

reaffirms portions of the delineated themes. The literature in each domain also is informative about other forces that produce flawed self-judgment, demonstrates some of the consequences of these flaws, and suggests strategies that might improve the accuracy of self-assessment, or at least alleviate the costs of erroneous ones.

HEALTH

Among the three highly valued resources Ben Franklin referred to in his widely cited advice, healthy precedes wealthy and wise. Public opinion polls show that physical health is consistently rated as one of the most valued of personal resources. The United States spends more of its gross domestic product on health services than any other major industrialized country (Braden et al., 1998).

In light of the value and importance of health, people should be highly motivated to understand their personal risk of developing a serious illness or injury. However, they succumb to numerous misperceptions and erroneous beliefs about personal health risks and the relationship between symptoms and illness. In this section, we first consider biases in perceiving health risk and then discuss how erroneous perceptions of social norms and individual uniqueness affect healthy and unhealthy practices. Then, we discuss how laypeople's potentially mistaken beliefs about health and illness prompt mistaken self-judgments that influence their efforts to obtain health care, as well as their adherence to medical regimens.

Several themes we discussed earlier are echoed in this summary of self-perceptions and health. In particular, people tend to be overly optimistic about their vulnerability to health risks. They also tend to exhibit pluralistic ignorance in ways that affect their health-related behavior. In addition, misjudging the emotion of situations, they tend to mispredict the preferences they would have if they faced certain medical decisions, and thus make decisions for other people that differ from what those other people want. Finally, people at times exhibit confidence in their ability to diagnose themselves, an example of the double curse of incompetence.

Unrealistic Optimism About Health Risks

A wide range of lifestyle behaviors, such as smoking, drinking too much alcohol, overeating, and avoiding physical exercise, are associated with premature death and disease (e.g., Belloc, 1973). To be motivated to relinquish these practices, people need to recognize their personal risk of disease and injury. However, they tend to be unrealistically optimistic about their health—as they are about other areas of life—perceiving themselves to be significantly less at risk than their peers for a wide range of physical diseases and negative health outcomes. For example, when a large sample of nominally healthy adults completed a questionnaire that listed a series of health problems and other hazards (e.g., food poisoning, lung cancer, drug addiction, ulcer, mug-

ging, stroke, serious auto injury, cancer, high blood pressure), they typically rated their personal risk between *average* and *less than average* (Weinstein, 1987).

Studies focused on specific health risks echo these findings. People tend to believe their personal risk of becoming ill from their food (e.g., salmonella poisoning) is lower than the risk for most other people (Sparks & Shepard, 1994). Chinese students and European Canadians in Toronto rated their personal risk of being infected with severe acute respiratory syndrome (SARS) as lower than their peers' risk, with the bias being stronger among the Chinese (Ji, Zhang, Usborne, & Guan, 2004). Almost 90% of gay men not infected with HIV rate themselves as having significantly lower risk of becoming infected than the average gay man (Gold & Aucote, 2003). In the United Kingdom, secondary school students who smoke express unrealistic optimism about their health risks, although they do concede that their risks are higher than nonsmokers' (Sutton & Bolling, 2003).

In sum, there is a pervasive tendency for people to perceive themselves as having significantly lower risk of a host of physical health problems than their peers. Logically, however, everyone cannot have a less-than-average risk. Some individuals, by virtue of their age, occupational level, and education, are at lower risk than others, but Weinstein (1987) found that unrealistic optimism about health risks was independent of these factors. He also found that the health risks people were likely to be unrealistically optimistic about were those associated with the incorrect belief that if the problem has not yet appeared, it is unlikely to occur in the future. This unrealistic optimism may make people feel overly comfortable and reduce their motivation to take preventive action.

Causes of Unrealistic Optimism and Unrealistic Pessimism

Many factors converge to produce unwarranted optimism. Weinstein (1983, 2003) proposed that unrealistic optimism is based on a need to defend self-esteem against possible threats. Several findings point to such a motivational explanation. Typically, if people are asked to generate reasons why a particular outcome might happen to them, or to think through a series of events that could lead to this outcome, their perceptions of the likelihood of this outcome increase (e.g., J. Sherman, Skov, Hervitz, & Stock, 1981). This tendency, however, can be biased by people's desire to think of themselves as healthy.

