Explanatory Style as a Risk Factor for Traumatic Mishaps

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Six studies investigated a possible link between hopeless explanatory style—that is, the habitual explanation of bad events with stable and global causes—and risk for traumatic injuries. In samples of college students, dancers, athletes, and trauma patients (total n = 2274*), stable and global explanations for bad events correlated with the occurrence of mishaps. The link appeared to be mediated in part by a preference for potentially hazardous settings and activities in response to negative moods associated with hopelessness. Taken together, these findings suggest that catastrophizing individuals may be motivated to escape negative moods by preferring exciting but risky courses of action.*

KEY WORDS: explanatory style; trauma; accidents.

In a study of psychological risk factors for untimely death, Peterson, Seligman, Yurko, Martin, and Friedman (1998) discovered that individuals who as young adults explained the causes of bad events with pervasive and long-lasting causes were more likely decades later to die from accidents. This finding was unanticipated because of speculation that explanatory style is linked to poor health by immunological or cardiological pathways or both (Peterson & Bossio, 1991; Peterson, Maier, & Seligman, 1993). Nonetheless, the finding makes sense given that explanatory style emerged from the attributional reformulation of helplessness theory, where it is considered a distal influence on helpless behavior (Abramson, Seligman, & Teasdale, 1978). People who explain bad events with causes that are general across time and

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situation are thought to display stable and global helplessness (Peterson & Seligman, 1984).

Lifestyle—that is, habitual behavior—contributes to many accidental deaths by determining the settings that people enter and what they do in these settings. Helpless individuals are dysphoric, socially estranged, and poor problem solvers. They are inattentive to the relationships between actions and outcomes. None of these characteristics bodes well for their ability to avoid or escape hazards. If an individual encounters enough dangerous situations, an accidental death eventually occurs, or so Peterson et al. (1998) hypothesized.

The present investigations took as their point of departure this line of reasoning. Peterson et al.'s (1998) sample was the well-known Terman subjects, individuals originally selected as adolescents because of their high intelligence and followed throughout their lives (e.g., Terman & Oden, 1947). Although the Terman sample is a unique source of longitudinal information, further questions about explanatory style and traumatic mishaps remain that can only be answered with other evidence. Two questions in particular guided the present research. First, does a hopeless explanatory style predict nonfatal mishaps? Second, assuming that the link is found, what processes lead from this explanatory style to traumatic accidents?

STUDY 1

The first study attempted to see if explanatory style was associated with nonfatal mishaps among a sample of college students. These research participants completed a measure of explanatory style and reported the number of accidents requiring medical attention experienced in the past 2 years.

Method

In 1997, at the University of Michigan, 460 introductory psychology students (42% male; 70% White; average age = 19 years) completed questionnaires the first day of class, including the item: "During the past 24 months, how many accidents, assaults, injuries, or poisonings did you experience that required medical attention?" This question is a standard phrasing from epidemiological surveys of traumatic accidents, and available options ranged from 0 to 9+.

Participants also completed an abbreviated version of the Attributional Style Questionnaire asking them to rate on 7-point scales how they usually explained bad events: with stable (vs. unstable) causes and with global (vs. specific) causes (Peterson et al., 1982). Specifically, these questions were as follows: "When a bad thing happens to you, is the cause of this event usually" *not at all long-lasting* (0) or *extremely long-lasting* (6); and "When a bad thing happens to you, does the cause of this event usually" *affect just this type of event* (0) or *affect many types of events* (6)? For comparability with previous studies of explanatory style, these ratings were converted from 0–6 to 1–7 scales. Stability and globality ratings were entwined ($r = .55$, $p < .001$) and were combined into a single score. Research participants also

provided demographic information such as gender, ethnicity, and handedness, and they responded to the brief form (13 items) of the Beck Depression Inventory (BDI; Beck, Rial, & Rickels, 1974).

Results

Table I presents the means, standard deviations, and reliabilities of these variables. Predicting the number of accidents requiring medical attention were stability and globality of explanatory style ($r = .12$, $p < .05$), depressive symptoms ($r = .09$, $p < .05$), male gender ($r = .13$, $p < .05$), and non–right-handedness ($r = .11$, $p < .05$). These zero-order correlations are modest but replicate what is known about risk factors for accidents. However, ethnicity, coded as 1 (*White*) versus 0 (*not White*), was unrelated to accidents ($r = .01$, *ns*; cf. Baker, O'Neill, Ginsburg, & Li, 1992). Consistent with previous research, explanatory style and depressive symptoms were correlated ($r = .40$, $p < .05$).

