# Explanatory Style and Health

**LESLIE P. KAMEN and MARTIN E.P. SELIGMAN**
*University of Pennsylvania*

Explanatory style, the habitual way an individual explains the causes of bad and good events, is reliably associated with future health. In this article, we review evidence from three studies which demonstrate a significant relationship between pessimism (the belief that bad events are caused by internal, stable, and global factors and good events are caused by external, unstable, and specific factors) and an increased risk for infectious disease, poor health, and early mortality. We suggest two possible mechanisms which might mediate the link between pessimism and poor health. Finally, we propose that interventions aimed at changing a pessimistic outlook might lower the probability of future illness.

The way we habitually explain the causes of good and bad events may have important implications for our later susceptibility to illness. Several lines of research indicate that one's "explanatory style" is a significant predictor of future health in both the short and long term. In this article, we present theory and evidence suggesting that the types of causal explanations one makes for events are associated with (1) susceptibility to infectious disease, (2) number of doctor visits made over a one-year span, (3) health status over a twenty year span, (4) longevity, and (5) immune functioning.

## EXPLANATORY STYLE: DEVELOPMENT OF THE CONSTRUCT

Beginning in 1967, a series of experiments was initiated demonstrating that organisms exposed to uncontrollable, aversive events will behave as if they are "helpless." Specifically, they will show motivational deficits (lower response initiation), cognitive deficits (failure to learn new response-outcome contingencies, even when responding would now terminate the event), and, in humans, emotional deficits (decreased self-esteem) (Seligman, Maier, & Geer, 1968; Seligman, 1975). These helplessness deficits were throught to be learned; that is, when presented with uncontrollable, aversive events, organisms learn that there is nothing they can do to terminate these events. As a result, they will come to expect that outcomes are independent of responses (Seligman, Maier, & Solomon, 1971). Helplessness deficits have been found in several experiments with animal subjects (Maier & Seligman, 1976; Overmier & Seligman, 1967; Seligman & Maier, 1967) and human subjects (Hiroto, 1974; Hiroto, & Seligman, 1975).

Three main theoretical difficulties surfaced, however, with the original learned helplessness model. First, the model could not account for the generality of the

motivational and cognitive deficits produced by helplessness. Under some conditions the deficits were cross-situational (Hiroto & Seligman, 1975) while in others they were situation-specific (Cole & Coyne, 1977). Second, the chronicity or time-course of helplessness remained unclear; sometimes the deficits were short-lived while other times they were long lasting. Finally, consider the self-esteem deficits. The original model did not specify when and why someone might feel a sense of personal inadequacy following an uncontrollable aversive event and when he might not.

Abramson, Seligman, and Teasdale (1978) addressed these conceptual difficulties in a reformulation of learned helplessness theory along attributional lines. They proposed that "when a person finds he is helpless, he asks *why* he is helpless" (Abramson et al., 1978, p. 50). Three dimensions, each corresponding to one of the theoretical difficulties mentioned above, are relevant in arriving at an explanation: internal-external (the event is caused by the person *versus* the situation), stable-unstable (the cause of the event will last a long time *versus* a short time), and global-specific (the cause of the event will influence many *versus* few situations).

According to the reformulation, the way individuals explain the cause of a particular event will affect their reactions to the event. So, for example, if the event is failing a test, an internal explanation ("I'm stupid") is more likely to produce decreased self-esteem than an external explanation ("The room was hot"). A stable explanation ("I'm always stupid") is more likely to produce long-lasting deficits than an unstable explanation ("I had a bad day"). Finally, a global explanation ("I have no talent") is more likely to result in a generalized reaction than a specific explanation ("This particular test was difficult").

Abramson et al. (1978) explained the individual differences in vulnerability to learned helplessness by arguing that people who habitually explain bad events by internal, stable, and global causes, and good events by external, unstable, and specific causes (the "pessimistic" explanatory style) will be more likely to experience general and lasting helplessness deficits with self-esteem loss than people with the opposite or "optimistic" style. Here we extend the range of deficits to include increased morbidity.

*Measurement of Explanatory Style*

There are two techniques for measuring explanatory style.

