Research Report

CATASTROPHIZING AND UNTIMELY DEATH

Christopher Peterson,[1] Martin E.P. Seligman,[2] Karen H. Yurko,[3]
Leslie R. Martin,[4] and Howard S. Friedman[5]

[1]University of Michigan, [2]University of Pennsylvania, [3]Children's Hospital of Michigan, [4]La Sierra University, and [5]University of California, Riverside

Abstract—*Participants in the Terman Life-Cycle Study completed open-ended questionnaires in 1936 and 1940, and these responses were blindly scored for explanatory style by content analysis. Catastrophizing (attributing bad events to global causes) predicted mortality as of 1991, especially among males, and predicted accidental or violent deaths especially well. These results are the first to show that a dimension of explanatory style is a risk factor for mortality in a large sample of initially healthy individuals, and they imply that one of the mechanisms linking explanatory style and death involves lifestyle.*

Explanatory style is a cognitive personality variable that reflects how people habitually explain the causes of bad events (Peterson & Seligman, 1984). Among the dimensions of explanatory style are

- internality ("it's me") versus externality
- stability ("it's going to last forever") versus instability
- globality ("it's going to undermine everything") versus specificity

These dimensions capture tendencies toward self-blame, fatalism, and catastrophizing, respectively. Explanatory style was introduced in the attributional reformulation of helplessness theory to explain individual differences in response to bad events (Abramson, Seligman, & Teasdale, 1978). Individuals who entertain internal, stable, and global explanations for bad events show emotional, motivational, and cognitive disturbances in their wake.

Explanatory style has been examined mainly with regard to depression, and all three dimensions are consistent correlates of depressive symptoms (Sweeney, Anderson, & Bailey, 1986). More recent studies have looked at other outcomes (notably, physical well-being), and researchers have also begun to examine the dimensions separately. Stability and globality—but not internality—predict poor health (Peterson & Bossio, 1991). This is an intriguing finding, but questions remain.

First, do these correlations mean that explanatory styles are risk factors for early death? Previous studies are equivocal either because of small samples or because research participants were already seriously ill.

Second, is the link between explanatory style and health the same or different for males versus females? Again, previous studies are equivocal because they often included only male or only female research participants.

Third, what mediates the link between ways of explaining bad events and poor health? The path is probably overdetermined, but one can ask if fatalism and catastrophizing predict differentially to particular illnesses. These explanatory styles, as cognates of hopelessness, may place one at special risk for cancer, implying an immunological pathway (Eysenck, 1988). Alternatively, these explanatory tendencies, because of their link with stress, may place one at special risk for heart disease, suggesting a cardiovascular pathway (Dykema, Bergbower, & Peterson, 1995). Or perhaps fatalism and catastrophizing predispose one to accidents and injuries and thus point to an incautious lifestyle as a mediator. Once again, previous studies are equivocal either because illness was deliberately operationalized in nonspecific terms or because only one type of illness was studied.

We attempted to answer these questions by investigating explanatory style and mortality among participants in the Terman Life-Cycle Study (Terman & Oden, 1947). The original sample of more than 1,500 preadolescents has been followed from the 1920s to the present, with attrition (except by death) of less than 10% (Friedman et al., 1995). For most of those who have died (about 50% of males and 35% of females as of 1991), year of death and cause of death are known. In 1936 and 1940, the participants completed open-ended questionnaires about difficult life events, which we content-analyzed for explanatory style. We determined the associations between dimensions of explanatory style on the one hand and time of death and cause of death on the other.

METHOD

Sample

The Terman Life-Cycle Study began in 1921–1922, when most of the 1,528 participants were in public school. Terman's original objective was to obtain a reasonably representative sample of bright California children (IQs of 135 or greater) and to examine their lives. Almost every public school in the San Francisco and Los Angeles areas was searched for intelligent children. The average birth date for children in the sample was 1910 (*SD* = 4 years). Most of the children were preadolescents when first studied; those still living are now in their 80s. Data were collected prospectively, without any knowledge of eventual health or longevity.

In young adulthood, the participants were generally healthy and successful. In middle age, they were productive citizens, but none was identifiable as a genius. The sample is homogeneous on dimensions of intelligence (above average), race (mostly white), and social class (little poverty).

This article is one of a series developed from a large-scale, multiyear, multidisciplinary project on psychosocial predictors of health and longevity. The data are derived from thousands of variables in the 70-year Terman Life-Cycle Study archives or follow-ups. Relevant findings are included to the extent feasible in each report, but multiple publication is necessitated because of the complexity and scope of the project. Care should be taken not to include overlapping findings in meta-analyses or other reviews.

