Journal of Psychopathology and Behavioral Assessment, Vol. 15, No. 3, 1993

The Problem-Solving Diathesis in Depression, Hopelessness, and Suicide Ideation: A Longitudinal Analysis

Michael J. Priester[1] and George A. Clum[1,2]

Accepted: July 19, 1993

The problem-solving deficit (PSD) diathesis-stress model of suicide behavior proposed by Clum, Patsiokas, and Luscomb (1979) and expanded by Schotte and Clum (1982, 1987) was examined in a short-term longitudinal test. The present study assessed the relationship between problem-solving deficits at Time 1—prior to the stressor (a D or F on a midterm examination)—and adjustment at Time 2—after the stressor. Evidence was found for an additive predictive relationship for stress and problem-solving deficits to Time 2 measures of depressive symptoms, hopelessness, and suicide ideation. Evidence was also found that PSD × Stress interactions uniquely predicted the three criteria. The results of this study were taken as evidence of problem-solving deficits functioning as a diathesis for depression, hopelessness, and suicide ideation.

KEY WORDS: depression; hopelessness; suicide ideation; longitudinal analysis.

INTRODUCTION

Intrapersonal factors that mediate response to stress have been the object of a variety of research investigations. Cognitive factors that mediate this response have included coping responses (Folkman & Lazarus, 1986), attributional style (Abramson, Metalsky, & Alloy, 1989), and interpersonal problem-solving abilities (Nezu, Kalmar, Ronan, & Clavijo, 1986) among

[1]Department of Psychology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0436.
[2]To whom correspondence should be addressed.

0882-2689/93/0900-0239$07.00/0

others. Links between problem-solving, stress, and adjustment are based on the idea that stress produces demands on the individual which require resolution and/or adaptation. Individuals with well-developed problem-solving skills respond to stressors in ways which reduce their impact and which at times may alter the stressor itself, thus improving subsequent adjustment. Conversely, individuals with poor problem-solving skills react poorly to stressors, fail to resolve them effectively, and respond with consequent depression. Recently, several researchers (Schotte & Clum, 1982, 1987; Spirito, Overholser, & Stark, 1989) have begun to demonstrate how problem-solving mediates the relationship between stress and depression, hopelessness and suicide ideation. To date, these demonstrations have attested to the concurrent validity of problem-solving deficits in differentiating poor and good responders to stress, defined as a score on a life events inventory. The present study expands this knowledge base by addressing the question of whether a relatively minor stressor — a poor grade on a psychology exam — would affect changes in depression, hopelessness, and suicide ideation. It further assessed whether specific problem-solving deficits predict post-stressor adjustment and whether problem-solving deficits mediate response to a stressor.

Research into the mediating effects of problem-solving on the relationship between stress and adjustment developed out of the problem-solving model of D'Zurilla and Goldfried (1971), who postulated that the problem-solving process involved several steps: (1) a set to view life stress as problems to be solved, (2) problem identification, (3) generation of alternative solutions to the problem, (4) identification of positive and negative consequences associated with alternatives, and (5) selection and implementation of an identified alternative as a means to solve the problem. Parallel to the development of this model, Platt and Spivack (1972) developed the Means-Ends Problem-Solving (MEPS) measure, an instrument devised to assess one aspect of problem-solving, the ability to generate relevant alternatives to a set of contrived problems. Schotte and Clum (1987) expanded the investigation of problem-solving deficits, consistent with the D'Zurilla and Goldfried model, by devising the Modified MEPS (MMEPS). In addition to assessing the ability to generate alternative solutions to problems, the MMEPS also assessed (1) ability to identify problems, (2) ability to engage in the process of evaluating identified alternatives, and (3) perceived ability to carry out the solution. Schotte and Clum subsequently assessed the impact of these deficits on a group of hospitalized suicidal psychiatric patients who, compared to a group of non-suicidal patients, were found to generate fewer alternative solutions to interpersonal problems and more frequently perceived negative consequences to proposed solutions and believed themselves unable to carry out

identified solutions. The present study, therefore, also utilized a problem-solving measure, the MMEPS, which assessed aspects of the problem-solving process thought most likely to mediate response to the stressor of a poor exam grade.

