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Active and Passive Problem Solving as Moderators of the Relation Between Negative Life Event Stress and Suicidal Ideation Among Suicide Attempters and Non-Attempters

Wendy P. Linda ^a, Brett Marroquín ^b & Regina Miranda ^c

^a Department of Psychology, Hunter College, City University of New York, New York, New York, USA

^b Department of Psychology, Yale University, New Haven, Connecticut, USA

^c Department of Psychology, Hunter College and The Graduate Center, City University of New York, New York, New York, USA

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Active and Passive Problem Solving as Moderators of the Relation Between Negative Life Event Stress and Suicidal Ideation Among Suicide Attempters and Non-Attempters

Wendy P. Linda, Brett Marroquín, and Regina Miranda

This study examined whether active problem solving would buffer against, whereas passive problem solving would exacerbate, the association of negative life stress with suicidal ideation. Young adult college students (73 females, $M_{age} = 19.0$) from a diverse urban public university, with ($n = 37$) and without ($n = 59$) a suicide attempt history completed measures of life stress, problem solving, hopelessness, depression, and suicidal ideation. Hierarchical linear regressions were conducted to test moderating roles of active and passive problem solving, along with suicide attempt history, on the relation between negative life event stress and suicidal ideation. There was a weaker relation between life stress and suicidal ideation at high and average levels of relevant problem solving than at low levels, and this was the case primarily for suicide attempters but not for non-attempters. Individuals with a past attempt produced more passive solutions than non-attempters, but among attempters, even passive problem solving buffered the association of life stress with suicidal ideation. Relevant problem solving in the face of life stress may be especially important for individuals vulnerable to suicidal ideation due to an attempt history. Among such at-risk individuals, generating even passive solutions in the face of life stress may be more adaptive than generating few solutions. Thus, clinical interventions with suicide attempters that focus on generating solutions to problems, even if these are initially passive, may help mitigate the effect of life stress on suicidal ideation.

Keywords life events, problem solving, suicide attempts, suicidal ideation

An improved understanding of the psychological processes that contribute to suicidal behavior will provide mental health professionals with valuable criteria for identifying

individuals at risk, and contribute to the development of effective suicide prevention and intervention strategies. Research on cognitive factors that contribute to

suicidality suggests that social problem solving skills, understood as the cognitive, emotional, and behavioral processes used to generate effective coping responses to stressors (D’Zurilla & Nezu, 1990), may interact with variables such as negative life stress to impact suicidal behavior (e.g., Schotte & Clum, 1982). Ineffective or limited problem-solving strategies may constrain an individual’s ability to react adaptively to negative life events, and thus increase vulnerability to suicidal thinking and behavior. Although both negative life events (Patsiokas, Clum, & Luscomb, 1979) and problem-solving deficits (Sadowski & Kelley, 1993) are associated with suicidal behavior, how the problem-solving approaches of high-risk individuals facing stress differ from those of low-risk individuals is not fully understood. The present study thus seeks to examine the characteristics of problem solving that are associated with suicidal ideation in the context of life stress, as well as to examine whether the role of problem solving differs depending on suicide attempt history.

Problem Solving and Risk for Suicidal Behavior

Problem solving has been operationalized and measured in a number of ways, and there is now convincing evidence that impaired problem solving represents an important vulnerability factor for suicidal ideation. Early investigations focusing on both undergraduate and inpatient populations linked problem-solving performance deficits with suicidal ideation (Schotte & Clum, 1982, 1987). Since then, many investigations of problem solving and suicidality have measured self-appraised problem-solving skills or problem-solving orientation, rather than performance per se. This research has provided strong evidence that self-appraised poor problem solving, and a

negative or avoidant orientation toward problem solving, are both associated with suicidal ideation (Dixon, Heppner, & Anderson, 1991; Dixon, Heppner, & Rudd, 1994; Rudd, Rajab, & Dahm, 1994).

Similarly, individuals with a past suicide attempt have been found to show greater problem-solving deficits than individuals without a history of suicide attempts. Compared with non-psychiatric controls, both suicidal and non-suicidal psychiatric inpatient adolescents reported being less able to generate alternatives, make decisions, and implement solutions during problem solving, but suicidal patients were further distinguished from non-suicidal psychiatric controls by difficulty in initiating problem solving (Sadowski & Kelley, 1993). Moreover, whereas research on suicidal ideation has placed more emphasis on individuals’ appraisals of their own problem-solving abilities, studies of individuals who actually attempt suicide have provided stronger evidence for impairment in objective problem solving performance. A review of 22 studies of social problem-solving deficits and suicidal behavior in adolescents found that the majority of studies pointed to various problem-solving deficits in adolescent suicide attempters relative to both non-suicidal psychiatric and non-psychiatric controls (Speckens & Hawton, 2005). These included not just negative social problem solving orientation and self-appraisal, but also less generative, more passive, and less effective problem solving performance.