*The Attributional Style Questionnaire.* The first technique consists of a forty-eight item self-report instrument: The Attributional Style Questionnaire (ASQ) (Peterson, Semmel, von Baeyer, Abramson, Metalsky, & Seligman, 1982; Seligman, Abramson, Semmel, & von Baeyer, 1979). The questionnaire was designed to measure an individual's characteristic style across a variety of situations rather than his or her explanation for a particular outcome (Peterson & Seligman, 1984). As such, the ASQ consists of twelve hypothetical events. Six describe positive outcomes (e.g., "You become very rich") and six describe negative outcomes (e.g., "You have been looking for a job unsuccessfully for some time").

Subjects read the following instructions for filling out the questionnaire: (1) Read each situation and vividly imagine it happening to you; (2) Decide what you believe to be the *major* cause if it happened to you; (3) Write this cause in the blank provided; (4) Answer three questions about the cause; and (5) Go on to the next situation. The three questions ask subjects to rate each situation on a seven-point scale in terms of the three explanatory style dimensions. High ratings represent maximum internality, stability, and globality, respectively.

The ASQ has three subscales (internal, stable, and global) for both positive and negative outcomes. In addition, the three subscales can be combined to yield a composite score for positive events (Composite Positive, or CP) and a composite score for negative events (Composite Negative, or CN). Finally, an overall composite score that takes ratings for both positive and negative events into account can be formed by subtracting the composite negative score from the composite positive score (CP *minus* CN).

*Internal Reliability.* The internal reliability of the ASQ has been examined in several studies (e.g., Golin, Sweeny & Schaeffer, 1981; Peterson, et al., 1982; Seligman, et al., 1979). In general, these studies report modest internal reliabilities for each of the three subscales. For example, in a sample of 130 undergraduates, subscale reliabilities estimated by Cronbach's (1951) coefficient alpha ranged from .44 to .69 (mean = .54) (Peterson, et al., 1982). Note, however, that these reliabilities were based on subscales containing only six items. Combining the subscales into eighteen item composite scores for good (CP) and bad (CN) events yielded substantially higher reliabilities (.75 and .72, respectively). Such a combination makes theoretical sense since *within* good and bad events, the intercorrelations among the three subscales (internal, stable, and global) are high (Peterson & Seligman, 1984; see also Tennen & Herzberger, 1986).

*Validity.* To what does explanatory style relate? In a meta-analytic review of 104 studies involving 15,000 subjects, explanatory style was found to be reliably associated with depression (Sweeney, Anderson, & Bailey, 1986). What does explanatory style predict? To date, it seems to predict both depression and achievement. Specifically, a pessimistic explanatory style has been shown to be a risk factor for depression in children, college students, and psychotherapy patients (Metalsky, Abramson, Seligman, Semmel, & Peterson, 1982; Nolen-Hoeksema, Girgus, & Seligman, 1986; Peterson, Luborsky, & Seligman, 1983; Seligman, Peterson, Kalsow, Tanenbaum, Alloy, & Abramson, 1984; see Peterson & Seligman, 1984, for a review). In addition, having a pessimistic explanatory style puts one at risk for both academic and occupational underachievement (Kamen & Seligman, 1987; Nolen-Hoeksema, et al., 1986; Seligman & Schulman, 1986). What this article is about is the ability of explanatory style to predict health.

*Content Analysis of Verbatim Explanations.* The second technique for assessing explanatory style is the content analysis of verbatim explanations—the CAVE technique. This method allows us to go back in time and ask longitudinally if one's earlier explanatory style influences some later aspect of life. Here is how it works.

Suppose we wanted to measure an individual's explanatory style at any time of life

through the CAVE technique. First, we need a verbatim sample (generally about 500-1,000 words) of some written or spoken material (e.g., a diary, letter, essay, therapy transcript) from the time of interest. Second, a trained judge extracts from this sample all statements describing an event for which a causal explanation was provided. For example, "I got fired from my job *because* I will never be able to learn to type." Third, three independent raters rate this event-explanation unit on a seven-point scale (following the ASQ) for each of the explanatory dimensions. So, for the above example, the ratings might be: Internality: 7, Stability: 7, Globality: 2 (Peterson & Seligman, 1985; see Schulman & Castellon, 1986, for a manual of the CAVE technique). We then form an explanatory style profile averaging over all event-explanation units. Ultimately, we use the explanatory style, so derived, to predict later outcomes (e.g., depression, achievement, and health).