All of these variables (except ethnicity) were then included in an ordinary least-squares multiple regression to predict the number of reported mishaps. The predictors were entered in blocks, first gender and handedness, then depressive symptoms, and finally explanatory style. The overall regression was significant ($R^2 = .04$, $F = 4.58$, $p < .001$). Explanatory style was a significant predictor ($\beta = .11$, $t = 2.15$, $p < .04$), even after controlling for the effects of male gender ($\beta = .13$, $t = 2.67$, $p < .008$), right-handedness ($\beta = -.10$, $t = 2.04$, $p < .05$), and depressive symptoms ($\beta = .03$, *ns*).

Table I. Means, Standard Deviations, and Reliabilities of Measures

Study	n	Accidents	Explanatory style	Other measures
1	460	$\bar{x} = .71$ (1.11)	$\bar{x} = 3.19$ (1.37); $\alpha = .71$	Short BDI: $\bar{x} = 3.78$ (4.19); $\alpha = .84$
2	139	9%	$\bar{x} = 4.17$ (0.78); $\alpha = .70$	BDI: $\bar{x} = 6.46$ (4.04); $\alpha = .77$
3	58	$\bar{x} = 1.07$ (1.52)	$\bar{x} = 4.79$ (0.88); $\alpha = .86$	BDI: $\bar{x} = 4.57$ (5.24); $\alpha = .90$
				Chance LOC: $\bar{x} = 3.23$ (0.96); $\alpha = .72$
				Neuroticism: $\bar{x} = 10.77$ (4.71); $\alpha = .80$
				Extraversion: $\bar{x} = 14.34$ (4.01); $\alpha = .78$
				Sensation seeking: $\bar{x} = 20.53$ (5.85); $\alpha = .75$
4	141	$\bar{x} = 1.73$ (1.62)	$\bar{x} = 4.78$ (0.84); $\alpha = .84$	Mood at time of accident ($n = 104$); $\bar{x} = 37.3$ (30.2); $\alpha = .93$
5	1258	$\bar{x} = 0.39$ (0.95)	$\bar{x} = 3.10$ (1.54)	Psychological problems: 30% Reckless response to negative mood: $\bar{x} = 0.71$ (0.83)
6	218	$\bar{x} = 0.43$ (0.75)	$\bar{x} = 4.44$ (1.44); $\alpha = .56$	Dangerous habits: $\bar{x} = 0.42$ (0.44); $\alpha = .71$

Note. Figures in parentheses are standard deviations.

Discussion

Individuals who explained bad events with stable and global causes were more likely to have experienced recent accidents, even when demographic risk factors and depressive symptoms were controlled, which would seem to rule out a simple explanation in terms of complaining or exaggeration. These findings are consistent with those of Peterson et al. (1998) showing that explanatory style is a risk factor for accidental death, but the present study is limited. Data were retrospective, and the measure of explanatory style was but two items.

STUDY 2

We undertook a second investigation, this time measuring explanatory style in a more typical way and conducting the research prospectively. This second study reanalyzed already gathered longitudinal data concerning explanatory style, depressive symptoms, and life events (Peterson & Villanova, 1988).

Method

In 1985, introductory psychology students at Virginia Tech completed questionnaires at two times, in small groups of approximately 10–12, in single sessions on each occasion. At Time 1, a total of 140 students (36% males; 95% White; average age = 19 years) completed the expanded version of the ASQ (Peterson & Villanova, 1988), which presents respondents with 24 bad events and asks them to offer the one major cause of the event and then to rate it on 7-point scales according to its internality, stability, and globality; they also completed the long form (21 items) of the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Again, stability and globality ratings were entwined ($r = .55$, $p < .001$) and were combined into a single score.

Four weeks later, 139 of these subjects returned to complete a second set of questionnaires, which included brief descriptions of the "four worst events" that had actually occurred to them in the past month. Two researchers blind to other information about the research participants independently coded these events as 1 (*traumatic accidents*) or 0 (*not*), and their agreement was perfect. Indeed, this coding was done in 1985, and the researchers were unaware of the present hypothesis, formulated 15 years later. The vast majority of these events were academic or social setbacks, but 13 of the subjects (9%) described an unintentional trauma potentially requiring medical attention (4 motor vehicle accidents, 3 broken bones, 2 muscle/ligament strains, 2 fires, and 2 infections secondary to accidental injuries).

Results

Neither sex nor race nor internality of explanatory style was related to the occurrence of traumatic accidents. Table I presents the means, standard deviations, and reliabilities of the remaining measures. Stability and globality of explanatory style predicted whether research participants experienced an accident ($r = .22$, $p < .05$).

BDI scores were unrelated to accidents ($r = .02$, ns), although they were correlated with stability and globality of explanatory style ($r = .34$, $p < .05$). A logistic regression was computed to predict the occurrence of accidents. BDI scores were entered first, followed by explanatory style scores. Only explanatory style was a significant predictor ($B = 1.30$, Wald statistic $= 6.73$, $p < .01$).