Weinstein and Klein (1995), for example, asked some experimental participants to list all their personal attributes that would tend to increase the likelihood that they would become 30% overweight or would develop a drinking problem. In another condition, different participants listed all their personal attributes that would decrease their likelihood of experiencing these outcomes. In both conditions, participants then estimated the likelihood that they would experience these problems in the future. The pattern of results was consistent with a motivational explanation of unrealistic optimism: Participants who focused on personal factors that should make a problem more likely did not

show the expected reduction in the optimistic bias, presumably because they did not want to think of themselves as being at high risk. However, participants asked to list attributes or behaviors that would reduce the risk of obesity became significantly more optimistic.

Nonmotivational factors may also produce unrealistic optimism—and pessimism. Egocentric neglect of others, for example, comes into play. Because people consider their own chances of experiencing an event but neglect the fact that the average person probably faces the same likelihood (Chambers, Windschitl, & Suls, 2003), they tend to think that they are both more likely to experience common events and less likely to experience rare events than their peers are. This results in unrealistic optimism in the case of common desirable events, as well as in the case of rare undesirable events. However, when people consider rare desirable events and common undesirable events, the tendency reverses itself, and people express undue levels of pessimism (see also Kruger & Burrus, 2004).

Consequences of Unrealistic Optimism

Unrealistic optimism and unrealistic pessimism are problematic for promoting good health, regardless of whether motivational or cognitive processes are responsible for these biases.⁵ One of the core components of many theories about health promotion—from the *health belief model* (Becker, 1974; Rosenstock, 1966) to *protective motivation theory* (Rogers, 1975) to *precaution adoption theory* (Weinstein, 1988)—is that perceived vulnerability is an important motivator for people to do something about their health. Indeed, a meta-analysis has shown that the degree to which people perceive themselves to be vulnerable to health problems predicts the likelihood that they will engage in health-promoting behaviors (Harrison, Mullen, & Green, 1992). Thus, being overly optimistic may dissuade people from learning about or adopting preventive measures because they fail to perceive any personal risk. Alternatively, unrealistic pessimism may prompt feelings of hopelessness that serve as obstacles to preventive actions.

The literature does provide examples showing that perceived invulnerability leads to complacency in the shadow of health risks. When people perceive themselves as relatively invulnerable to flu, they are less likely to intend to obtain a flu shot (Larwood, 1978). People who believe their risk is lower than that of their peers are more likely to engage in high-risk sex (Sheer &

Cline, 1994) and less likely to use contraception (Burger & Burns, 1988) than people who believe they have high risk.

That said, the literature on whether unrealistic optimism uniformly discourages prevention behaviors is mixed (Buunk, Gibbons, & Visser, 2002; Weinstein, 2003). At times, undue optimism is linked to behaviors that might prove problematic; at other times, perceived invulnerability does not affect health-related behaviors. One study even showed that lower levels of optimism were associated with adverse consequences. Rutter et al. (1998) found that among motorcyclists, lower optimism correlated with greater likelihood of abandoning precautions in the future! Perhaps the motorcyclists who perceived their risk more realistically (i.e., less optimistically) assumed that this recognition made them safer.

Moderators of Unrealistic Optimism

Some people, however, are more unrealistically optimistic than others. Experience matters, for instance. Drivers who have been hospitalized after a road accident are not as optimistic as drivers who have not had this experience (McKenna & Albery, 2001). Similarly, middle-aged and older adults are less optimistic about developing medical conditions than their younger counterparts are (Madedy & Gomez, 2003), presumably because older persons have had more exposure to health problems and aging. Acutely ill college students (approached at a student health center) perceive themselves to be at greater risk for future health problems than do healthy students, indicating that risk perceptions can be “debiased” if the person has a relevant health problem. Acutely ill students, however, continue to be unrealistically optimistic about problems that do not involve physical health (Kulik & Mahler, 1987).

In a similar vein, within a few days of experiencing the 1989 California earthquake, college students displayed no unrealistic optimism about being hurt in a natural disaster, but they were unduly optimistic about their invulnerability to other kinds of negative events. However, when surveyed 3 months later, these students were unrealistically optimistic about their vulnerability even to natural disasters. This study indicates that although people can be debiased after experiencing negative events, the debiasing seems to be event-specific and short-lived (Burger & Palmer, 1992).

