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Problem-Solving Appraisal, Stress, Hopelessness, and Suicide Ideation in a College Population

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This investigation expands the research linking problem-solving skills to suicide by examining the role of problem-solving appraisal. In Study 1, 277 students enrolled in introductory psychology courses completed measures of problem-solving appraisal, negative life stress, and suicide ideation. In Study 2, 382 students enrolled in introductory psychology courses completed measures of problem-solving appraisal, negative life stress, and hopelessness. The results from both studies suggest that problem-solving appraisal and negative life stress are significant independent predictors of suicide ideation and hopelessness. The results are discussed in terms of Schotte and Clum's (1982, 1987) diathesis–stress–hopelessness model of suicidal behavior.

Suicide is a growing concern in American society. This year approximately 28,500 people will commit suicide (Metropolitan Life Insurance Company, 1986). In essence, these statistics reflect, in large part, an inability to cope with the myriad of life demands, problems, and hassles. Moreover, issues relating to suicide are of considerable interest to therapists, with regard not only to protecting clients but also to attempts to understand the interpersonal and intrapersonal dynamics pertaining to suicide.

Suicide research has increasingly focused on the role that stressful life events may play in its etiology, course, and development (e.g., Schotte, & Clum, 1982, 1987). For example, suicidal individuals report four times as many negative life events preceding their suicide attempts than do nonsuicidal people and one and a half times the number of such events reported by depressed people prior to the onset of their depression (Paykel, Prusoff, & Myers, 1975). Furthermore, this relationship has been found to exist independently of age, sex, and social class variables (Cochrane & Robertson, 1975).

Although there is an established relationship between stress and suicidal behavior, many of the people who are under a great deal of stress do not make attempts on their lives. Thus, it seems likely that some variables exist, which, in combination with high stress levels, make suicidal behavior more or less likely to occur. This belief has led several investigators (Clum, Patsiokas, & Luscomb, 1979; Schotte & Clum, 1982, 1987) to develop a diathesis–stress–hopelessness model of suicidal behavior. According to this model, problem-solving variables may moderate the effects of stress on hopelessness, which in turn affects the occurrence of suicidal ideation. Thus, when people who are deficient in problem-solving abilities are exposed to naturally occurring conditions of high negative life stress, they are cognitively unable to develop effective alternative solutions necessary for adaptive coping, which in turn results in hopelessness. This hopelessness is then assumed to put the individual at an increased risk for suicidal behavior.

Schotte and Clum (1982) initially evaluated this hypothesis by examining the relationship between problem-solving skills, negative life stress, hopelessness, and suicide ideation in a college population. Poor problem solvers under high negative life stress were found to be significantly more hopeless and significantly higher in suicidal intent than any of the other groups. Subsequently, Schotte and Clum (1987) examined problem-solving skills in psychiatric patients. They compared a sample of patients who had been hospitalized as a suicide precaution with a control group of nonsuicidal hospitalized patients. Schotte and Clum's results indicated that the suicidal group was significantly less able to generate alternative solutions to problems and to evaluate the negative consequences of alternative solutions than were the nonsuicidal hospitalized patients. Thus, this preliminary research supported Schotte and Clum's diathesis–stress–hopelessness model of suicidal behavior.

It is important to note that Schotte and Clum (1982, 1987) operationalized problem-solving skills by examining scores on the Means–End Problem-Solving Procedure (MEPS; Platt & Spivack, 1975). The MEPS is an instrument that measures subjects' responses to hypothetical problems and most notably measures the number of steps subjects use to solve hypothetical problems. Despite the initial face validity of the MEPS, it has received considerable criticism within the literature, such as criticisms that (a) the test is an artificial or hypothetical problem-solving task with unclear generalizability to real-life problem solving, and (b) the test is significantly correlated with verbal intelligence (Butler & Meichenbaum, 1981). Thus, several doubts have been raised as to the validity of the MEPS as an indicator of problem-solving skills (see Butler & Meichenbaum, 1981). From a methodological perspective, it is therefore important to examine Schotte and Clum's model with another measure of problem solving.