In addition to assessing more completely the entire problem-solving process, the MMEPS has another advantage over the MEPS; rather than using contrived hypothetical problems and solutions to assess problem-solving skills, it is adaptable to any idiosyncratic problem. The ability of an individual to deal with specific problems can therefore be assessed. In the present study, we asked subjects to problem-solve their response to obtaining a poor grade on an introductory psychology exam prior to obtaining such a grade. Problem-solving deficits regarding this specific stressor were expected to predict response to this stressor.

Finally, as mentioned earlier, few studies have assessed the relationship of problem-solving deficits, stress and adjustment in a longitudinal design. Only one (Schotte, Cools, & Payvar, 1990) has used a longitudinal approach to evaluate problem-solving in relation to suicide behavior. One other recent study (D'Zurilla & Sheedy, 1991) used the Social Problem-Solving Inventory (SPSI) to predict general psychological distress in a longitudinal model, essentially concluding that orientation to problem-solving was a more important predictor of distress than perceived problem-solving skills. More typically, studies have assessed the level of stress that the subjects have undergone concurrently with measuring problem-solving ability, depression, hopelessness, and suicidal ideation. This procedure complicates the interpretation of the results such that it is impossible to determine whether depression, suicidal ideation, and hopelessness lower problem-solving ability or, alternately, problem-solving deficits lead to depression, hopelessness and suicidal ideation. Schotte *et al.* (1990) concluded that problem-solving ability was not a trait phenomenon but, rather, fluctuated with changes in the level of distress. Thus, subjects who were admitted to the psychiatric ward of a general hospital had poor problem-solving ability as well as high levels of depression, hopelessness, and suicide ideation shortly after admission. Approximately a week later, their scores on these dependent measures had improved greatly, while their problem-solving ability (relevant means on the MEPS) had also improved. The authors concluded that problem-solving skills fluctuate as a function of levels of psychological distress. Interestingly, subscores of irrelevant means and obstacles on the MEPS did not change over time in the Schotte *et al.* study, though a prior study (Schotte & Clum, 1987) had demonstrated their importance to suicidal behavior. The Schotte *et al.* (1990) study is important because it casts doubt on the premise that problem-solving deficits are a diathesis to depression, hopelessness, and suicide behavior. It is possible,

of course, that problem-solving deficits become apparent under stress in a subset of individuals who are then at risk for the aforementioned negative consequences. The present study afforded an examination of whether problem-solving deficits, extant prior to a stressor, affected adjustment subsequent to the stressor.

To summarize, to address some of the issues raised by previous research, we designed a short-term longitudinal study in which the problem-solving measure was assessed prior to the stressor. We controlled for level of the dependent variables by measuring each of them prior to the stressor and including them first in hierarchical regression analyses. In addition, we employed a version of the MMEPS scale to assess problem-solving ability for the specific problem of dealing with a poor grade. Finally, we explored several different types of problem-solving deficits consistent with the D'Zurilla and Goldfried (1971) model.

The following hypotheses were forwarded. (1) Problem-solving deficits measured at Time 1 will be predictive of measures of depressive symptoms, hopelessness, and suicidal ideation at Time 2. Consistent with the model of D'Zurilla and Goldfried, these deficits will include inability to generate alternative solutions, the generation of irrelevant solutions, increased number of perceived negative consequences of solutions, decreased number of perceived positive consequences of identified solutions, and perceived failure of identified solutions. These deficits are predicted from the model forwarded by Schotte and Clum (1987). (2) Problem-solving deficits at Time 1 will contribute uniquely to the prediction of Time 2 depressive symptoms, hopelessness, and suicide ideation when examined using hierarchical regression models controlling for Time 1 levels of the dependent measures. (3) Problem-solving deficits will interact with the stressor to uniquely predict Time 2 scores on the criterion variables when examined using hierarchical regression models.