Address correspondence concerning this specific article to Christopher Peterson, Department of Psychology, University of Michigan, 525 East University, Ann Arbor, MI 48109-1109; e-mail: chrispet@umich.edu. Address correspondence concerning the Terman Life-Cycle Study to Howard S. Friedman, Department of Psychology, University of California, Riverside, CA 92521; e-mail: friedman@citrus.ucr.edu.

Content Analysis of Causal Explanations

We scored explanatory style of the responses to the 1936 and 1940 questionnaires using the CAVE (content analysis of verbatim explanations) technique (Peterson, Schulman, Castellon, & Seligman, 1992). A single researcher read through all responses in which bad events were described. Examples of questions that elicited such responses include

> (from 1936): Have any disappointments, failures, bereavements, uncongenial relationships with others, etc., exerted a prolonged influence upon you?
>
> (from 1940): What do you regard as your most serious fault of personality or character?

When a bad event was accompanied by a causal explanation, the event and the attribution were written down. These events, each with its accompanying attribution, were then presented in a nonsystematic order to eight judges who blindly and independently rated each explanation on a 7-point scale according to its stability, its globality, and its internality. The researchers (supervised by Peterson) who identified and rated attributions were independent of the researchers (supervised by Friedman) who collected and coded mortality information (see the next section).

A total of 3,394 attributions was obtained from 1,182 different individuals, an average of 2.87 attributions per person, with a range of 1 to 13. Each of these attributions was rated by each of the eight judges along the three attributional dimensions. We estimated coding reliability by treating the judges as "items" and calculating Cronbach's (1951) alpha for each dimension; alphas were satisfactory: .82, .73, and .94, for stability, globality, and internality, respectively. Ratings were averaged across raters and across different attributions for the same participant. These scores were intercorrelated (mean $r = .52$), as previous research has typically found (Peterson et al., 1982). The means (and standard deviations) were 4.52 (0.86) for stability, 4.46 (0.64) for globality, and 4.49 (1.29) for internality.

Cause of Death

Death certificates for deceased participants were obtained from the relevant state bureaus and coded for underlying cause of death by a physician-supervised certified nosologist using the criteria of the ninth edition of the International Classification of Diseases (U.S. Department of Health and Human Services, 1980) to distinguish among deaths by cancer, cardiovascular disease, accidents or violence, and other causes. For approximately 20% of the deceased, death certificates were unavailable; whenever possible, cause of death was assigned from information provided by next of kin. Among the 1,182 participants for whom explanatory style scores were available, mortality information was known for 1,179. The numbers of deaths as of 1991 were 148 from cancer (85 men, 63 women), 159 from cardiovascular disease (109 men, 50 women), 57 from accidents or violence (40 men, 17 women), 87 from other (known) causes (50 men, 37 women), and 38 from unknown causes (24 men, 14 women).

RESULTS

Explanatory Styles and Mortality

To investigate the association between explanatory styles and mortality (through 1991), we used Cox Proportional Hazards regressions and checked them with logistic regressions. The Cox approach is nonparametric and assumes that the ratio of hazard functions for individuals with differing values of the covariates (stability, globality, and internality) is invariant over time. We used Tuma's (1980) RATE program for the Cox models, and LOGIST of SAS for the logistic regressions. When all three attributional dimensions were examined simultaneously for the entire sample, only globality was associated with mortality, with a risk hazard (*rh*) of 1.26 ($p < .01$). Results from the logistic regression analyses (predicting to a dichotomous variable of survival to at least age 65 vs. not) were consistent with this finding; only the odds ratio associated with globality was significant ($rh = 1.25$, $p < .05$).

Figure 1 depicts the probability of a 20-year-old in this sample dying by a given age as a function of sex and globality (top vs. bottom quartiles of scores). The point at which each curve crosses the .50 probability line represents the "average" age of death of individuals in the group. As can be seen, males with a global explanatory style were at the highest risk for early death.

To test whether the effects of globality were due to individuals being seriously ill or suicidal at the time of assessment, we conducted additional survival analyses that excluded individuals who died before 1945. The effects of globality remained for males.

Globality of Explanatory Style and Cause of Death

Next we investigated whether globality was differentially related to causes of death (cancer, cardiovascular disease, accidents or violence, other, and unknown) by comparing Gompertz models (see Table 1). When comparing a model with both sex and globality as predictors but constraining the effects of globality to predict equally across all causes of death (Model 2) with an unconstrained model in which globality was allowed to predict differentially to separate causes of death (Model 3), we found that the unconstrained model fit the data better than did the constrained model. This finding was also obtained when participants who did not survive until at least 1945 were excluded, $\Delta\chi^2(4, N = 1{,}157) = 13.29$, $p < .01$.