The CAVE technique has been used in a variety of studies, has high interrater reliability, is easily learned, and has accumulating validity data (Peterson, Luborsky, & Seligman, 1983; Peterson & Seligman, 1984; Peterson & Seligman, 1986). Further, it is completely blind; that is, the raters see only one statement when they make their rating and they do not know who the person quoted is nor what else they said. This means that the CAVE technique is useful in doing retrospective studies because it removes one major methodological difficulty: knowing the outcome during the rating. Thus, the CAVE technique offers us a clean method of undertaking longitudinal studies retrospectively and provides us with the exciting possibility of using historical data to forecast later outcomes.

## HELPLESSNESS, HOPELESSNESS AND HEALTH

A common theme throughout the literature linking psychological factors and poor health is that experience with uncontrollable events may have a deleterious effect on health. In particular, reactions of helplessness and hopelessness may be a significant factor underlying physical vulnerability (LeShan, 1966; Levy, 1984, 1986; Schmale & Iker, 1966a, 1966b).

For example, in one investigation, Greer, Morris, and Pettingale (1979) carried out a prospective study of sixty-nine women who underwent surgery (simple mastectomy) for early breast cancer. Three months following the operation, the women were interviewed and asked about how they perceived "the nature and seriousness of the disease and how their lives had been affected by it." Their responses were grouped into four categories: denial, fighting spirit, stoic acceptance, and feelings of helplessness/hopelessness. The target variable was recurrence-free survival at five-year follow-up. The results showed a significant relationship between reactions to the diagnosis and five-year outcome. Specifically, 75% of the women who reacted to the diagnosis with denial and fighting spirit were alive with no recurrence at follow-up, whereas only 35% of the women who showed stoic acceptance and helplessness/hopelessness had this favorable outcome at follow-up. Moreover, 88% of the women who subsequently died showed initial reactions of helplessness/hopelessness and stoic acceptance, whereas only 12.5% of the women who were dead at follow-up

reacted with denial and a fighting spirit. Thus, responding to illness (cancer) with helplessnesss/hopelessness can have a deleterious effect on the ability to combat the disease.

## EXPLANATION STYLE AND HEALTH

Individuals who explain the causes of bad events in internal, stable, and global terms are pessimistic because they expect bad events to occur consistently over time and different situations. Moreover, they expect future events to be uncontrollable. Thus, they are hopeless about changing the future and behave passively with respect to challenge. We can empirically measure the relationship between having a pessimistic outlook and subsequent susceptibility to onset of illness. The central theoretical prediction is that people who have a pessimistic explanatory (e.g., "It's my fault that I have cancer. I'm never going to be cured and the rest of my life will be ruined") should be more likely to show impaired health than those with an optimistic outlook (e.g., "I can overcome the cancer, and I'm not going to let it affect the other areas of my life").

A direct test of this hypothesis would be to measure explanatory style at time one and see if it predicts susceptibility to illness at time two. In the next sections, data from three studies are presented which show that a pessimistic explanatory style is reliably associated with later poor health.

### Study One: Explanatory Style and Infectious Disease

The first study we report tested the ability of explanatory style to predict physical illness in college students (Peterson and Seligman, 1987). At time one, subjects ($N = 172$) completed a version of the ASQ containing twenty-four hypothetical bad events. They also reported the occurrence of all illnesses experienced during the previous thirty days. Degree of illness was indexed by summing the number of different days that at least one symptom was present. Finally, subjects completed the Beck Depression Inventory (BDI) to control for the potential confounding effects of depression on reports of illness. At time two (four weeks later) subjects ($N = 170$) again reported all illness experienced during the previous thirty days. At time three (one year later) subjects ($N = 146$) filled out a questionnaire reporting the number of physician visits they made during the past year and were instructed to exclude routine check-ups and visits made because of an injury (e.g., broken bone).

Peterson and Seligman (1987) were interested in four main questions: (1) Does early explanatory style predict later degree of illness? (2) Does early explanatory style predict number of physician visits made over the next year? (3) Does the relationship between explanatory style and illness hold when degree of illness at time one is controlled? and (4) Is the relationship between explanatory style and illness independent of depression?

