects who experienced sad mood inductions were more likely to report physical symptoms, less likely to feel capable of carrying out health-protective behaviors, more pessimistic about improving their health, and more likely to believe that they would be victims of future diseases than subjects who experienced happy mood inductions. In the next section of this chapter, we would like to discuss three mechanisms by which mood might influence these effects on health judgments: (1) by influencing the memories most easily brought to mind, (2) by affecting the focus of attention, and (3) by altering physiological processes directly, especially the immune system, and, therefore, actually influencing health. In addition, a fourth mechanism is possible whereby mood influences behaviors (e.g., care-seeking, smoking, exercising) that have health ramifications. This sequence, however, is not discussed explicitly in what follows, but is alluded to in each of the three sections below. Because the first two mechanisms have been discussed elsewhere (Salovey and Birnbaum, 1989; Salovey and Rodin, 1985; Salovey et al., 1991), they will be given less attention here than the third one.

Mood-congruent recall

Mood may affect beliefs about health and illness by influencing the memories most easily brought to mind. A fairly robust finding in the mood-
memory literature is that individuals can more easily recall material from memory that is congruent in valence with an ongoing mood state (for reviews of the mood-congruent recall literature see Blaney, 1986; Gilligan and Bower, 1984; Isen, 1987; Mayer and Salovey, 1988; Singer and Salovey, 1988). Perhaps the earliest investigation of mood-congruent recall was conducted by Fisher and Marrow (1934), who hypnotically induced seven subjects to experience either happy or sad moods. Subjects were then provided with stimulus words and asked to free associate to them. They generated mood-congruent associates more quickly than incongruent ones. Autobiographical memories have been especially sensitive to mood-congruent recall, whether the moods are induced in the laboratory (Salovey and Singer, 1989; Snyder and White, 1982; or occur naturally (Lloyd and Lishman, 1975). The basic finding is that mood-congruent memories are more likely to be recalled than incongruent ones, and they are recalled more quickly than incongruent memories (Teasdale and Fogarty, 1979; Teasdale and Taylor, 1981).

When individuals are asked to make judgments about their health, they often base these judgments on what is most easily brought to mind (Tversky and Kahneman, 1973). And what comes to mind when the sad person thinks about health? Most likely, sadness recruits memories about the death of close friends and relatives, previous experiences with illness, images of sick people, and the like. When individuals think about such things, they believe that they are more likely to occur (Anderson, 1983; Carroll, 1978). For example, in one study (Sherman et al., 1985), subjects imagined contracting a disease described either with easily imagined symptoms or symptoms that were hard to conjure up. Subjects then rated their likelihood of contracting the disease, and easily imagined diseases were rated as more likely. In our experiments, mood may create a context in which memories about health or illness can be easily brought to mind and vividly imagined. These fantasies may subsequently influence judgments about present health status and future health-relevant events. Moreover, mood may color the interpretation of ambiguous information (such as some symptoms) rendering it affectively charged. This information may then serve as a cue for the recall of similarly valenced health-related thoughts. In turn, the availability of these thoughts collectively can influence judgments about health and illness.

**Changes in attentional focus**

Moods may also influence perceptions of physical symptoms and beliefs about health because 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, but especially when they are negative, there is a tendency for individuals to focus their attention onto themselves rather than on the external environment. In a variety of correlational studies, increased attentional focus onto the self has been associated with depressed moods (e.g., Ingram and Smith, 1984; Smith and Greenberg, 1981; see also a recent review of this literature by Ingram, 1990). Sadness-induced self-focusing has also been demonstrated experimentally (Salovey, submitted; Wood et al., 1990). 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 and Scheier, 1981; Duval and Wicklund, 1972) suggesting that allocation of attention onto the self serves a regulatory function and helps the individual to maintain goal-directed behavior. 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 (cf. Taylor and Brown, 1988).

Focusing attention on the body increases perceptions of symptoms and sensations (Pennebaker, 1982). For example, individuals who live in unstimulating environments—which presumably do not provide enough competition for internal cues—report more physical symptoms than individuals in stimulating environments. In experimental research, when subjects are instructed to exercise while attending to bodily cues (heartbeat or breathing), they are more likely to report symptoms (Pennebaker and Lightner, 1980). And every jogger knows that the pain associated with running seems lessened if one can focus attention externally by listening to music tapes during the run (see Fillingim and Fine, 1986, on this point).

The comorbidity of depression and physical symptoms, described at the outset of this paper, 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, 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 judgments about present and future health status as well.