The overall purpose of this investigation was to extend the research on Schotte and Clum's (1982, 1987) diathesis–stress–hopelessness model of suicidal behavior by examining other

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problem-solving variables. Within the coping and problem-solving literature, a variable that has received increased attention is the cognitive appraisal of one's ability to solve problems (see Heppner, 1988). Butler and Meichenbaum (1981) initially suggested that appraisal of one's problem solving may be an important variable in the problem-solving process. Subsequent research has confirmed that problem-solving appraisal, as measured by the Problem Solving Inventory (PSI), is associated with a wide range of cognitive, behavioral, and affective variables related to problem solving, as well as with various indices of psychological adjustment (e.g., Heppner & Anderson, 1985; Heppner, Baumgardner, & Jackson, 1985; Heppner, Hibel, Neal, Weinstein, & Rabinowitz, 1982; Heppner & Petersen, 1982; Heppner, Reeder, & Larson, 1983; Nezu, 1985; Nezu, Nezu, Saraydarian, Kalmar, & Ronan, 1986). Research suggests that the MEPS and the PSI have a low-to-moderate correlation with each other (Heppner & Petersen, 1982; Nezu & Ronan, 1988), suggesting that these two instruments measure different aspects of problem solving.

In short, given the prominence of problem solving within the diathesis–stress–hopelessness model and the questions surrounding the MEPS, it seems appropriate to examine another index of problem solving within this model, such as problem-solving appraisal. Thus, we began by examining in Study 1 the relationship among problem-solving appraisal, negative life stress, and suicidal thoughts in college students. We predicted significant main effects for both problem-solving appraisal and stress, such that high stress and ineffective problem solving would independently be associated with higher levels of suicide ideation. In addition, we hypothesized a Problem Solving × Stress interaction such that suicidal intentions would be most pronounced for subjects who report a great deal of stress and appraise their problem-solving skills negatively.

A second purpose for conducting this study was to determine which of the PSI factors (Problem-Solving Confidence, Approach–Avoidance Style, and Personal Control) is most strongly related to suicide ideation. To date, there has been a lack of attention paid to differential relations with the three factors (see Larson & Heppner, 1989). Such a focus might result in the addition of more specific information to the understanding of the coping process, particularly with regard to suicide. We hypothesized that the Problem-Solving Confidence factor would have the strongest relation of the three PSI factors to suicide ideation.

After completing our first study, we conducted a second study to replicate and extend Study 1. Study 2 further extends the diathesis–stress–hopelessness model by examining the relationship between problem-solving appraisal and hopelessness. Only two investigations to date have provided empirical support for a problem solving–hopelessness relationship; one study involved the MEPS (Schotte & Clum, 1982), and the other involved problem-solving appraisal (Bonner & Rich, 1988). Hopelessness is one of the leading predictors of suicidal thoughts (Bonner & Rich, 1987; Schotte & Clum, 1982), suicide attempts (Minkoff, Bergman, Beck, & Beck, 1973), and suicide completions (Beck, Steer, Kovacs, & Garrison, 1985). Hence, determining which factors covary with hopelessness is important. Schotte and Clum (1982) initially found that subjects who had poor problem-solving skills and were experiencing high negative life stress had the highest hopelessness scores. More recently, Bonner and Rich (1988) found that problem-solving appraisal and its interaction with negative life stress were unique predictors of hopelessness apart from the effects of depression. However, in Bonner and Rich's (1988) study, the overlap between depression and hopelessness was partialed out. Hence, Bonner and Rich's results only generalize to that segment of the population that is hopeless but not depressed. Because most individuals who are hopeless are also somewhat depressed, determining the overall magnitude of the relationship among problem solving, stress, and hopelessness seems warranted. Thus, in Study 2 we examined the magnitude of the relationship between problem-solving appraisal and hopelessness in college students. On the basis of prior research, problem-solving appraisal and its interaction with negative life stress were both hypothesized to be significant predictors of hopelessness.

We also explored the relationships between the PSI factors and hopelessness, in large part to determine if we could replicate the pattern of results found in Study 1. Thus, we predicted that problem-solving confidence would be the best predictor of hopelessness.