METHOD

Subjects

Male and female college freshmen were recruited through the Introductory Psychology student pool at Virginia Polytechnic Institute and State University under the announcement for a study concerning students' reactions to stress. Subjects were recruited during both fall and spring terms and were given four extra credit points for their participation. A total of 339 subjects signed up to participate in this study (180 fall term, 159 spring term). Of this number, 322 came to at least one of the assessment sessions.

Two hundred eighty-two subjects completed all of the assessment measures, with the material from the remaining 40 subjects incomplete, incorrectly filled out, or lacking identifying information for analyses. The majority of these *S*'s ($n = 21$) failed to return for the second assessment period and could not be reached or no longer wished to participate in the study. An additional group of 17 *S*'s failed to appear for their scheduled first session. Data from the remaining subjects were discarded because of incomplete or incorrectly completed forms. Using mean scores on each of the preexam criterion measures, subjects who did not complete the second assessment were compared to S's who completed both assessments. No difference was found between the two groups on any of the three dependent measures (BDI $t = 1.29$, $p > .05$; BHS $t = .56$, $p > .05$; MSSI $t = .50$, $p > .05$). Of the 282 subjects who completed all assessment data, 64 received a grade of D or F on the exam, which served as the stressor.

Procedure

After the potential subjects signed up to participate in the study, they were screened to insure that they were all in Introductory Psychology and were all freshmen who had not previously taken the course. This was done to increase the likelihood that a failed test would be considered stressful.

The subjects were evaluated in groups of 20–30 people each. Subjects attended two sessions (one before the exam — Time 1; one afterward — Time 2), each of which lasted approximately 1.75 hr. The preexam sessions were held 6 to 8 days before the exam, and the posttest assessments were held 2 to 8 days after the exam was taken.

Subjects assessed in the fall and spring terms were compared on their scores for depressive symptoms using the Beck Depression Inventory (BDI), hopelessness using the Beck Hopelessness Scale (BHS), and suicidal ideation using the Modified Scale for Suicide Ideation (MSSI). No significant differences were found (BDI $t = 0.97$, $p > .05$; BHS $t = 0.56$, $p > .05$; MSSI $t = 0.44$, $p > .05$). Accordingly, we felt justified in combining both groups for further analyses. Because subjects were evaluated from as few as 2 days after the exam to as many as 8 days after the exam, correlations were computed between the number of days post-exam and scores on the BDI, BHS, and MSSI. No significant correlations were found (BDI $r = -.10$, $p > .05$; BHS $r = -.04$, $p > .05$; MSSI $r = -.06$, $p > .05$). These nonsignificant correlations indicated that no relationship existed between scores on the criteria measures and time from the stressor to the poststress assessment.

After the subjects were screened to ensure their eligibility, they were given instructions to fill out, in the order indicated, the consent form, the BDI, the BHS, the MSSI, and the Modified MEPS (MMEPS).

At the Time 2 assessment, exam grades were posted in the group testing room by student ID number to insure that individuals knew their test score. All of the subjects were asked to code their test score on a 5-point scale (F = 5, D = 4, C = 3, B = 2, A = 1) on their opscan sheets. The BDI, BHS, and MSSI were then readministered. At the end of each assessment period the scores on the BDI, BHS, and MSSI were reviewed; anyone with significantly elevated scores on any of these instruments (cutting scores: BDI=6; BHS=6; MSSI=4) was contacted, briefly interviewed, and given referrals for counseling. All subjects who were interested in the hypotheses of the study were informed of them after the postexam session.

Criterion Measures

Beck Depression Inventory (BDI; Beck, 1967). This is a 21-item questionnaire which measures cognitive, somatic, and behavioral indices of depression. Each item is scored from 0 to 3, with higher scores indicating more serious depressive symptoms; the range of scores is 0 to 63. The inventory shows good internal consistency (alpha coefficient = .86) and has been shown to have a good construct validity within a university population (Oliver & Burkham, 1979).

Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974). This is a 20-item scale which measures the extent of negative expectations regarding the future and pessimism. Items are in a true–false format and are scored (1 or 0) in the positive direction. Half of the items are reversed. The range of possible scores is 0 to 20, with higher scores indicating higher levels of hopelessness. The BHS has been shown to have high levels of internal consistency (KR-20 = .93). Its predictive validity of eventual suicide has been well-documented (Beck, Steer, Kovacs, & Garrison, 1985).

Modified Scales for Suicidal Ideation (MSSI; Miller, Norman, Bishop, & Dow, 1986). This 18-item instrument was modified from the Beck, Kovacs, and Weissman (1979) inventory for use as a self-report instrument to assess the extent of suicidal ideation and intent. Its scores have been shown to be correlated with administered versions of the interview form of the Scale for Suicide Ideation (SSI). The MSSI has been found to have high internal consistency reliability (coefficient alpha = .94) as well as satisfactory levels of concurrent discriminant and construct validity (Miller *et al.*, 1986).

Problem-Solving Measures

Modified Means-End Problem-Solving Scale (MMEPS). The MMEPS is a specially modified instrument to assess problem-solving skills in dealing with a poor academic grade. The adaptation of the MMEPS used in the present study is similar to a scale developed by Schotte and Clum (1987). In the form used in the present study, the presenting problem and outcome were furnished as follows: (problem) "You have failed your first Introductory Psychology test"; (outcome) "You end up feeling OK about your performance." This framework permits individuals to deal with the problem of a poor test grade by identifying strategies for improving their grade (problem-focused solution) and/or dealing with the negative emotional response to a poor grade (emotion-focused solution). We decided to use this particular solution format rather than, e.g., "You end up doing well in the course" to give students a broader selection of possible solutions and to force them to identify the type of solution (problem- vs emotion-oriented) on their own. From this instrument, several scores were obtained, with the problem-solving construct from the D'Zurilla and Goldfried (1971) model being assessed noted in parentheses: number of relevant means (ability to generate appropriate alternative solutions), number of irrelevant means (deficit in ability to generate appropriate alternative solutions), average number of pros and cons for each mean (ability to evaluate alternatives and tendency to emphasize negative vs positive outcomes for identified solutions), and average probability of success attributed to each identified mean (selection and identification of alternatives). The relevancy of solutions provided to the presented problem requires a subjective judgment. Accordingly, interrater reliability was computed for the present study. The first author scored all of the inventories (blind to all subject factors) for relevancy/irrelevancy. A correlation was then computed between the investigator's ratings and a trained, independent rater's ratings of a subset of 20 MMEPS, randomly selected by the independent rater. This yielded moderate interrater reliabilities [relevant means, $r(20) = .76$, $p = .0001$; and irrelevant means, $r(20) = .57$, $p = .009$] for the two problem-solving measures that required clinical judgment.

RESULTS

Design of Study and Outline of Analyses

The data were examined in a three-step process. First, correlations among and between each of the predictor measures at Time 1 and each

Table I. Correlations Among and Between Measures of Problem-Solving and Stress at Time 1 and Depression, Hopelessness, and Suicide Ideation at Time 2

	TOT	PROB	RM	IM	Pros	Cons	Test score	BDI	BHS
Time 1 assessment									
Total No. means (TOC)									
Probability of success (PROB)	−.14**								
Relevant means (RM)	.45***	−.10							
Irrelevant means (IM)	.57***	−.03	−.43***						
Pros	.03	.22***	.07	.00					
Cons	.23***	−23.***	.15***	.14**	.13*				
Test score	−.04	−.26***	−.26***	.18**	−.08	−.08			
Time 2 assessment									
BDI	−.01	−.05	−.23***	.20**	.02	.04	.25***		
BHS	.01	−.21***	−.21**	.18**	.00	−.03	.17**	.71***	
MSSI	−.08	−.27***	−.27***	.16**	.02	.10	.18**	.59***	.50***