Discussion

Study 2 corrected some of the flaws in the design of the first investigations. Explanatory style was measured with a typical ASQ, and accidents were predicted prospectively. Although only 9% of the research participants experienced an accident in the 1-month time period, those who did were more likely to explain the causes of bad events with stable and global causes. As in Study 1, these results were obtained even when depressive symptoms were controlled.

STUDY 3

The results of these two investigations, coupled with those of Peterson et al. (1998), establish a correlation between stability and globality of explanatory style and traumatic accidents. What is responsible for this link? Our next study examined some of the psychological risk factors shown in previous research to predispose accidents: depression, external locus of control, neuroticism, extraversion, and sensation seeking (e.g., Dahlback, 1991; McKenna, 1983; Slovic, Kunreuther, & White, 1974).

Method

In 1997, a total of 58 male introductory psychology students at the University of Michigan (72% White; average age $= 19$ years) were recruited to participate in this investigation based on information provided on the first day of class in response to the question "During the past 24 months, how many accidents, assaults, injuries, or poisonings did you experience that required medical attention?" Available options ranged from 0 to 9+, and an attempt was made to overrepresent male research participants who reported two or more such accidents by calling them on the telephone and inviting them to participate in the study; the specific reason was not conveyed. The remaining participants simply signed up for the study per standard subject pool protocol at the University of Michigan; there was no information on the sign-up sheet except that the study was limited to males. The final sample consisted of 16 (28%) individuals who had experienced two or more accidents; the remaining participants reported none (52%) or only one (20%) accident during the past 2 years. With only a few exceptions, the 58 research participants in Study 3 were included among the 460 individuals in Study 1.

In small groups of 5–8, the research participants in a single session completed the following questionnaires: (a) demographics; (b) number of accidents in the past 24 months; (c) an open-ended description of the most serious accident they had experienced in this time, if there had been one; (d) short form of the BDI;

(e) Levenson's chance locus of control (LOC) scale (Levenson, 1974); (f) Eysenck's Personality Questionnaire (EPQ; Eysenck, Eysenck, & Barrett, 1985), which yields separate scores for extraversion and neuroticism; (g) Zuckerman's Sensation Seeking Scale Form V (SSS V; Zuckerman, Eysenck, & Eysenck, 1978), which yields an overall score as well as separate scores for thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility; and (h) a 10-item version of the ASQ in which respondents provide ratings of the stability and globality of causes (Dykema, Bergbower, Doctora, & Peterson, 1996). Again, stability and globality scores were highly correlated ($r = .66$) and were combined. Means, standard deviations, and reliabilities for these scales are reported in Table I.

Results

Simple correlations were first computed among the various measures.[9] Stability and globality scores were correlated with BDI scores ($r = .43$, $p < .05$). The only significant predictors of the number of accidents reported were explanatory style ($r = .34$, $p < .05$) and extraversion ($r = .28$, $p < .05$), and these characteristics were independent of one another ($r = .09$, ns). No obvious candidate for a mediator between explanatory style and accidents was suggested by the pattern of correlations.

Exploratory Analyses and Discussion

Neither overall sensation seeking nor any of the four subscales of the SSS V was related to accidents, which at first was surprising. A closer look at the SSS V items revealed that some involve seeking sensations potentially associated with danger (e.g., drinking, going to wild parties), whereas others involve seeking sensations per se (e.g., preferring modern art). So, a new scale was formed by choosing items that entailed a preference for doing things that would arguably increase the risk of mishaps.[10] Seven items were chosen for this new scale (items 1, 6, 11, 12, 18, 25, and 30 from the original SSS V), which we refer to as the Preference for Dangerous Activities Scale.[11]

The internal consistency of this new scale ($\bar{x} = 4.14$, $SD = 1.80$) was satisfactory ($\alpha = .77$), and it was correlated with accidents on the one hand ($r = .44$, $p < .001$) and with stable and global explanatory style on the other ($r = .34$, $p < .009$), suggesting that it might be a mediator. We followed the strategy outlined by Kenny, Kashy, and Bolger (1998) for identifying mediation. That is, variable M mediates a correlation

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[9]Because the sample was created to overrepresent high scores on accidents, treating the number of accidents as a continuous variable in correlational analyses may not be strictly warranted. All of the analyses reported here were repeated with a dichotomous version of the accidents variable (0 or 1 vs. 2+), and the identical patterns of significant results were obtained.

[10]We also created a new scale by choosing SSS V items that entailed a preference for dangerous sports such as mountain climbing, high diving, and sailing, but scores on this scale were related neither to explanatory style nor to reported accidents.