Past suicidal behavior, which places individuals at greater risk for future suicidal ideation, may be linked with poor problem solving. However, questions still remain regarding how different types of deficits relate to suicidal behavior, how different types of problem solving interact with environmental factors, and how deficits among attempters contribute to future ideation (Reinecke, 2006). In examining more fine-grained aspects of problem

solving that may increase risk for suicidal behavior, there are indications that the problem solving of suicide attempters may be marked by the generation or implementation of more passive solutions. Pollock and Williams (2004) found that patients with a past suicide attempt not only generated fewer solutions to problems than did psychiatric and non-psychiatric control groups, but their solutions were also more passive (e.g., relied on another person, chance, or the passage of time) than those of non-psychiatric controls (though not compared to psychiatric controls). The authors suggested that passivity—though, perhaps, not unique to suicide attempters—might contribute to suicidal vulnerability, along with more general deficits in solution generation and effectiveness (Pollock & Williams, 1998, 2001, 2004). This conclusion is consistent with evidence that a suicide attempt history is associated with less active problem solving compared to ideation without an attempt history (Linehan, Camper, Chiles et al., 1987), and that passive social problem solving may have a more direct relation to suicide attempts than to suicidal ideation (Dieserud, Røysamb, Ekeberg et al., 2001). Adaptive problem solving is perhaps most called for in the context of negative life events, and if individuals with a past suicide attempt respond to problems in a particularly passive way, this may help specify the internal factors that facilitate suicidal ideation in the face of such “external” events.

Stressful Life Events, Suicidal Ideation, and Suicide Attempts

Cognitive factors such as problem solving likely play important roles in suicide risk, but such vulnerabilities must be considered within the context of situational demands (i.e., problem-solving deficits are less relevant if there are few problems to

be solved). Individuals who make suicide attempts report experiencing more recent negative life events than the general population, suggesting a situational context in which effective problem solving skills would be especially useful. In addition, attempters have been found to experience a greater number of negative life events prior to their attempts than have depressed individuals (without a suicide attempt history) prior to the onset of their depression (Paykel, Prusoff, & Myers, 1975). Furthermore, negative life events—including lesser events, or daily hassles—are associated with hopelessness, and both high levels of stress and negative self-appraisals of social problem solving are associated with hopelessness and suicidal ideation (Dixon, Heppner, & Anderson, 1991).

It thus appears that both situational factors (i.e., life stress) and cognitive factors (i.e., problem solving deficits) are implicated in suicidal ideation and attempts. Schotte, Clum, and colleagues have proposed that life stress interacts with cognitive rigidity to predict hopelessness, and that hopelessness, in turn, leads to suicidal ideation and behavior (Patsiokas, Clum, & Luscomb, 1979; Schotte & Clum, 1982; 1987). This diathesis-stress hopelessness model postulates that individuals who are cognitively rigid encounter difficulty in generating solutions when problem solving is required, and therefore experience difficulty coping with life stressors. Thus, the interaction of poor problem-solving skills and stress leads to a state of helplessness and hopelessness, placing the individual at risk for suicidal behavior. Schotte and Clum (1982) found no differences in problem-solving performance between college students with and without suicidal ideation. Instead, problem-solving deficits interacted with life stress, such that individuals with poorer problem-solving skills who experienced more negative life events reported the highest suicide intent. More recent research on self-appraised problem

solving supports this idea, but also raises the question of whether such a pattern may be attributable to depressive symptoms or hopelessness (Grover, Green, Pettit et al., 2009). Cognitive inflexibility in response to changing external contingencies—such as is required in problem solving—prospectively predicts suicidal ideation among suicide attempters in particular, an effect not simply attributable to hopelessness (Miranda, Gallagher, Bauchner et al., 2012). This recent finding suggests that a more fine-grained understanding of problem solving deficits in their situational context may illuminate cognitive mechanisms through which suicide attempt history confers risk for ideation.

The Present Study

The current study sought to examine more closely, among young adults, whether the active or passive dimension of an individual's interpersonal problem-solving approach would moderate the association of negative life event stress with suicidal ideation, and to examine this role above and beyond symptoms of depression and hopelessness. Based on previous research, we expected that individuals with a past suicide attempt would exhibit more passive problem solving than those without a past attempt. We also predicted that individuals with a previous suicide attempt would report more recent life event stress than individuals without a suicide attempt history.