One of the strongest moderators of unrealistic optimism is perceived control (Helweg-Larsen & Shepperd, 2001). The greater a person’s perceived control over an event or its outcome, the stronger the person’s optimistic bias. A meta-analysis conducted by C. Klein and Helweg-Larsen (2002) synthesized the results of 21 studies and found a moderate relationship between perceived control and the bias. For example, people are less optimistic about becoming sick because of air pollution (low control) than about becoming injured in an automobile accident (high control because precautions, such as fastening the seat belt, are possible; McKenna, 1993; Quadrel, Fischhoff, & Davis, 1993).

⁵We should note that we concentrate on the impact of unrealistic self-views for physical health. During the past 15 years, there has been a vigorous debate about the impact of unrealistic self-views on mental health. The dominant assertion in this debate is that overly positive self-views are actually beneficial for coping and psychological adjustment when people face extreme adversity (Taylor & Brown, 1988), such as cancer (Taylor, Lichtman, & Wood, 1984) or the aftermath of a civil war (Bonanno, Field, Kovacevic, & Kaltman, 2002). This assertion, however, is not without its critics (Colvin & Block, 1994; Shedler, Mayman, & Manis, 1993), and everyone agrees that if overrating one’s self is advantageous, it is desirable only in moderate doses (Baumeister, 1990; Taylor & Brown, 1994; see Dunning, 2005, for a review of this debate).

Interventions to Reduce Unrealistic Optimism

Thus, exposure to negative life events can reduce unrealistic optimism about similar events that might take place in the future, at least temporarily. The question is whether physicians and other health professionals might have other techniques at their disposal to make people more realistic about their chances of succumbing to serious illness or injury.

Two techniques have demonstrated some success in reducing unrealistic optimism. One is personalized feedback. Kreuter and Strecher (1995) asked patients waiting in family practice clinics to complete a questionnaire about their perceived and actual risk of dying from heart attack or stroke within the next 10 years. Perceived risk was measured with questions about degree of risk (i.e., respondents indicated whether they thought their risk was much lower than average, lower than average, etc., compared with other people their same age and sex). Actual risk was assessed with questions about age, height, weight, blood pressure, and other risk factors (Amler, Moriarty, & Hutchins, 1989). Algorithms were then used to calculate each patient's actual risk for each cause of death. Two to four weeks after completing the baseline questionnaire, patients received mailed feedback about their actual risk (i.e., whether it was average, lower than average, or higher than average compared with the risk of other people of the same age and sex). Six months later, a follow-up questionnaire on perceived risk (using the same format as in the original questionnaire) was mailed to the patients. Results indicated that patients who were initially unrealistically optimistic about their stroke risk became more realistic after receiving personal risk information. Individualized risk feedback had no effect on perceived risk of heart attack, however. These results suggest that receipt of objective risk information can debias risk perceptions, but more research clearly is needed. This is a promising approach, but probably not appropriate for mass campaigns (Weinstein, 2003). Using personalized risk feedback may be appropriate when there is direct contact with the individual, as, for example, during a medical visit.

The second technique that has been shown to reduce unrealistic optimism about health risks targets the motivational basis of such unrealistic optimism. If one confronts people with information about risk factors, they will defend against it. However, if their sense of self-worth is bolstered before they encounter that information, they become more willing to accept it and to change their behavior. For example, college students who wrote about a personally important value (e.g., how much they cared about their friends and family) before viewing an AIDS-awareness film were more affected by the message than were students in a control group, who wrote about a more neutral topic. They viewed themselves as more at risk and purchased a greater number of condoms as they left the laboratory (D.A.K. Sherman, Nelson, & Steele, 2000). Reminding people of a time in which they were kind to other people, a memory that affirms their self-esteem, makes them more willing to accept information that their health is

at risk, and less likely to distort their memory of that information (Reed & Aspinwall, 1998).