*$p < .05$.
**$p < .01$.
***$p < .002$

of the criteria measures at Time 2 were computed. These results are given in Table I. Second, hierarchical multiple-regression analyses were done to test the unique contribution of the predictor variables at Time 1 (main effects) to each of the criterion measures at Time 2 after first entering Time 1 scores on the dependent variables and stressor (see Table II). These hierarchical regression analyses were generated in a two-step process: (1) in step 1, the Time 1 score on the dependent variable and the stressor were entered first; (2) in step 2, problem-solving measures were entered in a stepwise fashion. Then a second set of hierarchical regression analyses was conducted to test the interactions of problem-solving deficits by stress. These hierarchical regression analyses were generated in a two-step process: (a) in step 1, Time 1 score on dependent variable, the stressor and the problem-solving deficits were entered first; and (b) in step 2; the problem-solving × stress interactions were entered in a stepwise fashion. These two sets of regression analyses permitted the assessment of the predictive validity of stress and problem-solving measures as main effects and then the relationship of the interaction of problem-solving/stress to the criterion measures.

Problem-Solving Model

As shown in Table I, the measure of stress and two of the six problem-solving measures — relevant means and irrelevant means — were correlated with each of the criteria. In addition, the "probability of success" associated with the generated alternatives predicted hopelessness and suicide ideation but not symptoms of depression. Further, with the exception of a moderate correlation between relevant and irrelevant means, the correlations among problem-solving measures are low or nonsignificant.

The results of the first set of hierarchical regression analyses to all three adjustment criteria are summarized in Table II. Score on the criterion measure of interest and level of the stressor were entered as predictors in Step 1. Problem-solving measures were entered at Step 2, including total number of means, number of relevant means, number of irrelevant means, probability of success, and number of pros and number of cons. Throughout the analyses an alpha level of .15 was used as the criterion for a predictor variable to be entered into the regression equation, and an alpha level of .05 was needed for the variable to remain in the equation.

As Table II shows, the number of relevant alternatives and the number of irrelevant alternatives identified at Time 1 both significantly predict levels of depressive symptoms and hopelessness at Time 2. Further, the number of relevant alternatives and the average number of negative con-

Table II. Hierarchical Regression Analyses Examining Stepwise Contribution of Problem-Solving Measures at Time 1 to Depression, Hopelessness, and Suicide Ideation at Time 2

Predictor variable	Partial R^2	F
Criterion = Time 2 depression		
Time 1 depression	.68	220.90****
Level of stress	.68	14.80****
Relevant alternatives	.72	42.25****
Irrelevant alternatives	.73	5.43*
Criterion = Time 2 hopelessness		
Time 1 hopelessness	.72	291.51****
Level of stress	.72	19.10***
Relevant alternatives	.74	25.80****
Irrelevant alternatives	.75	6.96**
Criterion = Time 2 suicide ideation		
Time 1 suicide ideation	.48	168.90****
Level of stress	.48	12.90***
Relevant alternatives	.49	13.20***
Number of cons	.51	8.40**

*$p < .05$.
**$p < .01$.
***$p < .001$.
****$p < .0001$.

sequences (Cons) at Time 1 both significantly and uniquely predict level of suicide ideation at Time 2.

We next examined interactions of problem-solving deficits × stress to each of the three criteria using hierarchical regression analyses. Table III summarizes these analyses. As can be seen, both irrelevant alternatives × stress and total alternatives × stress emerged as significant predictors of depressive symptoms. Further, number of relevant alternatives × stress and number of cons × stress emerged as significant predictors of both hopelessness and suicide ideation.