[11]In a parallel investigation by our research group, we found that scores on the Preference for Dangerous Activities Scale predicted the number of car "crashes" by male college students in a driving simulation (*San Francisco Rush*, a game for the Nintendo 64 video system), thus supporting the construct validity of this measure (Fletcher, 1999)

between a predictor variable X and a criterion variable Y if (i) X correlates with Y, (ii) X correlates with M, and (iii) M correlates with Y after controlling for X. Complete or full mediation is inferred if the contribution of X becomes zero after controlling for M; otherwise, only partial mediation can be inferred.

We used ordinary least-squares regression to predict accidents from explanatory style (entered first) and Preference for Dangerous Activities (entered second). The overall regression was significant ($R^2 = .23$, $F = 8.37$, $p < .001$). Consistent with a hypothesis of partial mediation, Preference for Dangerous Activities remained a significant predictor of accidents ($\beta = .36$, $t = 2.89$, $p < .005$), and the contribution of explanatory style became nonsignificant ($\beta = .26$, $t = 1.72$, $p < .10$).

The results of Study 3 replicate the association between explanatory style and the occurrence of traumatic accidents, and imply that a preference for potentially dangerous activities and settings might mediate this association. Other individual differences—depressive symptoms, chance LOC, extraversion, neuroticism, and sensation seeking per se—played no apparent mediating role. Individuals who explain bad events with stable and global causes may put themselves in potentially dangerous positions where accidents are more likely.

What is surprising about this interpretation is that individuals with such an explanatory style are thought to be helpless—passive and demoralized. We might expect them not to remove themselves from harm's way, but we would not expect them to choose to be there in the first place. Such a choice, however dangerous it may prove to be, is an active response at apparent odds with what is meant by learned helplessness (Peterson, Maier, & Seligman, 1993).

Leíth and Baumeister's (1996) research suggests an explanation. These investigators showed that people in negative moods are motivated to escape their unhappiness by embarking on activities that promise high hedonic payoff. They apparently do not consider the possibility that high payoff activities may also entail risk for loss or danger. Leíth and Baumeister supported their argument experimentally, creating negative moods among research participants and then providing them choices that varied along dimensions of payoff and risk. If we generalize their findings to people in chronic negative moods—and certainly "helpless" individuals would fall into this group—we would predict that they prefer dangerous activities and settings if these promise pleasure that might take them, however temporarily, away from their unhappiness.[12]

[12]The research participants in Study 3 who had experienced accidents in the past 24 months were asked to describe briefly the most serious of these. We coded the accidents as happening during activities that seemed fun (e.g., drinking, snowboarding) and those that did not (e.g., working, doing household chores). The rule used was whether the activity was recreational or social versus not, and the independent agreement of two researchers blind to other information about the research participants was perfect. Individuals whose accidents occurred while attempting to have fun ($n = 24$) scored higher on our Preference for Dangerous Activities Scale than did those participants whose accidents occurred otherwise ($n = 4$), 4.99 versus 3.50, $t = 2.63$, $p < .05$. They also reported more overall accidents, 2.38 versus 1.25, $t = 2.78$, $p < .01$. Explanatory style scores were unrelated to the "fun" variable, perhaps because the variance in explanatory style was reduced by limiting analyses just to individuals who had experienced an accident. Leíth and Baumeister (1996) concluded that only arousing negative moods (e.g., anger, anxiety, or embarrassment) lead to risk taking, which may explain why BDI scores related neither to Preference for Dangerous Activities nor to the occurrence of "fun" accidents in Study 3. Individuals who favor stable and global explanations for bad events are often depressed but experience as well the gamut of negative emotions, including arousing ones (Peterson et al., 1993).

STUDY 4

Do individuals with a hopeless explanatory style experience more accidental injuries as a function of the negative moods they habitually experience? We investigated this question in a sample of young adults, recruiting individuals from groups we suspected to be at high risk for injuries: serious participants in sports or dance. We asked these individuals to complete a version of the ASQ and to describe how many accidental injuries they had recently experienced while participating in their chosen athletic or artistic pursuit. If they had experienced one or more injuries, they used a standard mood scale, the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971), to describe their feelings immediately prior to the most severe injury; the POMS was scored for the present purposes by summing responses indicative of negative mood. We expected that athletes/dancers with a hopeless explanatory style would report more negative moods at the time of an accident, and, further, that those who reported more negative moods would report a greater number of accidents.

Method

Research participants were a convenience sample of 141 young adults in southeast Michigan, recruited by research assistants from the University of Michigan (UM) Central Campus Recreation Building, the Eastern Michigan University (EMU) Recreation Center, practices of nonvarsity sports teams at UM and EMU, and dance classes at UM and in the Ann Arbor community. The sample was 36% male, 85% White, and on average 24 years of age. There were 99 athletes, regular participants in such sports as triathlon, cheerleading, soccer, and volleyball; and 42 dancers, mostly students of modern dance, jazz, ballet, and various ethnic dances. Neither gender, nor age, nor whether a research participant was an athlete or dancer had an effect on any of the results reported, and these contrasts are not mentioned again. Research participants on average had pursued their favored activity for 9.8 years (41% of their lifetime).