Exceptions to Unrealistic Optimism

The literature, however, also shows that erroneous assessments of personal health risk can sometimes be overly pessimistic. For example, in the study by Ji et al. (2004), although Chinese respondents believed that they were less susceptible to SARS than their peers (i.e., relative risk), they overestimated their absolute risk of being infected. Similarly, a representative sample of Malawians expressed significant unrealistic pessimism regarding their susceptibility to malaria and schistosomiasis (Morrison, Ager, & Willock, 1999), and they also reported feeling they had less control over these diseases than other people do. Interestingly, in settings with endemic health risk, feelings of pessimism and lack of control may actually be adaptive. Indeed, supplementary evidence indicated that persons who perceived the diseases to be low in predictability and controllability were more likely than others to adhere to healthy practices.

In Kreuter and Strecher's (1995) study of personalized feedback, patients were also queried about their risk of cancer and injury in a motor vehicle crash. Respondents were initially unrealistically pessimistic about these risks, perhaps because of all the mass media attention given to breast cancer and traffic accidents. These instances of unrealistic pessimism run against the usual tendency toward undue optimism, and future research could profitably delineate the conditions under which people overestimate their risk rather than underestimate it. For example, one perspective mentioned earlier (Chambers et al., 2003) predicts unrealistic pessimism about common negative events because people fail to appreciate that common events are just as likely to happen to other people as to themselves.

Perceptions of Uniqueness and Consensus

Up to now, we have been discussing how people tend to see themselves as unique among their peers, usually in a self-congratulatory direction. Pluralistic ignorance is a different kind of false-uniqueness error, whereby individuals falsely think their private opinions are at odds with those of everyone else, but do not feel good about being different (Miller & McFarland, 1987; Suls & Wan, 1987). Instead, they feel odd, different, deviant.

Pluralistic ignorance can also play a role in health-related behaviors, such as the excessive consumption of alcohol on college campuses, a major concern of college administrators, health officials, and parents because of the resulting injuries, legal infractions, and low academic performance (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). Transition to college typically is associated with increases in alcohol consumption, and this shift appears to represent the effects of strong public norms among students favoring excessive rather than moderate consumption (Friend & Koushki, 1984). Students, however, may have several reasons to have personal misgivings

about these practices. They get first-hand exposure to hung-over roommates and inappropriate behavior associated with drinking.

Prentice and Miller (1993) speculated that college students may have real concerns about excessive drinking but feel inhibited about sharing them with peers because nearly everyone's public behavior on campus seems to support excessive drinking as the norm. To evaluate this idea, Prentice and Miller had Princeton University students rate both their own and their friends' comfort level with alcohol practices on campus. Students consistently rated themselves as less comfortable than their friends (see also Perkins & Berkowitz, 1986; Suls & Green, 2003) and also as less lax about the number of drinks they consumed per hour and about the number of drinks they would consume if they were going to drive afterward (Bourgeois & Bowen, 2001).

These misperceptions have behavioral consequences. Believing their concerns are unique, students may set aside their misgivings and strive to conform to the perceived social norm (Schachter, 1951). Indeed, Prentice and Miller (1993, Study 2) found that personal alcohol consumption increased over the course of the semester among students who believed their behavior initially diverged from the perceived norm. College males seem to feel this social pressure more intensely than college females, perhaps because alcohol plays a larger role in their campus social lives and signals a "machismo" image (Suls & Green, 2003). Pluralistic ignorance also has been found with respect to other undesirable health practices, such as marijuana and amphetamine use and unsafe sex practices (Suls & Green, 2003).

Luckily, there has been some success using interventions to correct erroneous perceptions of social norms. For example, freshman college students who were exposed to peer-oriented discussions that focused on pluralistic ignorance relating to alcohol (discussions about the difference between public appearances and private beliefs) drank less than students who received an individually oriented discussion about the risks associated with excessive drinking (Schroeder & Prentice, 1998). Agostinelli, Brown, and Miller (1995) also found that providing realistic feedback about misperceived norms was effective in reducing excessive drinking in college students.

People, however, also make the reverse error, overestimating how much their attitudes, habits, and outcomes coincide with those of other people. Such beliefs can have a powerful influence on behavior (e.g., Ajzen & Fishbein, 1980). In essence, the difficulty of identifying true social norms may force people to depend on simple rules of thumb. A heuristic that is often used to judge the frequency of events is based on availability (i.e., in memory)—an event or behavior is perceived to be more common the more memorable or accessible to memory it is (Kahneman & Tversky, 1973). Because people's own behavior and attributes are most accessible to them, they may distort norms in the direction of their own behaviors or preferences. This phenomenon, the false-consensus effect, has been well documented in a wide range of domains (Mullen et al., 1985; Ross, Green, & House, 1977).