The nature of these interactions was further explored by dividing the sample at the median for each problem-solving measure found significant in the regression analyses, cross-tabulating them with stressor scores (D or F vs. A, B, or C), and computing *n*'s and standard deviations on the dependent measures for each cell. These results are shown in Table IV. It should be noted that only the data pertaining to interactions found to be significant in the preceding multiple regressions are shown. As shown, the expected interaction between stress and irrelevant alternatives emerged for

Table III. Hierarchical Regression Analyses Examining Interactions of Problem-Solving Measures at Time 1 with Stress to Depression, Hopelessness, and Suicide Ideation at Time 2

Predictor variable	Partial R^2	F
Criterion = Time 2 depression		
Time 1 depression	.73	282.60****
Level of stress	.73	25.00***
Relevant alternatives	.73	0.01
Irrelevant alternatives	.73	3.96*
Total alternatives	.73	1.72
Probability of success	.73	2.58
Number of pros	.73	0.01
Number of cons	.73	0.06
Irrelevant alternatives × stress	.74	13.27***
Total alternatives × stress	.75	5.77*
Criterion = Time 2 hopelessness		
Time 1 hopelessness	.75	331.73****
Level of stress	.75	12.51***
Relevant alternatives	.75	0.45
Irrelevant alternatives	.75	1.18
Total alternatives	.75	0.06
Probability of success	.75	0.02
Number of pros	.75	0.09
Number of cons	.75	1.92
Relevant alternarives × stress	.76	11.48***
Number of cons × stress	.77	5.29*
Criterion = Time 2 suicide ideation		
Time 1 suicide ideation	.51	156.46****
Level of stress	.51	3.81*
Relevant alternatives	.51	0.53
Irrelevanbt alternatives	.51	0.06
Total alternatives	.51	0.02
Probability of success	.51	0.06
Number of pros	.51	0.32
Number of cons	.51	5.57*
Relevant alternatives × stress	.53	13.71***
Number of cons × stress	.54	8.39**

*$p < .05$.
**$p < .01$.
***$p < .001$.

depression. Less clear was the interaction of total number of alternatives and stress with regard to depressive symptoms. The expected direction of interaction for number of relevant alternatives × stress and Cons × stress emerged for both hopelessness and suicide ideation.

Table IV. Means and Standard Deviations on Dependent Measures at Prestress and Poststress for Students Dichotomized by Level of Stress and Problemn-Solving Deficit Scores

	Depression					Hopelessness				Suicide ideation			
	Prestress		Poststress			Prestress		Poststress		Prestress		Poststress	
Measure	M	SD	M	SD	Measure	M	SD	M	SD	M	SD	M	SD
Low stress					Low stress								
High Tot alt	5.02	4.16	4.11	4.92	High Rel Alt	2.63	2.62	1.74	1.70	1.69	3.40	0.91	1.27
Low Tot Alt	5.09	4.60	3.47	4.27	Low Rel Alt	2.92	2.81	2.68	3.03	1.44	2.53	1.25	2.36
High stress					High stress								
High Tot alt	4.13	4.70	6.93	6.90	High Rel Alt	3.20	3.55	3.20	3.74	1.10	1.29	0.50	0.71
Low Tot Alt	4.27	4.97	6.69	7.72	Low Rel Alt	1.70	1.93	3.19	3.88	2.96	7.42	2.94	6.66
Low stress					Low stress								
High Irrel Alt	5.08	4.07	4.20	4.93	High Cons	2.69	2.54	2.38	2.81	1.51	2.57	1.66	3.04
Low Irrel Alt	5.06	4.66	3.39	4.23	Low Cons	2.96	2.89	2.60	2.92	1.46	2.74	0.97	1.66
High stress					High stress								
High Irrel Alt	4.90	5.09	9.58	8.36	High Cons	2.27	2.63	3.47	4.56	2.87	6.46	4.00	9.38
Low Irrel Alt	3.61	4.66	4.09	5.29	Low Cons	1.84	2.19	3.10	3.62	2.67	7.04	2.12	4.86

DISCUSSION

The results obtained in the present study generally support the principle hypotheses. That is, problem-solving deficits both alone and in interaction with level of stress, predict symptoms of depression, hopelessness, and suicidal ideation. The several measures of problem-solving assessed by the MMEPS appear to be measuring different aspects of the problem-solving process. This was suggested by both the low correlations among these measures and their unique contributions to the three criteria.