Method

Subjects

Subjects consisted of 277 (134 male and 143 female) students in Study 1 and 382 students (approximately 50% male and 50% female; because of a coding error, exact numbers cannot be reported) in Study 2 who were enrolled in introductory psychology classes at a large midwestern university. The subjects were predominantly White, middle-class, 18- and 19-year-old freshmen and sophomores who were full-time students. By voluntarily participating in this study or alternative assignments, the students could partially fulfill course requirements.

Instruments

Problem Solving Inventory (PSI). The PSI (Form A; Heppner & Petersen, 1982) is composed of 32 6-point Likert-type items rated on a 6-point scale ranging from *strongly agree* (1) to *strongly disagree* (6) that measure people's perceptions of their personal problem-solving behaviors and attitudes. The test measures people's appraisal of their problem-solving capacities on a global level, apart from specific problems (Heppner, 1988). Lower scores indicate assessment of oneself as a relatively effective problem solver, whereas higher scores indicate assessment of oneself as a relatively ineffective problem solver. Although PSI scores have been found to correlate significantly with observational ratings of problem-solving skill (Heppner et al., 1982), the PSI measures an individual's global self-appraisal of his or her problem-solving ability, rather than the individual's actual ability (Heppner, 1988). Factor analysis has revealed that the PSI is composed of three factors, the Problem-Solving Confidence factor (11 items), the Approach–Avoidance Style factor (16 items), and the Personal Control factor (5 items). The PSI appears to be rather reliable, with internally consistent coefficient alphas ranging from .72 to .90 and test–retest coefficient alphas ranging from .83 to .89 over a 2-week period. In addition, the PSI has received sizable research

support suggestive of its validity in discerning differences across problem-solving styles, attitudes, and behaviors (see Heppner, 1988).

Life Experience Survey (LES). The LES (Sarason, Johnson, & Siegel, 1978) is a 64-item measure of life stress, which assesses the incidence of various important life change events (e.g., leaving home for the first time, serious illness) that have occurred over the last 6 months or 1 year. Ratings are made on a 7-point Likert scale ranging from *extremely negative* (−3) to *extremely positive* (+3). Summing the ratings of those events designated as negative by the subjects provides a negative life experiences score. A positive life experiences score is obtained by summing the impact ratings of those events experienced as positive by the subject. By adding together the negative life experiences score and the positive life experiences score, a total stress score is obtained. Because previous research has indicated that positive life events are unrelated to depressive symptoms (Sarason et al., 1978) or to suicidal ideation (Schotte & Clum, 1982), in Studies 1 and 2 we only examine scores reflecting negative stress impact. High scores reflect more stress due to negative life events. The LES scale appears to be moderately reliable, with test–retest coefficients ranging from .63 to .64 over a 6-week period. In addition, negative life stress scores have been found to correlate significantly, in the anticipated direction, with a variety of variables (e.g., anxiety, personal maladjustment, depression, and loss of control; Sarason et al., 1978).

Scale for Suicide Ideation (SSI). The SSI is a 19-item scale that was developed by Beck, Kovacs, and Weissman (1979) for measuring the intensity, pervasiveness, and characteristics of suicidal intent. The instrument is normally presented in an interviewer-rated format. The self-report form, which was used in this investigation, has been found to correlate highly (r = .90) with the interview form. Scores on the SSI range from 0 to 38, with higher scores indicating higher degrees of suicidal intent. The SSI appears to have rather high levels of internal consistency (r = .89) and interrater reliability (.83), as well as adequate levels of concurrent, discriminant, and construct validity (Beck et al., 1979). In addition, the test is sensitive to changes in suicidal thoughts with treatment (Beck et al., 1979).

Hopelessness Scale (HS). The HS is a 20-item true–false inventory developed by Beck, Weissman, Lester, and Trexler (1974) for measuring the degree to which individuals' cognitive schemata are characterized by future pessimistic expectations. Scores range from 0 to 20, with higher scores indicating greater degrees of hopelessness. Internal consistency has been reported at .93, concurrent validity, in terms of agreement with clinical ratings of hopelessness, at .74, and, in terms of agreement with other scores of hopelessness, at .60 (Beck et al., 1974).