Each research participant was paid $10 for completing and returning by mail a packet of questionnaires. The questionnaires addressed (a) demographics, including the major form of sport/dance and extent of participation; (b) number of injuries that occurred during the past 12 months while participating in the major sport/dance; (c) if at least one injury had occurred, questions about the most severe of these injuries, including negative mood at the time immediately prior to it, using the POMS; and (d) the 10-item version of the ASQ described in Study 3, in which respondents provide ratings of the stability and globality of causes. Once again, stability and globality scores were highly correlated ($r = .55$, $p < .001$) and were combined into a single score. Reliabilities for all these scales are reported in Table I, along with their means and standard deviations.

Results

The correlation between stability and globality of explanatory style and number of accidents was significant ($r = .34$, $p < .01$), replicating the results already reported.

Among the 104 research participants who had experienced at least one accident in the past 12 months, negative mood at the time of the most severe accident was correlated as predicted with explanatory style on the one hand ($r = .26$, $p < .01$) and with number of accidents on the other ($r = .29$, $p < .01$), suggesting mediation. Explanatory style and negative mood were then included in an ordinary least-squares to predict the number of reported accidents. Explanatory style was entered first, then negative mood. The overall regression was significant ($R^2 = .16$, $F = 9.06$, $p < .001$). Negative mood remained a significant predictor ($\beta = .23$, $t = 2.35$, $p < .02$) and so did explanatory style ($\beta = .27$, $t = 2.82$, $p < .01$), suggesting that mood partially but not completely mediated the association between explanatory style and accidents.

The analyses just described were based on the subset of research participants with at least one accidental injury. Although these individuals were the majority of the sample (70%), the results do not directly address mood differences between participants who experienced no accidents versus those who experienced one or more. However, we were able to shed some light on this matter by comparing the POMS scores of the present research participants (who had experienced accidents) with normative data from 2086 athletes provided by Terry and Hall (1996). Our injured athletes and dancers reported more negative moods than did other athletes in the course of (mishap-free) participation (37.3 vs. 30.0, $t = 2.43$, $p < .05$). The analyses already reported were repeated by assigning these normative POMS scores to each of the noninjured dancers/athletes and thus including all the research participants in the correlational and regression analyses. All of the results previously obtained were replicated and indeed more robustly.

If they had experienced an accident, we asked our research participants to rate on 5-point scales how risky they considered the activity during which the accident occurred as well as how important it was. Almost 70% of the injured dancers and athletes gave a 1 or 2 rating for riskiness, meaning that they did not regard the activity as potentially dangerous; in contrast, almost 60% of them gave a 4 or 5 rating for importance, meaning that they regarded it as having potentially desirable consequences. Explanatory style was not related to rated riskiness ($r = .00$, ns), but it was correlated with rated importance ($r = .20$, $p < .05$). Together, these findings support our thesis that hopeless individuals prefer high pay-off activities while not appreciating potential risks (cf. Leíth & Baumeister, 1996).

Discussion

Study 4 provides explicit support for the argument we are developing that the link between hopeless explanatory style and traumatic accidents is mediated in part by negative mood. When asked to describe their mood at the time of the most severe injury experienced during the past year, the research participants described negative moods (relative to normative mood data) and especially so if they had a hopeless explanatory style. The more hopeless their explanatory style, the more negative their mood, and the more negative their mood, the more likely they were to report additional traumatic mishaps. However, negative mood did not fully mediate the link between explanatory style and accidents.

Study 4 used a convenience sample, thereby limiting generality. Nonetheless, the results were unaffected by age, gender, or whether the research participant was an athlete or dancer. A more serious limitation of these results was the study's retrospective design. We assumed that research participants could reconstruct their moods with fidelity months after a traumatic accident, but one can question this assumption. Our best argument in favor of taking these reports at face value is that they converged with the findings of the other studies reported here. Again, following Leíth and Baumeister (1996), we suggest that our hopeless dancers and athletes, because of their negative moods, did not properly estimate the riskiness of the activities that led to their injuries. Perhaps they did so because the promise of relief from their mood led them to ignore the risk altogether, or perhaps they did so because their judgments of risk became more deliberate and uncertain (i.e., confused; Forgas, 1995).

STUDY 5

Study 4 linked negative mood to accidents and further implied that negative moods may be involved in the hypothesized process that results in traumatic injury. However, Study 4 did not address a final piece of our interpretation, namely that hopeless individuals behave recklessly *in response to* negative moods. So, the next study we undertook was a survey asking college students how they typically explained bad events, how many accidents they had recently experienced that required medical attention, and how they usually responded to negative moods.