Several caveats apply to the results of this study. First, the present study is an analogue examination of the hypotheses. As such, we do not know if they would generalize to clinical levels of depression, hopelessness, and suicidal ideation. Second, the naturalistic stressor used in this study was a mild one. While we might expect that problem-solving deficits would mediate the effects of a more severe stressor, it is possible that the effects of such a stressor would directly affect adjustment, regardless of the level of problem-solving deficits. Third, the relatively low interrater reliability of irrelevant means may affect the reproducibility of these results in other future studies.

While the results generally support the hypothesis that problem-solving deficits as measured by the MMEPS interact with stress to predict the criteria measures, not all aspects of problem-solving were important in predicting all criteria. The pattern of predictive relationships appeared to be most similar for the criteria of hopelessness and suicide ideation, while the pattern was somewhat different in predicting symptoms of depression. In predicting hopelessness and suicide ideation, the number of negative consequences linked to identified alternatives interacted with the test score measure of stress, as has been previously reported by Schotte and Clum (1987). These authors hypothesized that the high number of Cons for suicide ideators was due to the "Yes, but . . ." attitude that was common to these individuals. Interestingly, as a main effect, the number of Cons was unrelated to any of the three criteria. Only for those individuals who received a poor test score did the number of Cons become important. This finding suggests that individuals who can think only of negative consequences for their identified solutions of dealing with a failing grade develop hopelessness and suicide ideation when they in fact do poorly on a test. This mental set may prevent them from implementing alternative strategies. The number of Cons was unrelated to the prediction of depression either alone or in interaction with stress. This unexpected finding suggests that the perception of negative consequences for identified alternatives interacts with stress to predict hopelessness and suicide thinking but does not accomplish this via the mediator of depressive symptoms. This unique finding

may be idiosyncratic to the present study but certainly bears evaluation in future studies. Another aspect of problem-solving, number of relevant identified solutions, interacted with test score to predict hopelessness and suicidal ideation. Thus, individuals whose solutions were judged relevant to solving the problem of receiving a poor test grade were less likely to become hopeless and depressed if they obtained a poor test grade. Symptoms of depression were more likely to follow a poor test grade for individuals with a high number of irrelevant solutions.

The fact that different problem-solving variables were predictive of hopelessness and suicide ideation than were predictive of depressive symptoms emphasizes the importance of measuring all phases of problem-solving ability and suggests that specific deficits in problem-solving lead to specific psychological dysfunctions. There was evidence in the present study that some problem-solving deficits are important predictors of adjustment independent of their interaction with stress. Apparently, if problem-solving deficits are profound enough, they can lead to increased suicidal ideation regardless of stress levels. More specifically, individuals who generate fewer relevant solutions are more vulnerable to all these adjustment measures. Individuals who generate more frequent irrelevant solutions are more vulnerable to symptoms of depression and hopelessness, while individuals who anticipate more negative consequences for their defined solutions are more likely to experience suicide ideation.

What of the question of whether or not problem-solving deficits are a diathesis or simply covary with depressive symptoms, hopelessness, and suicidal ideation? The answer to this question is important inasmuch as the identification of individuals "at risk" for suicide behavior is only possible if problem-solving deficits antedate such behavior. The recent study by Schotte *et al.* (1990) casts doubt on the notion that problem-solving deficits antedate suicidal behavior and therefore challenges whether such deficits are part of an etiological chain for suicide behavior. The present study, however, lends support to the interpretation that problem-solving deficits act as diatheses. Several factors point to this conclusion. First, problem-solving deficits were assessed prior to the naturalistic stressor. Second, prestress measures of the dependent variables were entered first into the regression equation, yet the stressor interacted with problem-solving deficits above and beyond that contributed by the initial level of each dependent variable. Finally, a close examination of the results of the Schotte *et al.* (1990) study indicates that the number of irrelevant means and the number of obstacles (roughly equivalent to the Cons measure in the present study) did not, in fact, covary with improvements over the course of hospitalization. Since the number of Cons was a consistently important diathesis in the present study, it is likely that this problem-solving deficit acts more like