Procedure

Study 1. At the beginning of the 1988 winter semester, 277 students who were enrolled in an introductory psychology class at a large midwestern university completed the PSI, the LES, and the SSI as part of the psychology department's mass testing program. Overall, testing took approximately 50 min to complete. The subjects were informed that we were interested in gathering information on cognitive and affective variables associated with the frequency and intensity of suicidal thoughts in college students. In addition, subjects were informed of the names and telephone numbers of individuals and mental health centers they could contact if they had serious thoughts of suicide and wanted assistance talking about these matters. Furthermore, they were informed that they would be contacted by the investigators and urged to seek counseling if their scores on the SSI indicated that they were seriously contemplating suicide.

Study 2. At the beginning of the 1988 fall semester, 382 students who were enrolled in introductory psychology classes at a large midwestern university completed packets of self-report measures containing the PSI, the LES, and the HS. The study was conducted in group sessions of 20 to 45 individuals. Testing took approximately 30 min. The subjects were informed that we were interested in gathering information on the cognitive and affective variables associated with stress in college students.

Results

Study 1. The means and standard deviations for all of the measures as well as their zero-order intercorrelations are listed in Table 1. The means suggest that the subjects appraised themselves slightly more positively than do other college students their age (see Heppner, 1988). The students' appraisal of their negative life events and suicide ideation were typical of college students their age (Schotte & Clum, 1982). However, as scores on the SSI range from 0 to 38, the mean of 1.5 suggests that the majority of students appraised themselves as very low suicidal ideators in comparison to a mean of 9.43 for a group of patients hospitalized for suicide ideation (Beck et al., 1979). Because of the statistical difficulties inherent in the positive skewness of the suicide scores, a square root transformation, as suggested by Cohen and Cohen (1983), was conducted to help normalize the SSI scores. Nonetheless, this lack of variance in suicide ideation scores reduced the power of the statistical tests we conducted and probably underestimated the magnitude of the various relationships.

Table 1
Means, Standard Deviations, and Intercorrelations Among the Variables in Studies 1 and 2

Variable	1	2	3	4	5	6
			Study 1 (N = 277)			
1. PSI	—	.81**	.91**	.76**	.12*	.12*
2. PSC		—	.55**	.51**	.06	.17*
3. AAS			—	.59**	.13*	.04
4. PC				—	.12*	.13*
5. NLES					—	.34**
6. SSI						—
M	82.80	23.56	41.72	17.53	11.60	1.39
SD	18.24	6.66	10.42	4.39	14.68	1.19
			Study 2 (N = 382)			
1. PSI	—	.88**	.94**	.77**	.22**	.39**
2. PSC		—	.69**	.62**	.23**	.49**
3. AAS			—	.64**	.17**	.29**
4. PC				—	.19**	.25**
5. NLES					—	.21**
6. HS						—
M	88.39	26.90	44.80	16.69	15.70	2.51
SD	25.09	9.51	14.24	4.30	17.48	3.04

Note. PSI = Problem Solving Inventory; PSC = Problem-Solving Confidence factor of the PSI; AAS = Approach–Avoidance Style factor of the PSI; PC = Personal Control factor of the PSI; NLES = negative life stress as measured by the Life Experiences Survey; SSI = Scale for Suicide Ideation (square root transformations of scores); HS = Hopelessness Scale. Higher scores on the NLES, SSI, HS, PSI (and factors) indicate more stress due to negative life events, higher degrees of suicidal intent, greater degrees of hopelessness, and more negative appraisals of one's problem-solving skills.
* $p < .05$. ** $p < .001$.

We analyzed the results of this study using a hierarchical multiple regression with scores on the SSI serving as the dependent measure. Problem-solving appraisal, which is characterized more as a trait than a state and is stable over time (Heppner, 1988), was assumed to be temporally prior to the negative life events and less likely to be affected by the more transitory state of negative life events (Nezu & Ronan, 1988). On this basis, problem-solving appraisal was entered first into the hierarchical multiple regression (see Cohen & Cohen, 1983). This regression was significant, $F(1, 275) = 4.23$, $p < .041$, and indicated that 1.4% of the variance in suicidal thoughts was accounted for by the PSI. Once the variance for problem solving was removed, negative life stress was entered as a predictor variable and was found to account for an additional 10.7% of the variance, $F(1, 274) = 33.29$, $p < .0001$. The Problem Solving × Stress interaction was entered next and was not significant, $F(1, 273) = .59$, $p > .05$. Collectively, this model accounted for over 12% of the variance in suicide scores, $F(3, 273) = 12.70$, $p < .0001$.