We furthermore hypothesized that generating a higher number of problem solving alternatives would moderate the association between negative life event stress and suicidal ideation. Support for this hypothesis would be consistent with the notion that problem solving most clearly exerts its protective effects against ideation in the context of life stress. We also predicted, however, that whereas *active*

problem solving would diminish the relation of stress with ideation, *passive* problem solving would strengthen the relation between life stress and suicidal ideation. We furthermore examined these hypotheses among individuals with and without a suicide attempt history, given empirical questions as to how problem-solving deficits among attempters contribute to their unique risk for suicidal ideation. Although we predicted that these hypotheses would hold regardless of attempt history, the literature indicates that individuals with a suicide attempt history may differ substantially from individuals without an attempt history in the relation between problem solving and suicidal ideation (e.g., Dieserud, Røysamb, Ekeberg et al., 2001; Linehan, Camper, Chiles et al., 1987; see also Miranda Gallagher, Bauchner et al., 2012).

METHOD

Participants

Ninety-six college undergraduates (73 female), ages 18–30 ($M = 19.0$, $SD = 2.2$) from a public college in the northeastern United States took part in this study for either \$50 in compensation or for research credit in their introductory psychology course. Self-reported race/ethnicity was 31% Asian, 30% White, 23% Hispanic, 7% Black American/Caribbean, and 8% other ethnicities. Participants were recruited from a sample of 1,011 individuals who had taken part in another study (see Chan, Miranda, & Surrence, 2009; Rajappa, Gallagher, & Miranda, in press). Participants with a suicide attempt history were oversampled ($n = 37$; 36%), relative to the proportion of attempters in the larger sample (about 8%) from which the present one was selected. The final sample, which included 59 individuals without a suicide attempt history and 37 individuals with a

suicide attempt history, provided 80% power to detect differences in means involving a medium-to-large effect size (Lenth, 2006). There were no statistically significant age, gender, and racial/ethnic differences between individuals with and without a suicide attempt history.

Measures

Suicidal Ideation and Attempts. Past history of suicidal behavior was assessed using questions derived from the young adult version of the Diagnostic Interview Schedule for Children (Shaffer, Fisher, Lucas et al., 2000), with suicide attempt history assessed with the question, "Have you ever, in your whole life, tried to kill yourself or made a suicide attempt?" Suicidal ideation was measured using the Beck Scale for Suicidal Ideation (BSS; Beck & Steer, 1991), a 21-item self-report questionnaire assessing wish to die, suicide plans, and access to lethal means. Total ideation is calculated by adding the first 19 items, with scores ranging from 0 to 38. Scores in the present sample ranged from 0 to 14 ($M=1.11$, $SD=2.79$). The BSS has demonstrated strong concurrent validity (correlations $>.90$) with clinician ratings (Beck, Steer, & Ranieri, 1988). Cronbach's alpha for the current sample was .97.

Depressive Symptoms. Depressive symptoms were assessed using the Beck Depression Inventory, 2nd Edition (BDI-II; Beck, Steer, & Brown, 1996). Items assess sadness, anhedonia, and other symptoms of depression, each rated on a scale of 0 to 3. Totals are calculated by summing the 21 items, with a possible range of 0 to 63. The BDI has been found to have strong internal consistency and validity (Beck, Steer, & Brown, 1996). Cronbach's alpha in the current sample was .86. Total scores in the present sample ranged from 0 to 38, with a mean of 12.92 ($SD=8.46$).

Hopelessness. The Beck Hopelessness Scale (BHS; Beck & Steer, 1989) is a 20-item true/false scale that assesses hopeless and negative expectations about the future. Scores can range from 0 to 20 (by totaling all of the items, with some reverse-scored). Higher scores indicate greater hopelessness. This scale has demonstrated strong internal consistency and construct validity (Beck & Steer, 1989). Cronbach's alpha for this measure in the current sample was .87, with scores ranging from 0 to 20 ($M=5.69$, $SD=4.52$).

Negative Life Stress. The Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) was used to measure life stress. The LES is a 60-item measure that assesses the occurrence of various interpersonal and non-interpersonal life events in the past year (e.g., death of a loved one, loss of a job). For each endorsed event, participants rate the impact of the event on a 7-point Likert scale ranging from *extremely negative* (-3) to *extremely positive* ($+3$). The LES has been found to have good test-retest reliability (Sarason, Johnson, & Siegel, 1978). Scores for the impact of negative life events—computed by summing all of the negative ratings and taking the absolute value—ranged from 2 to 45 ($M=14.84$, $SD=9.32$) in the present sample.

Problem Solving. Interpersonal problem solving was assessed using four items from the Means-End Problem-Solving (MEPS) task (Platt & Spivack, 1975). Participants were presented with the beginning and the end of various interpersonal scenarios and were asked to write a paragraph that linked the beginning with the end, where an interpersonal problem was resolved. The four problem scenarios focused on meeting people in a new neighborhood, resolving an argument with a friend, taking a leadership role in a meeting, and resolving an argument with a significant other. Solutions were scored for number

of relevant means, active means, and passive means. Relevant means were defined as discrete steps that directly facilitated the achievement of the desired end or helped overcome an identified obstacle (Platt & Spivack, 1975). Relevant means were further divided into active and passive means. A mean was considered active if it was initiated by the protagonist in the story; it was considered passive if it was initiated by another character, occurred due to fate or chance, or relied on the passage of time for a resolution (Linehan, Camper, Chiles et al., 1987). The coding scheme used was adapted from the work of Lyubomirsky and Nolen-Hoeksema (1995). Participants' solutions were rated by two independent judges (blind to suicide attempt history), with an inter-rater reliability of at least .80 on each of the MEPS variables. The total number of relevant, active, or passive means participants generated across the four scenarios was summed to yield a total score for each type of mean.