Method

In 1999, at the University of Michigan, 1316 introductory psychology students (44% male; 74% White; average age = 19 years) completed a variety of questionnaires the first day of class, including the same question described for Study 1 concerning the number of accidents in the last 12 months requiring medical attention. They also used the 7-point scale described for Study 1 to rate how they usually explained bad events: with global (vs. specific) causes. Research participants also provided demographic information such as gender and ethnicity, and they responded to a single question asking if they had ever experienced psychological problems (1 = *yes*, 0 = *no*). Finally, on 5-point scales (0 = *never*, 4 = *always*), they answered the question "When I am in a bad mood, usually I . . ." with respect to each of these responses: (a) distract myself by eating or drinking; (b) do something reckless or dangerous; (c) get together with close friends; (d) just ignore how I feel; (e) listen to music, watch TV, or go to a movie; (f) stay home by myself; and (g) think about how I feel.

Results

Table I presents the means, standard deviations, and intercorrelations of the variables from Study 5. Global explanatory style was associated with the past experience of psychological problems ($r = .25$, $p < .05$), and the number of accidents requiring medical attention was predicted by global explanatory style ($r = .18$, $p < .05$),

psychological problems ($r = .09$, $p < .05$), reckless response to bad moods ($r = .12$, $p < .05$), and male gender ($r = .06$, $p < .05$). As in Study 1, these zero-order correlations mostly replicate what is known about risk factors for accidents, although once again ethnicity, coded as 1 (*White*) versus 0 (*not White*), was not related to accidents ($r = .03$, $p < .05$). Global explanatory style was also correlated with reckless response to bad moods ($r = .21$, $p < .05$). These variables (except ethnicity) were then included in two ordinary least-squares multiple regressions testing whether reckless reponses mediated the link between globality of explanatory style and accidents.

The first regression predicted the number of reported mishaps from gender (entered first), psychological problems (entered second), globality of explanatory style (entered third), and reckless response to a negative mood (entered last). The overall regression was significant ($R^2 = .04$, $F = 13.18$, $p < .001$). Reckless response to negative mood was a significant predictor of accidents ($\beta = .07$, $t = 2.43$, $p < .015$), even after controlling for the effects of male gender ($\beta = .03$, $t = .94$, *ns*), psychological problems ($\beta = .04$, $t = 1.43$, *ns*), and explanatory style ($\beta = .16$, $t = 5.31$, $p < .001$).

The second regression predicted reckless response to a negative mood from gender (entered first), psychological problems (entered second), and globality of explanatory style (entered last). The overall regression was significant ($R^2 = .12$, $F = 54.69$, $p < .001$). Explanatory style remained a significant predictor of reckless response to negative mood ($\beta = .20$, $t = 7.44$, $p < .001$), even after controlling for the effects of male gender ($\beta = .26$, $t = 9.71$, $p < .001$) and psychological problems ($\beta = .10$, $t = 3.61$, $p < .001$).

Taken together, these results imply that the link between explanatory style and accidents is mediated in part by a reckless response to a negative mood. Using the same analytic strategy, we also explored the role of the other responses to a negative mood as possible mediators of the link between explanatory style and traumatic mishaps. Distracting oneself by eating and drinking was also a partial mediator. This finding, not detailed here, is nonetheless consistent with our overall thinking about how explanatory style predisposes accidents: by encouraging potentially dangerous behavior.

As might be expected, males and females differed with respect to most of the responses to a negative mood, in ways consistent with more extensive studies by Nolen-Hoeksema, Larson, and Grayson (1999). That is, males were more likely than females to behave recklessly or to ignore their feelings, whereas females were more likely than males to eat or drink, to see friends, to stay home, or to think about their feelings.

Discussion

Study 5 showed one more time that the link between explanatory style and accidents originally described by Peterson et al. (1998) holds for mundane mishaps. The new finding from this study was the demonstration that those who catastrophize (explain bad events with global causes) are at increased risk for accidents in part because they behave in reckless or dangerous fashion in response to a negative

mood. This finding helps make sense of the previous results implying links among explanatory style, risk-taking, and dysphoria. That is, catastrophizers apparently take risks to escape negative moods.

The limitations mentioned for Study 1 apply to these data: the study was cross-sectional, and the explanatory style measure this time consisted of only one item. We do note that the correlation between globality of explanatory style and psychological problems was comparable to that obtained with more established measures of explanatory style, adding to the construct validity of the abbreviated measure used here and in Study 1.