The explanation style dimensions of stable and global characterize what we mean by hopelessness since explaining bad events as caused by factors that will affect many

situations and last a long time means that one's present helplessness is extrapolated into the future and across situations. Moreover, these dimensions are often highly correlated (Peterson & Villanova, 1986). In this study, stable and global correlated at $r = .39$, $p < .01$. Peterson & Seligman (1987) collapsed these dimensions into a composite score and asked whether internality, the stable and global composite, depression, and illness at time one could predict illness at time two.

The results showed that the stable and global composite (hopelessness) was a significant independent predictor of time-two illness ($r = .22$, $p < .05$). In addition, depression ($r = .21$, $p < .05$), and time-one illness ($r = .16$, $p < .05$) were also reliable independent predictors of time-two illness. Finally the stable and global composite was the only significant predictor of number of doctor visits made over the following year ($r = .23$, $p < .05$). Interestingly, 95% of the illnesses reported at time-two were infectious (e.g., colds, flus, sore throats). Thus, hopelessness, as indexed by explanatory style, is a risk factor for later infectious disease, and predicts illness above and beyond initial health and depression.

*Study Two: Explanatory Style and Health Status*

The results of study one showed that explanatory style predicts illness in college students in the short term. Is early pessimism a risk factor for poor health in the long term? The second study we report found that having a pessimistic outlook in early adulthood was reliably associated with poor health status in middle and late adulthood.

The subjects in this study were participants in the Grant Study, a longitudinal investigation of select members of the classes of 1939-1944 at Harvard University ($N = 268$). The subjects were selected on two criteria: (1) exceptionally good psychological and physical health, and (2) exceptional academic performance.

Each subject filled out an open-ended questionnaire in 1946 (at approximately age 25) regarding difficult experiences in World War II. The responses of 99 randomly chosen men were submitted to CAVE analysis, and an average of 11.1 bad events and causal explanations were obtained for each subject (Peterson, Seligman, & Vaillant, 1987). In addition, information provided by the subjects' personal physicians was used to form the following health status scale: "1 = good health; normal. 2 = multiple minor complaints, mild back trouble, prostatitis, gout, kidney stones, single joint problems, chronic ear problems, and so on. 3 = probably irreversible chronic illness without disability; illness that will not fully remit and will probably progress—e.g., treated hypertension, emphysema with cor pulmonale, radical mastoidectomy, diabetes, and so on. 4 = probably irreversible chronic illness with disability—e.g., myocardial infarction with angina, disabling back trouble, hypertension and extreme obesity, diabetes and arthritis, multiple sclerosis, and so on. 5 = deceased." (Peterson, Seligman, & Vaillant, 1986, pp. 7-8). Health status scores were obtained every five years from age 25 to age 60.

Explanatory style is initially unrelated to physical illness, but as time passes, the hypothesized correlation emerges. Its most robust level was reached at age 45, twenty

years after the time that explanatory style was assessed. After this time, the correlation between explanatory style and health falls off. This pattern may make sense. In the first ten years or so (age 25-35), health at age 25 accounts for most of the variance in health. In early middle age (35-50), health becomes more variable, and psychological factors come to play a substantial role, perhaps by contributing to lifestyle (e.g., smoking, drinking, and drugs), to self-care (e.g., health habits, seeking out and following medical advice), and to social support. In late middle age (50-60), constitutional factors (e.g., genetics) dominate health and psychological factors from youth play a smaller role. Thus, even in the long term, explanatory style is a significant predictor of health.

*Study Three: Explanatory Style and Longevity*

The above studies show that a pessimistic explanatory style is a risk factor for poor health in both the short and long term. Does pessimism also put one at risk for early death? Seligman and Peterson (in progress) are asking this question using members of the baseball Hall of Fame. They extracted event-explanation units from sports page quotes while the players were young, healthy, and successful, and are looking at the relationship between explanatory style and longevity.

There are ninety-four members of the Hall of Fame who meet the following two criteria: (1) not managers, and (2) began their career between 1900 and 1950, to insure that they are now dead or in the last third of life. Seligman and Peterson read the entire sports pages of the *New York Times* and the *Philadelphia Inquirer* for all of September and early October from 1900 to 1950. Twenty-four of these men were quoted enough to extract two or more event-explanation units for bad events and thirty men were quoted enough for good events. The explanatory style profile was then correlated with the age at death (in the case of the dead) or with the age now (in the case of the living). About half are dead now.