a trait measure than a state measure for this subpopulation. It is possible that the number of relevant means, the variation that changed most in the Schotte *et al.* (1991) study, reflects not only problem-solving ability, but also level of motivation. Thus the MEPS which assesses problem-solving by requiring the subject to compose stories and then totals the number of means identified in arriving at a goal may be confounded by motivational factors. The less depressed an individual is, the more likely it is that the stories would increase in length and concomitantly produce an increase in means to the goal. A measure such as the number of irrelevant means—linked to symptoms of depression in the present study—or the number of perceived obstacles may reflect more enduring problem-solving deficits. Future studies will need to examine alternative explanations. Further studies also need to be accomplished which extend the duration between the assessment of the problem-solving deficits and both the stressor and the dependent measures before we can feel safe in concluding that some deficits in problem-solving are more chronic in this population.

REFERENCES

Abramson, L. Y., Metalsky, G.L., & Alloy, L. B. (1989). Hopelessness depression: A theory based on subtype of depression. *Psychological Review, 96,* 358-372.

Beck, A. (1967). *Depression: Clinical, experimental, and theoretical aspects.* New York: P. B. Hoeber.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology, 42,* 862-865.

Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry, 142,* 559-563.

Clum, G. A., Patsiokas, A. T., & Luscomb, R. L. (1979). Empirically based comprehensive treatment program for parasuicide. *Journal of Consulting and Clinical Psychology, 47,* 937-945.

D'Zurilla, T. J., & Goldfried, M. R. (1971). Problem-solving and behavior modification. *Journal of Abnormal Psychology, 88,* 107-126.

D'Zurilla, T. J., & Sheedy, C. F. (1991). Relations between social problem-solving ability and subsequent lack of psychological stress in college students. *Journal of Personality and Social Psychology, 61,* 841-846.

Folkman, S. L., & Lazarus, R. S. (1986). Stress processes and depressive symptomatology. *Journal of Abnormal Psychology, 85,* 107-113.

Miller, I. W., Norman, W. H Bishop, S. B., & Dow, M. G. (1986). The Modified Scale for Suicidal Ideation: Reliability and validity. *Journal of Consulting and Clinical Psychology, 5,* 724-725.

Nezu, A. M., Kalmar, K., Ronan, G. F., & Clavijo, A. (1986). Attributional correlates of depression: An interactional model including problem solving. *Behavior Therapy, 17,* 50-56.

Oliver, J. M., & Burkham, R. (1979). Depression in university students: Duration, relation to calendar time, prevalence, and demographic correlates. *Journal of Abnormal Psychology, 88,* 667-670.

Platt, J. J., & Spivack, G. (1972). Problem-solving thinking of psychiatric patients. *Journal of Consulting and Clinical Psychology, 39,* 148-151.

Schotte, D. E., & Clum, G. A. (1982). Suicide ideation in a college population: A test of a model. *Journal of Consulting and Clinical Psychology, 50,* 690-696.

Schotte, D. E., & Clum, G. A. (1987). Problem-solving skills in suicidal psychiatric patients. *Journal of Consulting and Clinical Psychology, 55,* 49-54.

Schotte, D. E., Cools, J., & Payvar, S. (1990). Problem-solving deficits in suicidal patients: Trait vulnerability or state phenomenon? *Journal of Consulting and Clinical Psychology, 58,* 562-564.

Spirito, A., Overholser, J., & Stark, L. J. (1989). Common problems and coping strategies. II. Findings with adolescent suicide attempters. *Journal of Abnormal Child Psychology, 17,* 213-221.