To investigate which aspect of self-appraised problem-solving ability was most strongly associated with suicidal thoughts, it was first necessary to test for multicollinearity among the predictor variables. It is important to note that regression coefficients may vary widely from sample to sample when the independent variables are highly intercorrelated (i.e., multicollinearity). To test for multicollinearity in the PSI subscale regressions, we conducted the following analyses. In accordance with Cohen and Cohen's (1983) recommendations, stepwise multiple regressions were conducted with each independent variable in turn serving as the criterion variable and the others serving as the predictors. No linear combination came close to predicting the majority of the variance in a predictor variable ($R^2 = .36–.43$). Therefore, a simultaneous multiple regression was conducted in which the transformed SSI scores served as the dependent measure and the three PSI factors served as the independent variables. Results of the simultaneous regression indicated that only Problem-Solving Confidence accounted for a significant portion of unique variance, $\beta = .14$, $F(1, 273) = 5.29$, $p < .0221$. Approach–Avoidance Style and Personal Control did not account for significant proportions of the unique variance, $\beta = -.09$, $F(1, 273) = 2.22$, $p > .05$, and $\beta = .09$, $F(1, 273) = 2.19$, $p > .05$, respectively. (Note that the Beta weights represent standardized regression coefficients.)

Study 2. Table 1 also contains the means and standard deviations for all of the measures used in Study 2 as well as their zero-order intercorrelations. The students' appraisal of their problem-solving ability, negative life events, and hopelessness were typical of college students their age (see Heppner, 1988; Schotte & Clum, 1982).

The results of Study 2 were also analyzed with a hierarchical multiple regression, with scores on Beck's Hopelessness Scale serving as the dependent measure. Again, the first predictor variable entered into the equation was self-appraised problem-solving ability. This regression was significant, $F(1, 380) = 69.56$, $p < .0001$, and indicated that 15.22% of the variance in hopelessness was accounted for. Once the variance for problem solving was removed, negative life stress was entered as a predictor variable and was found to account for an additional 1.80% of the variance, $F(1, 379) = 7.29$, $p < .0072$.The Problem Solving × Stress interaction was entered third and was not significant, $F(1, 378) = 2.15$, $p > .05$. Collectively, this model accounted for over 17% of the variance in predicting hopelessness, $F(3, 378) = 26.33$, $p < .0001$.

To determine which factor of self-appraised problem-solving ability is most strongly associated with hopelessness, a simultaneous multiple regression was conducted in which hopelessness served as the dependent measure and the three PSI factors as the predictor variables. The results of the simultaneous regression indicated that the Problem-Solving Confidence factor accounted for 15.72% of the unique variance, which was highly significant, $\beta = .40$, $F(1, 378) = 78.87$, $p < .0001$. Approach–Avoidance Style, $\beta = -.06$, $F(1, 378) = 1.55$, $p > .05$, and Personal Control, $\beta = -.04$, $F(1, 378) = .90$, $p > .05$, were not significant in the amount of variance for which they accounted.

Discussion

Suicide can be conceptualized as an inability to adapt to life's demands. Results from these two studies indicate that high negative life stress and self-appraised ineffective problem solving are associated with higher levels of hopelessness and suicide ideation. More specifically, individuals under higher levels of stress reported significantly more hopelessness and suicidal thoughts than individuals under lower levels of stress. Likewise, self-appraised ineffective problem solvers reported significantly more hopelessness and more suicidal thoughts than self-appraised effective problem solvers. Our results suggest that difficulty in adapting to life's demands, as reflected in hopelessness and suicide ideation, is not only a function of the demands or stressors (specifically, negative life events) but also a function of the perceived problem-solving ability (i.e., a particular resource) that the individual brings to his or her responses to stressors. Thus, this study provides additional support for the role of problem solving within the stress–diathesis–hopelessness model of suicidal behavior. Moreover, this study extends previous research on the stress–diathesis–hopelessness model, which found individuals deficient in problem-solving skills to be at an increased risk for suicidal behavior. Problem-solving appraisal, apart from or in addition to actual problem-solving skill, appears to be an important variable in hopelessness and suicide ideation, as considered within Schotte and Clum's (1982, 1987) model.