For example, Chassin, Presson, Sherman, Corty, and Olshavsky (1984) found that adolescents' ratings of their friends' use of alcohol, cigarettes, and marijuana were positively correlated with their own personal use. Suls, Wan, and Sanders (1988) reported a false-consensus effect for a wide range of health-relevant behaviors (e.g., substance use, use of seat belts). For example, college students who smoked cigarettes believed that more of their peers smoked cigarettes than did nonsmokers. In contrast, nonsmokers perceived there to be more nonsmoking students than smokers did.

These erroneous perceptions have behavioral effects. For example, among smokers, overestimating the prevalence of smoking is directly associated with an increase in this behavior (Gibbons & Gerrard, 1995). Not only does the false-consensus effect justify one's personal practice, but the erroneous perception may perpetuate and even increase the practice. Luckily, false-consensus effects can be corrected with special health-promotion programs. For example, Hansen and Graham (1991) developed a school intervention that involved providing students in junior high school with true information about the prevalence of drinking, as well as perceptions of acceptability. This intervention reduced alcohol, marijuana, and tobacco use among the students over a year's time. Other researchers have had success with similar programs in secondary schools and colleges (Borsari & Carey, 2001; Perkins, 2002).

Using the Self to Predict the Preferences of Other People

False consensus can also influence the decisions family members make when a spouse or other relative is too sick to make medical decisions for him- or herself (Fagerlin, Ditto, Danks, Houts, & Smucker, 2001). In such cases, the family member is asked to use the standard of *substituted judgment*, that is, to make the decision that the incapacitated patient would make if he or she could. The idea is that the surrogate should choose only those treatments the patient wants. But if people tend to believe erroneously that others share their behaviors and opinions, a surrogate's decisions about life-sustaining treatments may reflect the surrogate's preferences more than the patient's.

More to the point, if surrogates are not able to accurately project what their own preferences would be if they were in the patient's place, then they will make decisions that contradict the patient's actual preferences. The potential for this type of misjudgment is not trivial, given that people tend to misperceive how they would respond to emotionally laden situations when they are not currently emotionally aroused (Van Boven et al., 2004, in press).

Fagerlin et al. (2001) most directly showed that surrogates make false-consensus errors when predicting the preferences of patients. The researchers read six end-of-life scenarios to senior citizens and to the persons they would designate as their surrogates in joint sessions. As the older adults made treatment decisions for each scenario, they were asked to describe their

rationale for making each decision, and the surrogates were asked to raise any concerns or questions they had. Following the discussion, both parties individually completed a questionnaire involving life-support preferences and predictions in several realistic illness scenarios (e.g., Alzheimer's disease with no chance of recovery, terminal colon cancer with no pain, stroke with a slight chance of recovery).

The results indicated that surrogates' predictions of the senior citizens' preferences more closely matched their own treatment wishes than the wishes of the senior citizens. Supplementary analyses showed that the patients' preferences also contributed to the surrogates' predictions—indicating that the patients had input into the decision-making process—but that the surrogates' own preferences also significantly influenced the decisions. The assumption of similar treatment wishes might be a conscious one on the part of surrogates, but also may occur with little awareness. The most important lesson to be taken from this research is that the standard of substituted judgment may be impossible to fully meet because of the influence of the false-consensus effect and people's inability to project accurately what their own wishes and desires would be if they were in the patient's position.

Symptom Perception and Commonsense Models of Illness

It would seem clear that medical diagnosis should be left to the professionals. If a person is not sure about what to make of his or her chest pain or indigestion, it would make sense for that person to seek out a doctor's expert judgment about what might be wrong. This logic is simple and direct, but it leaves out factors that influence the decision about whether a trip to the physician is warranted. Herein lies the problem: People hold an arsenal of commonsense theories about health and illness that they endorse with confidence, and these theories determine whether they seek out medical care or adhere to what their doctor recommends. These theories, however, may be quite wrong—and given the research on self-insight into one's incompetence (e.g., Kruger & Dunning, 1999), there is reason to believe that people feel quite competent in their role of playing doctor even when this self-confidence is misplaced.