**Mood-induced changes in immune system functioning**

Although it could not be studied in the experiments described earlier, mood may also have direct effects on the physiological processes upon which symptom reports are based, and may even lead to illness by lowering resistance to effects of pathogens like bacteria and viruses. Although this notion has been popular wisdom for many centuries, the effects of distress on the functioning of the immune system have been studied only for the last 15 years or so, a period during which increasingly sophisticated tests for immunologic assessment have been developed. This endeavor, christened
"Psychoneuroimmunology" by Robert Ader in his 1981 book by that title (and mercifully abbreviated to PNI in more recent years) has resulted in the accumulation of considerable evidence for effects of a variety of psychosocial factors on immune functioning (reviewed by O'Leary, 1990). Although many of the stressors studied in the early period of inquiry were extreme and unusual (for example, space splashdown), more recent studies have revealed significant immune effects even of relatively minor, everyday events and resulting mood states.

Psychological influences on immune function. As noted above, early psychoimmunologic research focused on the effects of severe stressors. For example, in several investigations, bereavement was demonstrated to lower immune functioning (Bartrop et al., 1977; Irwin et al., 1987; Schleifer et al., 1983). A more frequently experienced form of social disruption—marital separation and divorce—is, however, also capable of reducing immune competence, and this is true both for women (Kiecolt-Glaser et al., 1987) and men (Kiecolt-Glaser, et al., 1988). These papers also reported psychological correlates of immune function indicating that, among divorced people, high levels of attachment to the lost spouse and the spouse (rather than the subject) having initiated the divorce were associated with depressed immunity, while among married subjects, lower reported marital quality was associated with reduced immune competence. Even commonly observed levels of loneliness in the absence of recent loss have been found to be associated with reduced immune function in such disparate populations as medical students (Glaser et al., 1985; Kiecolt-Glaser et al., 1984a) and psychiatric inpatients (Kiecolt-Glaser et al., 1984b).

Depression and depressed mood, psychological states that presumably accompany the stress of social disruption, have been examined in their own right, and here too effects have been observed across a wide gradient of severity. Patients hospitalized with major depressive disorder have been shown to have impaired immunity (Schleifer et al., 1984), and the effects are not due to the stress of hospitalization (Schleifer et al., 1985). Although these studies employed standard clinical assessments of functional immune status, another study has demonstrated impairment of the ability of lymphocytes to repair DNA damaged by irradiation in depressed psychiatric inpatients (Kiecolt-Glaser et al., 1985). This finding may have important implications for the development of cancers.

Even naturally occurring, nonclinical fluctuations in daily mood may have immunologic correlates. One recent study examined mood as it related to salivary immunoglobulin-A antibody, which is the first line of defense against bacteria and viruses entering the body (Stone et al., 1987). In this study, salivary antibody response to stimulation with a rabbit albumin antigen was measured three times each week for eight weeks. Mood was measured with a standard mood adjective checklist. In a within-subjects analysis, secretion of salivary antibody was found to be significantly greater on days when more positive mood was reported, and lower when more negative mood was reported. Since daily fluctuations in mood are related to daily events (Stone, 1987), one would expect that everyday stressors might produce immunologic changes. Indeed, a number of studies have reported reductions in immune function accompanying the very common stress of academic examination (see Kiecolt-Glaser and Glaser, 1987).

Methodological issues in PNI research. Among the criticisms of psychoimmunologic research employing healthy subjects is the claim that the observed fluctuations in immune function may not be of sufficient magnitude to result in illness. A few studies have assessed self-reported health and found it to be related to psychological factors (Glaser et al., 1987; Kiecolt-Glaser et al., 1988); however, it is clearly not the case that illness invariably accompanies strong negative mood (of course, the presence of a pathogen is necessary for illness to occur). It may be reasonable to think of mood-related immunologic effects as constituting risk factors for illness, much as elevated blood pressure or serum lipids increase risk for myocardial infarction. A number of studies have utilized specific illness models and demonstrated psychoimmunologic effects of relevance to the disease under consideration (reviewed by O'Leary, 1990); these studies are less vulnerable to this criticism.

Another criticism of psychoimmunologic research is that apparent relationships between psychological stress and immune function may be mediated by stress-induced changes in behaviors, such as diet, sleep, use of psychotropic substances, or exercise. Since each of these behaviors has immunologic effects, it is possible that stress is exerting only indirect, behavioral effects rather than direct, affect-mediated ones. Some of the studies reported above have attempted to assess these behavioral factors; however, a comprehensive assessment would be difficult, if not impossible, to conduct.