Both measures yielded suggestive results. For good events, an optimistic explanatory style (internal, stable, and global) correlated significantly with longevity ($r = .45$, $p < .012$); those in the upper *versus* lower quartile of optimism for good events significantly differed on longevity ($U = 6$, $p < .01$). For bad events, optimism also correlated marginally with longevity ($r = .26$, $p < .08$); those in the upper *versus* lower quartile of optimism also significantly differed on longevity ($U = 16$, $p < .05$). Thus, while these results are preliminary, the data suggest that a pessimistic explanatory style may put one at risk for early mortality.

*Summary*

The above studies show that an explanatory style is a reliable independent predictor of later health, and in particular that a pessimistic outlook is associated with future illness, poor health status, and a shorter life. While these findings demonstrate a relationship between pessimism and increased morbidity, the mechanism by which explanatory style impacts on health is unknown. In the next section, we suggest

several possible pathways through which a pessimistic explanatory style might be linked to poor health.

## EXPLANATORY STYLE AND HEALTH: MECHANISMS

We propose two mechanisms by which pessimism might lead to poor health. First, there might be a direct link between pessimism and pathophysiology, such that pessimists have *less competent immune systems.* Second, pessimists might be more likely to be *passive* with regard to self-care, self-help, and meeting life challenges. Each of these possibilities is considered below.

*Pessimism and Immunosuppression*

There is a large literature linking helplessness to immunosuppression in animals (e.g., Laudenslager, Ryan, Drugan, Hyson, & Maier, 1983; Visintainer, Volpicelli, & Seligman, 1982; Sklar & Anisman, 1979). One possible mechanism by which pessimism may impact poor health in humans is that individuals who explain bad events in internal, stable, and global terms may have less competent immune systems. Thus, behavioral responses characterized by helplessness and hopelessness should produce increased susceptibility to those diseases which are modulated by the immune system.

Is there any evidence linking a pessimistic or hopeless outlook to immunosuppression? In 1980, Rodin at Yale University began a large-scale, longitudinal study examining the role of psychosocial factors on nutritional intake and health in older adults (mean age = 71.1). She interviewed subjects nine times over the course of two years and information regarding life changes, stressors, and health states was obtained during each interview. In addition, she obtained a sample of blood from a subsample of the subjects. Subjects were ineligible to provide blood if they were taking medications known to affect the immune or endocrine systems or and any medical conditions that might affect immune function. Preliminary results indicate that subjects experiencing a recent major life stressor over which they felt no sense of control had suppressed immune systems (Rodin, Timko, & Harris, 1986).

Kamen, Seligman, Dwyer & Rodin (1987) are in the process of CAVING the Rodin interviews and directly testing the ability of explanatory style to predict one measure of immunocompetence, the T-helper cell/T-suppressor cell ratio (T4/T8 ratio) in healthy older adults ($N = 47$). Proper functioning of the immune system requires that these two subpopulations of T-lymphocytes be in balance; therefore, a low ratio implies immunosuppression. Preliminary results indicate that individuals with a pessimistic explanatory style had significantly lower T4/T8 ratios than those with an optimistic style controlling for current health and depression. So pessimism might bring about immunosuppression.

*Passivity*

Learned helplessness is reliably associated with passivity (e.g., Seligman, Maier, & Geer, 1968). We believe there are three different arenas of life in which passivity might lead to poor health.

*Passivity about self-care.* The first arena in which passivity might put one at risk for poor health involves health-relevant behaviors. A pessimistic or hopeless person may simply be less likely to take care of himself. He might seek no medical help, follow his/her physician's plan poorly, or fail to adhere to a specific dietary regimen, because he expects the worst and therefore does not believe that such self-care will improve his health (Peterson and Seligman, 1987; Rodin, 1986; Rodin, Timko, & Harris, 1986).

Peterson and Seligman, (1987) carried out a cross-sectional study of 126 college students to examine the relationship between pessimism and the participation in healthy *versus* unhealthy habits. Specifically, subjects filled out the modified ASQ (see Study One), and also completed a questionnaire which asked about the following health habits: (1) Do you eat a balanced diet? (2) Do you avoid salt in your diet? (3) Do you exercise regularly? (4) Do you eat breakfast? (5) Do you smoke? (6) Do you drink more than one glass of wine/beer/liquor per day? and (7) Do you sleep eight hours every night? In addition, subjects provided self-report ratings of their physical health.