People's labeling of and responses to symptoms are strongly determined by the commonsense models of illness that they hold. These models are based on personal experiences regarding symptom onset, duration, and intensity (Leventhal, Meyer, & Nerenz, 1980). People also observe patterns of covariation between symptoms and illnesses and use these patterns to attribute symptoms to possible causes. These beliefs are supplemented by information and experiences provided by family members and friends.

As an illustration of how symptom perception leads to decisions about whether to seek care, consider a study by Johnson and King (1995), in which they interviewed heart attack survivors. Results indicated that people experiencing symptoms of a heart attack took longer to seek medical intervention if the symptoms

did not match their beliefs or expectations about what a heart attack "should" feel like. Similarly, chronically elevated blood pressure (i.e., hypertension) is asymptomatic—people have no signals they can check to tell whether or not their blood pressure is elevated. However, a majority of patients (from 46% to 94%) diagnosed with hypertension believe that they can tell when their blood pressure is up (Baumann & Leventhal, 1985; Meyer, Leventhal, & Gutmann, 1985). Some patients think their pressure is high only when they are headachy; others think it is high when they are feverish, and so on. These patients fail to recognize that hypertension is a chronic condition.

These misperceptions may also influence compliance to prescribed medications. For example, hypertensives who believe their pressure is high only when they experience headaches may take their medications at only those times. Meyer et al. (1985) found that hypertension patients were more likely to adhere to their physician's recommendations (e.g., medication, exercise, change in diet) when they believed their medication was effective in controlling unpleasant symptoms than when they felt their symptoms persisted, even though these symptoms had no veridical relation to blood pressure. Interestingly, the patients acknowledged that "most people" cannot detect variations in blood pressure; they thought they personally were exceptions to the rule. Good compliers also tended to recognize that hypertension is a chronic or cyclic disorder. In contrast, patients who dropped out of treatment believed they had an acute disease that had been "cured" by temporary changes in diet and medication.

People follow a number of rules of thumb in their commonsense models of illness. These rules may seem compelling, but they often are in error. One of these heuristics is the *symmetry rule*; people expect symptoms to denote illness, and they expect illness to be accompanied by symptoms. Clearly this belief is often true, but overuse of this rule increases the probability of diagnostic errors. It can lead people to believe that they are well if they are not experiencing symptoms. This rule is misapplied in the case of common and serious diseases that exist without symptoms, such as hypertension. Another consequence of the symmetry rule is that people who believe they are ill expect to perceive symptoms. In a study consistent with this idea, Baumann, Cameron, Zimmerman, and Leventhal (1989) gave participants in the laboratory bogus feedback indicating they had elevated blood pressure readings. Subsequently, the participants complained of headaches and flushing—symptoms they erroneously believed were associated with hypertension.

Another heuristic is the *prevalence rule*, according to which health threats that are rare or unusual are also serious, and commonplace symptoms are mild or harmless (Jemmott, Croyle, & Ditto, 1986). The consequences of the prevalence rule are nicely documented in a medical anthropology study of Hispanic migrant workers who ignored serious gastrointestinal symptoms. Interviews indicated that the workers concluded that the symptoms were harmless because they were so common in their community (Clark, 1959).

The *stress-illness rule* (Cameron, Leventhal, & Leventhal, 1995) is a common heuristic applied to symptoms and illness (Kelley, 1967). According to this heuristic, if symptoms covary with troublesome life events, the symptoms may be attributed to stress rather than illness. People are particularly likely to attribute symptoms to stress if they are vague or ambiguous, rather than dramatic (e.g., profuse bleeding). For example, students who are preparing for an examination may discount physical symptoms because they assume that the symptoms are due to the exam stress.

Very recent research has provided some initial evidence that these erroneous theories about disease can be corrected. One such study of heart attack patients found commonsense models about heart disease could be changed through customized educational efforts—and that patients receiving such education were subsequently less incapacitated by chest pain, left the hospital sooner, and even walked on their own sooner than patients who did not receive this intervention (Petrie, Cameron, Ellis, Buick, & Weinman, 2002).