One final note: although the predominant finding obtained in PNI studies to date has been suppressed immune function in connection with negative mood, this is not always the case. Some stressors, particularly those activating the sympathetic nervous system, may have some immune enhancing effects, at least in the short run (e.g., Wiedenfeld et al., submitted). The literature concerning the "cancer-prone personality"—and cancer is an immune-related disease—would suggest that low levels of distress may be associated with unfavorable outcome (reviewed by Contrada et al., 1990). The interactions between the nervous, endocrine, and immune
systems are very complex (e.g., Blalock, 1989), and it would be unwise to draw simplistic conclusions at this point.

Some Implications

So far, we have discussed some of the ways moods influence the perception of physical symptoms and judgments about health and illness. We have argued that these mood effects might be explained by three (not mutually exclusive) mechanisms, mood-congruent recall, mood-induced shifts in attentional focus, and actual changes in the functioning of the immune system brought on by mood shifts. In this final section of the chapter, we shall describe two implications of this connection between moods and health that reflect two lines of research that we are currently conducting. The first concerns the accuracy of health information reported in health surveys. In particular, we are investigating whether ongoing moods bias memory for previous physical symptoms, especially complaints about pain. The second implication concerns the understanding of hypochondriasis. We propose that depressed mood (and consequent self-focused attention) accounts, in part, for the abnormal reporting of physical symptoms and consequent fear and worry that characterize the hypochondriac.

Memory biases on health surveys

If mood influences the reporting of physical symptoms and beliefs about health, can we trust the data obtained from large-scale health surveys, such as the National Center for Health Statistics' Health Interview Survey? Under a contract from NCHS, Salovey and his colleagues are presently investigating how mood (and other variables) affect memory for past health-related events (Salovey et al., 1990). We have focused much of this research on the reporting of physical pain. Because physical pain is especially focused on the self, judgments about it can be expected to be highly mood sensitive.

The quality of survey data on experiences with pain is threatened by a variety of sources of error in the recall of painful episodes as well as biases in judgments about the nature of present and past pain. Results of the studies reported in this chapter suggest that one source of error is the respondent's mood at the time of the survey. Mood has an especially strong impact on the processing of affectively laden information, as described earlier. Painful experiences are certainly affectively charged events, and memories about them may be organized around their affective qualities.

The role of moods and emotions in the accuracy of judgments about and recall of painful experiences has not been studied directly, despite the fact that it is suggested as the key variable mediating the accuracy of pain recall by many researchers (e.g., Eich et al., 1985; Hunter et al., 1977; Kent, 1985; Norvell et al., 1987; Roche and Gisbers, 1986). For example, respondents who experienced fear of going to the dentist remembered dental pain as more severe than it actually was. Kent (1985) asked dentists patients to rate pain expected prior to the dental procedure, actual pain experienced as a result of the procedure, and then, three months later, to recall the amount of pain they had experienced. Only modest correlation between recalled and actual pain were obtained ($r = .42$), indicating that factors other than the initial pain experience accounted for most of the variance in pain recall after 3 months. Interestingly, among individuals who were not anxious about dental work, the recalled/experienced correlation was much higher ($r = .79$), but there was virtually no correlation between the two among highly anxious individuals ($r = -.11$). In general, recall drifted in the direction of anxiety; that is, highly anxious individuals remembered the pain experience as much more severe than it actually was. These results are only suggestive, however, as the small sample size (fifteen low-anxious and eight high-anxious subjects) probably produced unstable correlations, the differences among which could not be evaluated statistically.

Another example is provided by mothers experiencing labor and childbirth. They tend to underreport the intense pains of labor after the baby is born. Guerra (1986) noted that "the parturient will tolerate much more pain and discomfort than will other surgical patients" (p. 77). In fact, Norvell et al. (1987) found that pain ratings on visual analogue scales made during the three phases of labor revealed considerably more intense pain than retrospective ratings made two days postpartum. The affective state of the mother during labor (fear, anxiety) and her affective state after the birth of the child (joy, relief) are so incongruent that there may be considerable interference with recall of material in the latter state that was encoded during the former (i.e., there will be no mood state-dependent memory facilitation; Bower, 1981).

Each of these situations exemplifies the important role played by affect in the recall of pain. Despite its common endorsement as an important factor resulting in inaccurate pain reporting, survey researchers have given scant attention to affect in the design of surveys and in the interpretation of their results. Recently, we completed several studies in which subjects recruited from the local community answered questions like those found on health surveys after experiencing a happy, a sad, or a neutral mood induction (Salovey, et al., 1990). One set of questions asked subjects to recall the number of days during the previous year on which they experienced each of seven different kinds of pain (e.g., headache, dental, stomach). We then summed these days into a pain recall index. As can be seen
in Figure 13.4, this index was mood sensitive. Consistent with the previous work reported in this chapter relating mood to the report of physical symptoms, women experiencing sad moods reported having experienced more pain than did women who experienced happy moods. However, an unusual pattern of pain reporting was found among men; more days of pain were recalled in both the happy and sad conditions as compared with the neutral control group, although none of these differences were statistically significant. Additional studies of affective biases in the reporting of pain and physical symptoms are now underway in order to understand this unpredicted mood by gender interaction.