Globality best predicted deaths by accident or violence ($rh = 1.98$, $p < .01$) and deaths from unknown causes ($rh = 2.08$, $p < .01$). The risk

Table 1. *Goodness of fit for Gompertz models predicting (age-adjusted) cause of death from sex and globality of explanatory style (*n = *1,179)*

Model	$\Delta\chi^2$	*df*
Model 1: predicting mortality from sex	705.44**	10
Model 2: predicting mortality from sex and globality, constraining the effect of globality to be equal across all causes of death	715.83**	11
Model 3: predicting mortality from sex and globality, not constraining the effects of globality to be equal across all causes of death	726.62**	15
Model 2 vs. Model 1	10.39**	1
Model 3 vs. Model 1	21.18**	5
Model 3 vs. Model 2	10.79*	4

*$p < .05$. **$p < .001$.

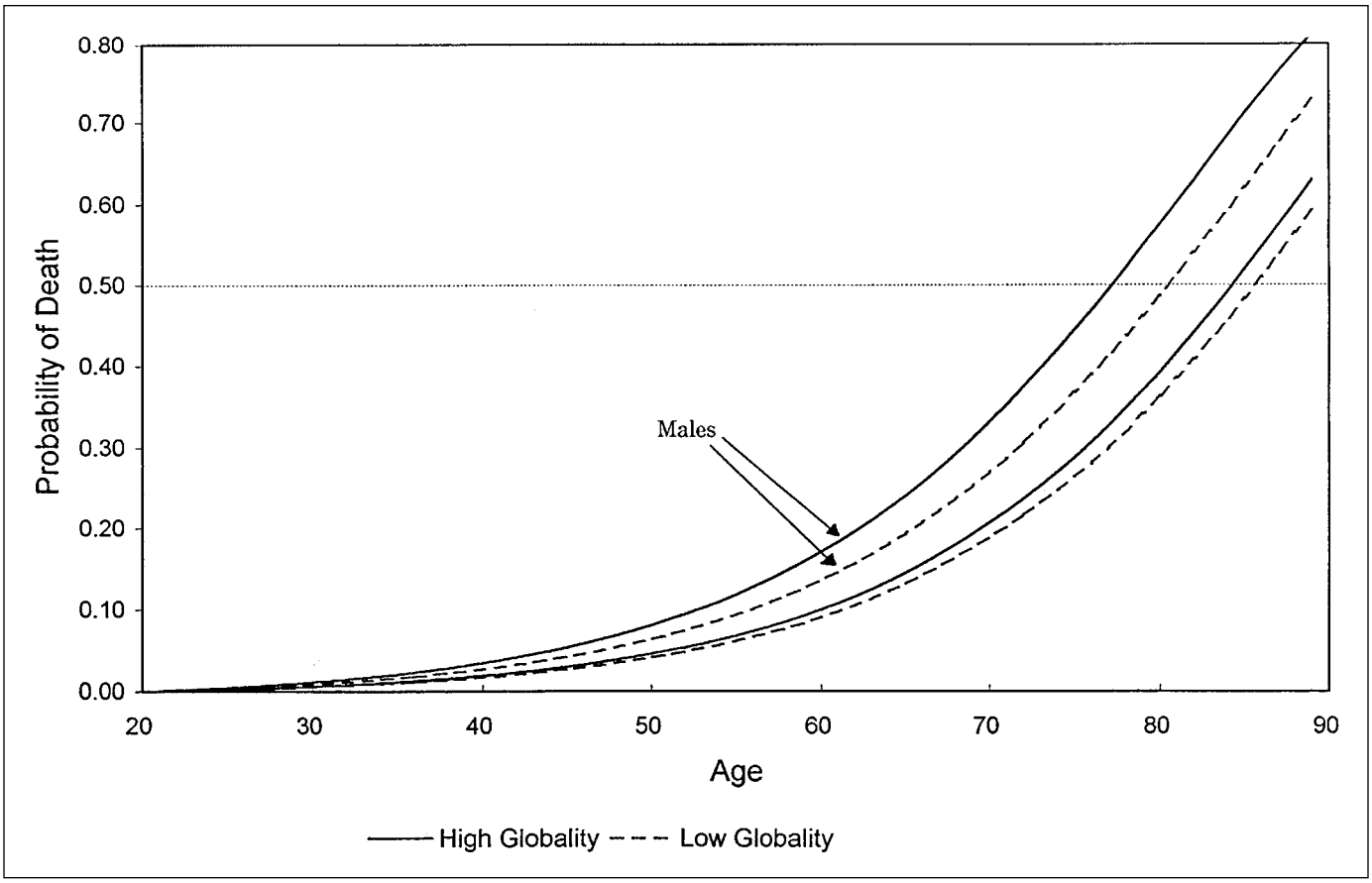

Fig. 1. Probability of a 20-year-old dying by a given age as a function of sex and globality (upper vs. lower quartiles).

ratios associated with other causes were 1.03 for cardiovascular disease (n.s.), 1.18 for cancer (n.s.), and 1.22 for other (known) causes (n.s.).