Mistaken Commonsense Models of Illness Based on Stereotyping

Mistaken notions of disease can come from two other everyday sources. One is media attention. In a recent review about symptom perception, R. Martin and Leventhal (2004) noted that the *New York Times* (Brody, 1999) reported an abrupt increase in visits to gastroenterologists by people with chronic heartburn shortly after a highly publicized study in the *New England Journal of Medicine* reported that chronic heartburn was associated with an increased risk of developing esophageal cancer (Lagergren, Bergstrom, Lindgren, & Nyren, 1999). This increase in physician visits did not arise because there had been a sudden increase in heartburn symptoms among the population. Rather, mass media attention made the heartburn symptoms more salient to people and provided them with a new label that represented a potentially serious health threat. Prior to this media blitz, these patients simply labeled their heartburn as a reaction to spicy foods.

Symptom ambiguity makes people highly susceptible to such situational and social influences. For example, if someone mentions to subjects that it is flu season, they are more likely to report relevant physiological symptoms, presumably because being primed with the idea of “flu season” leads subjects to attend to ambiguous physical signs (such as scratchy throat and headache; Pennebaker, 1982). Another example is medical students’ disease (Mechanic, 1972), whereby as medical students learn about the symptoms of various diseases, many of them come to believe incorrectly that they have contracted one or more of them at one time or another. This may result from health-related symptoms being primed and made temporally accessible as a result of reading about medical disorders.

A reliance on social stereotypes also can lead people to erroneous commonsense notions of illness. Consider heart attack symptoms (e.g., chest pain, shortness of breath, sweating, and shoulder pain). When people experience these symptoms, they should promptly seek medical attention because early medical intervention such as thrombolytic therapy (clot-busting treatment) is essential in preserving viable cardiac function. However, almost half of heart attack victims delay for longer than 2 hours before seeking medical attention, and a large minority delay for longer than 4 hours. Several large-scale studies have found that women delay longer than men after the onset of cardiac-related symptoms (Dracup et al., 1997). This sex difference in treatment delay may explain why outcomes tend to be worse for women than for men; extended delay reduces women’s eligibility for thrombolytic treatment. The extended delay for women, however, is curious in that women tend to be more responsive to most health threats and report more physical symptoms than men (Pennebaker, 1982).

These differential behaviors, and outcomes, for women versus men arise because commonsense models of illness also include stereotypes, which in the case of heart disease may lead to an individual using gender as a guide to whether medical attention is needed (R. Martin, Gordon, & Lounsbury, 1998). Specifically, symptoms such as chest pain, shortness of breath, and sweating are more likely to be attributed to a possible heart attack when the victim is a male rather than a female. Cardiac disease is more common, prior to age 65, among men than women. Therefore it is easier to think of a man with coronary heart disease than a woman with the same (Friedman & Rosenman, 1959). If women and men have a commonsense model of heart disease as being a male disease, then women who experience cardiac-like symptoms are apt to discount them as indications of stress or some other disorder. In contrast, men who experience the same symptoms will likely assume that they are cardiac in origin.

To test this hypothesis, R. Martin et al. (1998) presented participants with information about a person reporting chest pain and other symptoms consistent with an acute heart attack. Information about this target person (gender, high vs. low life stress) was manipulated, and participants were asked to rate the likelihood that the symptoms were due to a cardiac illness. For male targets, the symptoms were interpreted as representing heart disease, regardless of whether he recently experienced high- or low-stress life events. However, participants responded very differently to information about the female target, even though her symptoms were identical to those reported by her male counterpart. In the low-stress condition, the female target’s symptoms tended to be attributed to heart disease. But when the female target had high stress, participants were less likely to attribute her symptoms to cardiac causes. This selective discounting was found in college students, adults, and physicians and was not affected by how participants indicated their opinion (i.e., by using rating scales or writing narrative, open-ended responses to the vignettes; R. Martin & Lemos, 2002). Additional

evidence for the gender-based stereotype is that recall of biographical details regarding a male (stereotype-consistent) victim is superior to recall of such details regarding a female heart attack victim (R. Martin et al., 1998, Study 4).