The results of this study showed a significant correlation between unhealthy health habits and pessimism as measured by the stable and global explanatory style composite ($r = .25$; $p < .01$). Moreover, unhealthy health habits were reliably associated with a higher degree of illness ($r = .23$, $p < .05$). This finding suggests that engaging in fewer health-promoting behaviors is one possible pathway through which pessimism may lead to poor health.

*Passivity about life challenges.* There is substantial literature that links the number of bad life-events with which one is challenged and later illness (see Dohrenwend, & Dohrenwend, 1974). Perhaps pessimistic individuals have more bad events actually occur to them. If this were so, more bad events might link pessimism and illness.

Peterson and Seligman (1987) found evidence compatible with the link between the occurrence of bad life-events, a pessimistic explanatory style, and poor health in their study of college students. Specifically, they found a significant correlation between the occurrence of recent bad life-events and the tendency to explain bad events by stable and global causes ($r = .25$; $p < .05$). In addition, the occurrence of such events was significantly correlated with degree of illness ($r = .18$; $p < .05$). Thus, believing that no action can control bad events may itself increase passivity and therefore the likelihood and severity of bad events. This might be a second arena in which passivity may produce poor health.

Three possible causes of pessimists having more bad events follows from helplessness theory. First, individuals who believe bad events are stable and global (as well as uncontrollable) should take fewer preventive measures. Second, such individuals should do less to alleviate their bad situation once it has occurred. Finally, pessimists fail to see that solutions are possible when confronted with *new* uncontrollable situations (e.g., Alloy, Peterson, Abramson, & Seligman, 1984). The failure to recognize that new uncontrollable events or problems might actually be mastered may have important consequences for health. So, for example, even if a diet actually produces weight loss, the helpless individual might not recognize this connection.

*Passivity about social support.* The third arena in which passivity might lead to poor health involves lack of social support. Since pessimists believe that bad events are stable, global, and uncontrollable, they should be less likely to seek out help and support from others. In fact, there is some evidence that individuals with a pessimistic explanatory style are more lonely (Anderson, Horowitz, & French, 1983). Since loneliness is associated with immunosuppression, and, since increasing social contact has been shown to lead to improvement in immune function and health, pessimists may lack the important social buffer against illness (Kielcolt-Glaser, Garner, Speicher, Penn, Holliday, & Glaser, 1984; Kiecolt-Glaser, Glaser, Williger, Stout, Messick, Sheppard, Ricker, Romisher, Briner, Bonnell, & Donnerberg, 1985; Kielcolt-Glaser, Ricker, Mesick, Speicher, Garner, & Glaser, 1984).

## INTERVENTION

Whatever the mechanism by which explanatory style impacts on health, we believe that pessimism increases morbidity. This suggests that by changing a pessimistic outlook to a more optimistic one, current health may improve and/or future illness may be prevented. Evidence from two studies showing that increasing an individual's sense of personal responsibility and control produced long-term improvements in subjective feelings of well-being and objective health supports this suggestion (Langer & Rodin, 1976; Rodin & Langer, 1977). In addition, a recent study found that teaching institutionalized geriatric adults a relaxation technique designed to increase ability to control distress resulted in actual enhancement of immunocompetence. Specifically, this control intervention was associated with a significant increase in natural killer cell activity which remained over a two-month follow-up (Kiecolt-Glaser, et al., 1985). This finding indicates that increasing one's sense of control has beneficial effects even at the cellular level.

Cognitive therapy provides a brief and effective psychotherapeutic approach for changing explanatory style from pessimistic to optimistic (Beck, Rush, Shaw, & Emery, 1979). This suggests an intriguing preventive strategy. In collaboration with Rodin and Levy, we are currently conducting a study of whether cognitive therapy improves later health.

*Summary*

We have presented theory and evidence suggesting a link between a pessimistic explanatory style and poor health. We then suggested two possible mechanisms by which pessimism might cause poor health. Finally, we proposed a possible therapeutic strategy for changing a pessimistic explanatory style, which might improve health and prevent some later illnesses.

## NOTE

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