Understanding hypochondriasis

Hypochondriasis is characterized by (a) the experience of physical symptoms and (b) worry and fear about one’s health (DSM-III-R, American Psychiatric Association, 1987). Some ongoing work suggests that these two components, although correlated, are indeed separable (Stretton et al., submitted). Recently, Stretton and Salovey (1990) proposed that both of these dimensions of hypochondriasis may be augmented by depressed moods and by subsequent shifts in attentional focus on to the self. The apparently frequent comorbidity of clinical hypochondriasis and depression is consistent with this hypothesis (Diamond, 1985; Kellner et al., 1983–84; Kenyon, 1964).

Stretton (1990) recruited a sample of 250 healthy adults in order to study the relationship between sad mood, self-focused attention, and the two dimensions of hypochondriasis—physical symptom reporting and unjustified fear and worry. Sadness and self-attending made significant and independent contributions to accounting for the variance in symptom reporting and fear and worry, controlling for subjects’ prior health history. Of six different personality variables measured reliably by Stretton, sad mood was the one most strongly associated with hypochondriasis.

Although these results provide support for a view of hypochondriacal concerns that emphasizes the importance of depressed moods and self-focused attention, we are mindful that some investigators have argued against the utility of separating somatic and psychological complaints. For instance, Costa and McCrae (1985, 1987), Watson and Pennebaker (1989), and Watson (1988) have argued that neuroticism or negative affectivity (the tendency to kvetch about most anything) may be a “third variable” that accounts for observed associations between dysphoric moods and reported health problems. Although we do not discount this possibility, we are encouraged (from the standpoint of understanding hypochondriasis) by the repeated observation that individuals experiencing psychological distress are more likely than others to report physical symptoms and seek treatment for them (Mechanic, 1976, 1978, 1980).

Summary

Moods clearly affect perceptions of physical symptoms and judgments about health. When sad, individuals report more symptoms than when they are happy. Likewise, they believe they are less capable of carrying out behaviors that will alleviate their ills, and they are more pessimistic that any actions they might choose to take will relieve their symptoms. Sad individuals also believe that they are more vulnerable to future illness—heart disease, cancer, arthritis—than when happy. These links between mood and health beliefs can be understood by examining underlying mechanisms at two different levels of analysis. At a cognitive level, mood facilitates the recall of memories congruent with the mood. When sad, individuals may be more likely to call to mind previous experiences with illness. Subsequent judgments may then be based on the ease with which these autobiographical memories flood consciousness. Also at the cognitive level, sad individuals are more likely to focus their attentions on to themselves rather than on the external environment. The sad person may thus become acutely aware of internally generated symptoms and sensations and be less likely to be distracted by engaging stimuli from the environment. At the physiological level, recent research suggests that sad moods may be associated with immune system changes that can produce vulnerability to real illness. This chapter concluded with two implications of this line of research. One concerns the accuracy of symptom reporting—especially physical pain—on
health surveys, and the other, a view of hypochondriasis emphasizing the role of depressed mood and self-focused attention.

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References


Affect and Person Perception

JOSEPH P. FORGAS
University of New South Wales

Contents

The background to research on affect in person perception
Affect in person perception: a multiprocess approach
Affect and cognition in person perception
Affect and the choice of processing strategy
Affect in person perception: empirical investigations
Affect and the perception of interactive behaviors
Affective influences on learning and judgmental latency
Affective influences on memory and judgments in children
Praise or blame? Affective influences on achievement attributions
Affect and interpersonal choices
Mood effects in individual versus group judgments
Evidence from field studies
Summary and conclusions

Perceiving another person is one of the most common, yet at the same time most complex and demanding tasks we face in everyday life. Unlike physical perception, social perception usually involves highly elaborated judgments about characteristics which are not directly observable, but must be inferred, requiring the use of high-level cognitive processes. Affect can play an important role in person perception both through influencing the particular kind of information processing strategy adopted by judges, and through its influence on the way social information about another person is attended to, selected, interpreted, learned, remembered, and evaluated in judgments. This chapter describes the general conceptual and historical background to studying affective influences on person perception judgments, and a multiprocess approach to the understanding of such effects is developed. In the second half of the chapter, a series of our empirical studies illustrating various aspects of affective influences on person perception judgments are described.

The Background to Research on Affect in Person Perception

Since the earliest experimental investigations of person perception phenomena, it has been clearly recognized that person perception is inevita-