An important question is whether gender stereotypes about cardiac-related symptoms influence whether women experiencing the symptoms of an evolving heart attack seek treatment. R. Martin et al. (2004) explored this issue in a sample of heart attack survivors. Although the men and women patients were of comparable age and risk status and had similar medical histories and symptoms, the women were less likely than the men to attribute their prehospitalization symptoms to cardiac causes. Also, among the patients who received opinions and advice about their symptoms from friends and relatives, women were less likely than men to be told that their symptoms might indicate a heart attack and were also less likely to be advised to seek medical attention. In an attempt to correct these tendencies, the American Heart Association currently sponsors the “Go Red for Women” campaign, designed to raise consciousness about the prevalence and early signs of heart disease in women.

EDUCATION

Similar issues in self-assessment arise in the classroom. Students, obviously, profit from self-assessment that is accurate. Whether it be a junior high school student wondering whether to crack open his social studies textbook one more time before the test or a medical student deciding whether to practice her intubating technique before the next shift, students make more effective decisions about where to apply their learning efforts when they can accurately discern their strengths and weaknesses (Thiede, 1999; Thiede, Anderson, & Theriault, 2003). Accurate self-assessments allow students to become more autonomous agents in their education, taking responsibility for gaining and improving on their knowledge and skill (Boud, 1995; Dochy, Segers, & Sluijsmans, 1999; Topping, 1998).

Accurate self-assessment is valuable all the way up the educational ladder. However, it is especially crucial in higher education and professional school settings, particularly as some schools move to a problem-based or case-based model of instruction (Barrows & Tamblyn, 1980; Boud & Feletti, 1991). This approach to education has gained numerous adherents in medical schools, and its prevalence has recently increased in many other settings in higher education (e.g., Duch, Gron, & Allen, 2001). In problem-based learning, students working in groups learn by confronting real-world cases and are responsible for figuring out how to approach each case to bring it to a reasonable resolution. This approach places a premium on problem-solving skills, professionalism, and learning in hurly-burly circumstances that mimic real life.

An essential component of problem-based learning is that students must identify what skills they need to acquire and what knowledge they must gain—in short, they must make correct self-

assessments of strengths and deficits (Boud, 1995). Accurate self-assessment is also crucial for education to be a lifelong enterprise that continues far after the student has left the classroom (Guest, Regehr, & Tiberius, 2001; Sambell & McDowell, 1997). Company executives must continue to educate themselves in a changing business environment; doctors must refresh and enhance their treatment skills; and airline pilots must continue to monitor their flying proficiency.

Against this background, it is sobering to see that although self-assessment of skill and knowledge does tend to bear some relationship to objective performance, the relationship tends to be meager to modest. In a review on academic performance, Hansford and Hattie (1982) discovered that the average correlation between academic self-views and actual performance lay around .21. In a more extensive review, Falchikov and Boud (1989) found that, on average, the grades that college students would give to their work correlated .39 with the marks their teachers would give. Students also showed signs of overinflated self-views, in that 68% of the time they gave themselves higher marks than their teachers would.

To be sure, some specific circumstances did lead to improved, albeit still imperfect, self-assessments. Self-assigned grades, for example, were slightly more related to teachers' evaluations when the solutions to course assignments became more well-defined (e.g., in science classes vs. other areas of study). In addition, the correlations between grades that students gave themselves and teachers' grades were higher in advanced classes than in introductory courses. Studies containing more rigor in their design revealed more student-teacher agreement than those of lesser quality (Falchikov & Boud, 1989).⁶

Three observations should be made about the fact that advanced students provided more calibrated self-assessments than introductory students. First, this increase in calibration was not simply due to students' age. Older students were no more calibrated than younger ones. Second, this increase was observed for students who were assessing their classroom performance, and there is suggestive evidence that as students leave the classroom to face more unsettled and demanding training settings, their self-assessments do not necessarily become more accurate. For example, Arnold, Willoughby, and Caulkins (1985) tracked self-assessments of medical students from their first year, spent primarily in the classroom, to their final year, spent mainly in clinical settings. The relationship between students' self-ratings and supervisors' evaluations fell as students progressed through their studies. In addition, during the final year, students' self-ratings failed to correlate at all with their board scores.

⁶An anonymous reviewer of this manuscript made the insightful point that student-generated grades were occasionally used as inputs into formal grades in some of the studies examining student-teacher agreement. To date, the impact of this circumstance on student-teacher agreement is unknown, but it would be interesting to examine whether attaching consequences to student-generated grades prompts flaws or accuracy in the evaluations students produce.