STUDY 6

To demonstrate generality, we report a final study in which we included questions about dangerous activities and predicted that answers would relate to explanatory style on the one hand and frequency of accidents on the other. This study was an investigation of hospitalized trauma patients originally undertaken for other purposes. However, many of the patients in this study completed a measure of explanatory style, and most reported on the frequency of dangerous habits like drinking and driving. The outcome variable of interest was trauma recidivism: that is, the number of times patients had previously been hospitalized for a traumatic mishap. Not only did Study 6 make it possible to replicate some of the findings already reported, but it used a different population than the college student samples so far described.

Method

In 1996 and 1997, patients 18 years or older admitted to the University of Michigan Trauma Unit were approached for consent to participate in a study if they met these criteria: (a) a traumatic accident within 24 hr of admission; (b) the absence of a paralyzing spinal cord injury; and (c) a Glasgow Coma Scale of 15 (i.e., full consciousness and responsiveness) within 24 hr of admission or extubation. Approximately 70% of patients approached gave their consent. Demographic data were available from hospital records, including sex and age. During the initial hospitalization, individual interviews were conducted within 48 hr of admission or extubation. Questionnaires were orally administered and included somewhat varying measures of preinjury psychosocial characteristics and physical health (see Michaels et al., 1998, for details).

Of interest for the present purposes, 218 patients had responded to measures of explanatory style, dangerous habits, and the number of prior accidents requiring hospitalization during the past 5 years. Patients in this sample were 74% male, 84% white, and on average 38 years of age ($SD = 14.3$). Ethnicity was not related to any of the variables of interest and is not further mentioned. Each patient had answered a three-item version of the ASQ, which yielded stability and globality scores. As in the previous investigations, stability and globality scores were correlated ($r = .44$, $p < .01$) and were combined into a single explanatory style measure. These patients also had reported on the frequency of risky activities like using recreational drugs, sharing needles, driving while intoxicated, and being cited for moving violations.

Responses were made on 0–5 scales (0 = *never*, 5 = *always/frequently*) and then averaged across ten dangerous habits.

Results

Table I again presents the means, standard deviations, and reliabilities of the major variables of interest in Study 6. Females were more hopeless than males ($r = .23$, $p < .001$) but reported less risky habits ($r = -.21$, $p < .002$). Older patients had fewer past hospitalizations than younger patients ($r = -.20$, $p < .003$) and also reported less risky habits ($r = -.30$, $p < .001$). Patient age and gender were therefore partialled from subsequent analyses. In terms of these partial correlations, stability and globality of explanatory style was correlated as expected with the frequency of dangerous activities ($\rho = .13$, $p < .05$), which in turn was correlated as expected with trauma recidivism ($\rho = .22$, $p < .05$), suggesting mediation.

As in the previous studies, we investigated mediation by computing ordinary least-squares regressions. First, we predicted trauma recidivism from gender and age (entered first), explanatory style (entered second), and dangerous activities (entered last). The overall regression was significant ($R^2 = .10$, $F = 5.57$, $p < .001$). Dangerous activities remained a significant predictor of traumatic injuries ($\beta = .22$, $t = 3.16$, $p < .002$) after controlling for the effects of male gender ($\beta = .02$, $t = .28$, ns), age ($\beta = -.13$, $t = 1.91$, $p < .06$), and explanatory style ($\beta = .22$, $t = 1.05$, ns). In the second multiple regression, we predicted dangerous activities by entering first gender and age and then explanatory style. The overall regression was significant ($R^2 = .15$, $F = 12.15$, $p < .001$). Explanatory style remained a significant predictor of dangerous activities ($\beta = .13$, $t = 1.98$, $p < .05$), even after controlling for the effects of male gender ($\beta = .22$, $t = 3.39$, $p < .001$) and age ($\beta = -.29$, $t = 4.55$, $p < .001$).

Discussion

These results were not as robust as the findings of the other studies, perhaps because the sample of trauma patients was more heterogeneous and because the outcome variable (trauma recidivism) is multiply determined. Regardless, Study 6 found that explanatory style was related to the occurrence of traumatic mishaps and that the link involved in part the pursuit of dangerous yet exciting habits. Study 6 focused on more severe accidents than did our other investigations, and we measured dangerous habits rather than preference for dangerous activities or settings, but the interpretation of the findings appears to be the same. Unhappy individuals—presumably identifiable by their hopeless explanatory style—favor activities that promise excitement while ignoring potential risks. They are more apt to be hurt repeatedly than their counterparts with more hopeful explanatory styles.