It is important to note that problem-solving appraisal accounted for 1.4% of the variance in suicide ideation and 15.2% of the variance in hopelessness. Thus, problem-solving appraisal accounts for a substantial amount of variance in predicting hopelessness, which is the leading predictor of suicide. However, problem-solving appraisal accounts for a statistically significant but small amount of variance in predicting suicide ideation. These results might be a function of the very skewed SSI responses in our sample, or they might be indicative of more complex relations among these and other variables in the stress–diathesis–hopelessness model. Perhaps, in accordance with Schotte and Clum's model, problem solving influences suicidal behavior mainly through its impact on hopelessness.

It is also important to note that the pattern of results found in Study 2 replicates the pattern of results found in Study 1. Negative life stress and perceived ineffective problem solving were independently associated with increases in suicide ideation and hopelessness. There was not a significant Problem Solving × Stress interaction in either study. These findings are in contrast to the research on depression of Nezu and his colleagues, which involved somewhat older samples of college students (*M*s = 23 years, 26 years). These studies have shown a Problem Solving × Stress interaction such that problem solving acts as a moderator of stress-related depressive symptoms (see Nezu et al. 1986; Nezu & Ronan, 1988). Apparently, self-appraised problem-solving ability serves to moderate the effects of stress on some measures of negative affect (i.e., depression) but not on others (i.e., hopelessness and suicidal thoughts).

Of the PSI problem-solving appraisal factors (Problem-Solving Confidence, Approach–Avoidance Style, and Personal Control), the Problem-Solving Confidence factor was the most strongly related to suicide ideation and hopelessness. Thus, an evaluation of one's problem-solving confidence without reference to particular problems, which represents a global level of self-efficacy (Heppner, 1988), may reflect a general resiliency that is an important resource in coping with hopelessness and suicide.

Although the results of this study indicate a relationship between problem solving, stress, and hopelessness, as well as a relationship between problem solving, stress, and suicide ideation, various methodological considerations limit the generalizability of interpretations. First, because of the correlational nature of this study, cause and effect relationships are impossible to determine. Thus, suicide ideation and hopelessness may result in increased stress and self-appraised ineffective problem solving, as opposed to stress and self-appraised ineffective problem solving resulting in suicide ideation and hopelessness. Second, whether these results would generalize to a clinical population is not clear. Because suicide is a growing concern in college populations, the generalizability to college student populations is important, in and of itself. Third, suicide ideation and hopelessness were very positively skewed in our data set, making it difficult to obtain substantial estimates of variance in these variables. This reduced the power of our statistical tests and probably underestimated the magnitude of the various relationships; additional research examining these variables with more disturbed samples is needed.

Despite these limitations, the findings of this investigation have implications for future research and treatment interventions. Previous research has implicated a relationship between problem-solving skills and both hopelessness and suicidal thoughts. The present investigation expands upon this research by examining the role of perceived problem-solving ability. Although causal relationships are unclear, interventions for suicide prevention may need not only to focus on alleviating stressors but also to include attention to problem solving and perhaps even problem-solving training. Moreover, our results suggest that such training may need to focus on clients' perceptions or appraisals of their problem-solving ability (especially problem-solving confidence) as well as actual problem-solving skills. In addition, because stress and perceived ineffective problem solving appear to independently increase the risk for hopelessness and suicide ideation, counseling strategies may need to be multimodal and individualized in nature. For some clients problem-solving training may be helpful; for others a stress-management strategy may be more appropriate; and for still others a combination of these two therapies may be most beneficial. Clearly, continued attention to both problem-solving appraisal and stress is warranted within Schotte and Clum's stress–diathesis–hopelessness model as well as within counseling interventions for suicidal behavior.

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