Finally, we computed a Cox model for prediction from globality specifically to suicide (which had been included in the accident-violence group). The result was marginally significant ($rh = 1.84$, $p < .06$), but only 25 individuals in the sample with globality scores available were known to have committed suicide. When these 25 individuals were excluded, along with individuals who died of accidents (some of which may have been suicides), and the analyses already described were repeated, the same results were obtained: Globality predicted mortality for the entire sample ($rh = 1.20$, $p < .05$), especially for males ($rh = 1.31$, $p < .05$).

Additional Analyses

How might we explain the finding that globality of explanatory style predicted untimely death? In terms of simple correlations, men who had years earlier made global attributions experienced more mental health problems in 1950 ($r = .14$, $p < .001$), had lower levels of adjustment at this time ($r = –.11$, $p < .02$), and reported that they drank slightly more ($r = .07$, $p < .08$) than men who had made more specific attributions (see Martin et al., 1995). We examined other variables such as education, risky hobbies, and physical activity from 1940 through 1977, but none of the simple associations with globality was significant. The subsample of individuals for whom we had smoking data available was substantially smaller than the original sample because these data were collected in 1990–1991; however, within this group, no associations with globality were found.

Additional survival analyses were conducted, controlling for mental health and psychological adjustment. In these analyses, the association between globality and mortality risk remained stable and significant. When mental health was controlled, the relative hazard associated with globality was 1.27 ($p < .05$). When level of adjustment was controlled, the relative hazard was 1.29 ($p < .01$). A final model controlling for both mental health and adjustment resulted in a relative hazard of 1.24 ($p < .05$). Globality, although related to these aspects of psychological well-being, was distinct, and its association with mortality was not substantially mediated by these other factors.

Finally, globality of explanatory style was inversely related to a measure of neuroticism constructed from 1940 data ($r = –.15$, $p < .001$) (Martin, 1996). This finding seems to rule out confounding of our measures by response sets involving complaints or exaggeration.

DISCUSSION

The present results extend past investigations of explanatory style and physical well-being. They represent the first evidence from a large sample of initially healthy individuals that a dimension of explanatory

style—globality—is a risk factor for early death, especially among males. Because globality scores were the least reliably coded of the three attributional dimensions and had the most restricted range, the present results may underestimate the actual association between globality and mortality. In any event, our findings were not due to confounding by neuroticism, suicide, or psychological maladjustment. Stability per se did not predict mortality, perhaps because it involves a belief that is circumscribed, that is, relevant in certain situations but not others.

In contrast, globality taps a pervasive style of catastrophizing about bad events, expecting them to occur across diverse situations. Such a style can be hazardous because of its link with poor problem solving, social estrangement, and risky decision making across diverse settings (Peterson, Maier, & Seligman, 1993). Supporting this interpretation is the link between globality and deaths due to accident or violence. Deaths like these are often not random. "Being in the wrong place at the wrong time" may be the result of a pessimistic lifestyle, one more likely among males than females. Perhaps deaths due to causes classified as unknown may similarly reflect an incautious lifestyle.

Explanatory style, at least as measured in this study, showed no specific link to death by cancer or cardiovascular disease. Speculation concerning explanatory style and poor health has often centered on physiological mechanisms, but behavioral and lifestyle mechanisms are probably more typical and more robust. We were unable to identify a single behavioral mediator, however, which implies that there is no simple set of health mediators set into operation by globality.

Previous reports on the health of the Terman Life-Cycle Study participants found that childhood personality variables predicted mortality (Friedman et al., 1993). Specifically, a variable identified as "cheerfulness" was inversely related to longevity. Its components involved parental judgments of a participant's "optimism" and "sense of humor." Because a hopeless explanatory style is sometimes described as pessimistic and its converse as optimistic, these previous reports appear to contradict the present results. However, in this sample, cheerfulness in childhood was unrelated to explanatory style in adulthood. If cheerfulness and explanatory style tap the same sense of optimism, then this characteristic is discontinuous from childhood to adulthood. It is also possible, perhaps likely, that these two variables measure different things: An optimistic explanatory style is infused with agency: the belief that the future will be pleasant because one can control important outcomes.

In summary, a cognitive style in which people catastrophize about bad events, projecting them across many realms of their lives, foreshadows untimely death decades later. We suggest that a lifestyle in which an individual is less likely to avoid or escape potentially hazardous situations is one route leading from pessimism to an untimely death.

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