GENERAL DISCUSSION AND SIGNIFICANCE

Figure 1 summarizes the findings of the six studies in terms of a process by which explanatory style might put someone at risk for traumatic accidents. A hopeless or
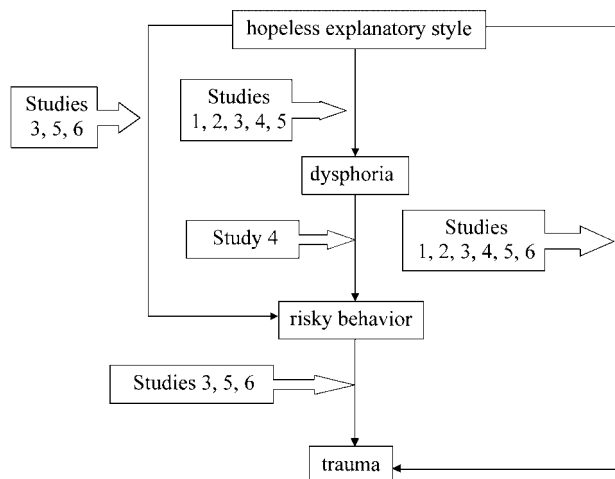
Fig. 1. Summary of results.

catastrophizing explanatory style—in which bad events are habitually explained with stable or global causes or both—is associated with dysphoria, which in turn can lead to risky behavior, which eventually can result in trauma.

None of these studies is perfect. We point to the small sample size of Study 3 and consequent low power; perhaps we were unable to detect additional mediators as a result. We also point to the large sample sizes of Studies 1, 5, and 6 and the fact that small magnitude relationships therefore attained statistical significance. A related problem in these particular studies was the abbreviated nature of the explanatory style measures. Finally, the studies described here relied on self-report measures, and most had a cross-sectional design.

The most obvious question about this research is whether we have identified the best way of characterizing the links among explanatory style, mood, risk taking, and trauma. Alternative causal models can be proposed. For example, perhaps a history of trauma influences explanatory style, making it more hopeless, which in turn influences negative mood. We explored this alternative model where possible in each of the cross-sectional studies, finding that it did not account for the data nearly as well as the hypothesized cascade. We also looked at other data available to us and found that causal explanations offered for traumatic events were *not* more stable and global than the causal explanations offered for more generic bad events (e.g., Peterson & Villanova, 1988). Nonetheless, future research should use longitudinal designs to test further the model proposed here against alternatives. It will be worth keeping in mind that our mediational analyses implied partial but not complete mediation by the variables we examined, meaning that future researchers will need to assess a broader array of constructs.

For the time being, we conclude that our results tell a coherent story across different samples, designs, and measures. We believe that we are reporting a genuinely new and potentially important finding that clarifies the earlier discovery by Peterson

et al. (1998) that individuals with a hopeless explanatory style are at increased risk for accidental death. As noted, explanatory style is not the only risk factor for traumatic injury, and it is not a robust one, but the identification of any psychological factor predisposing trauma is intriguing.

Traumatic accidents are the third leading cause of death in the contemporary United States, trailing only cancer and heart disease; traumatic accidents are also the overall leading cause of death for individuals under 45 years of age, and the leading cause of lost productivity (Baker et al., 1992). Psychologists have frequently studied intentional trauma (abuse, assault), while paying comparatively little attention to unintentional trauma. These studies help to correct this imbalance, and they have practical implications. Perhaps individuals at risk for traumatic accidents can be identified prior to any mishap by virtue of their explanatory style. Perhaps trauma recidivism can be reduced by interventions like cognitive therapy that are known to change explanatory style in a more hopeful direction (Seligman et al., 1988). And perhaps primary prevention of accidents is possible by cultivating hopeful explanatory styles among the young (Jaycox, Reivich, Gillham, & Seligman, 1994). Another prevention strategy suggested by our results is to encourage people to think differently about what makes an activity fun or exciting (Peterson & Moon, 1999).

Our results also have theoretical implications. First, they lead us to rethink the diathesis–stress hypothesis central to the learned helplessness reformulation: explanatory style (the diathesis) supposedly interacts with negative life events (the stress) to produce difficulties. Perhaps because helplessness theory and research originated in the animal learning laboratory, where experimenters control what does or does not occur, helplessness researchers have assumed that explanatory style and negative life events are independent. The results suggest to the contrary that the diathesis can be a risk factor for a potent stress, which may explain why empirical support for the diathesis–stress hypothesis is checkered at best.

A second theoretical point is that explanatory style has a richer meaning than simply a risk factor for learned helplessness. The construct has taken on a life of its own, and the present results suggest that people with a hopeless explanatory style may be more than just immobile. They may also become risk takers in an attempt to escape negative moods because they do not properly foresee the consequences of their actions. When the learned helplessness phenomenon was first described, it was said to entail a set of deficits: behavioral, cognitive, and emotional. In this set of studies, the only deficit to which explanatory style was linked was a cognitive one; the behavioral and emotional consequences of explanatory style are better regarded as active responses, however dysfunctional they may be.

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