Procedure

Participants completed a packet of questionnaires that included the LES and inquiries about whether they had ever made a suicide attempt as part of a larger study of social-cognitive predictors of suicidal ideation and behavior among first- and second-year college students (see Chan, Miranda, & Surrence, 2009). Those who reported a history of a suicide attempt or any suicidal ideation (with or without an attempt history), and gave permission to be contacted, were recruited from the larger study, along with a random sample of participants who did not report ideation or an attempt (see Rajappa, Gallagher, & Miranda, in press).¹

¹Item 9 of the Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999) was used to screen for suicidal ideation in the previous 2 weeks. Seventeen participants without a suicide attempt history endorsed ideation on the PHQ-9.

During a second study session, which took place about 3 weeks later and was run by research assistants with at least a Bachelors degree, participants completed the MEPS, BSS, BHS, and BDI.

Participants who endorsed suicidal ideation with a plan (on the BSS) were asked to speak with a licensed clinical psychologist and, if necessary, were referred or escorted to the college's counseling center. All participants also received a list of local mental health referrals. Study procedures received full Institutional Review Board approval.

Statistical Analysis

Differences between individuals with and without a suicide attempt history were examined via independent samples t-tests, and correlation analyses were conducted to examine the associations among variables separately for individuals with and without a suicide attempt history. To test the hypothesis that problem solving moderates the relation between negative life stress and suicidal ideation, we conducted a series of hierarchical linear regressions with suicidal ideation as the outcome. In each regression, variables were entered in three blocks. In Block 1, life event stress and problem solving (either total relevant means, total passive means, or total active means) were entered into the analysis, adjusting for a suicide attempt history, hopelessness, and symptoms of depression. Two-way interactions between life stress, problem solving, and suicide attempt history were entered in Block 2, and the 3-way interaction among these variables was entered in the third block to test for moderation. Continuous variables were centered around their means prior to computing interactions. Simple effects for the life events \times problem solving interactions were estimated using Hayes and Matthes' (2009) MODPROBE approach in order

to examine whether problem-solving moderated the relation between life events and suicidal ideation.

RESULTS

Group Differences

Means and standard deviations on study measures are presented in Table 1. Participants with a suicide attempt history ($N=37$) reported significantly higher suicidal ideation, $t(37.5)=3.24, p<.01$, hopelessness, $t(94)=2.66, p<.01$, and depressive symptoms, $t(94)=2.18, p<.05$, compared to participants without an attempt history ($N=59$).

Differences in Problem Solving Means. As predicted, individuals with a past attempt generated a significantly higher number of passive means on the MEPS than individuals with no past attempt, $t(94)=2.07, p<.05$, indicating greater use of passive solutions in problem solving. Attempters and non-attempters did not differ in overall number of relevant means generated, $t(94)=0.21, p=.83$, number of active means $t(94)=1.56, p=.12$, or negative life stress, $t(94)=1.03, p=.31$. Age, sex, and race/ethnicity were not significantly related to any measures.

Associations Among Study Variables

Correlations are presented in Tables 2 and 3. Among individuals with a previous

TABLE 1. Means for Study Measures

	No past attempt		Past attempt		Effect size <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Suicidal Ideation (BSS)	0.27***	0.74	2.46***	4.07	0.75
Hopelessness (BHS)	4.75**	3.97	7.19**	4.96	0.54
Depression Symptoms (BDI)	11.46*	7.91	15.24*	8.90	0.45
Negative Life Event Stress (LES)	14.07	9.15	16.08	9.57	0.21
Relevant Means (MEPS)	7.91	2.40	7.80	2.61	0.04
Passive Means (MEPS)	1.61*	1.35	2.24*	1.61	0.42
Active Means (MEPS)	6.29	2.20	5.58	2.09	0.33

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

Participants with no past attempt $N=59$; Participants with past attempt $N=37$.

TABLE 2. Correlations among Measures for Individuals with a Past Suicide Attempt

	1	2	3	4	5	6	7
Suicidal Ideation (BSS)	–						
Hopelessness (BHS)	.40*	–					
Depression Symptoms (BDI)	.03	.67**	–				
Negative Life Event Stress (LES)	.19	.19	.19	–			
Relevant Means (MEPS)	–.04	.11	.20	.13	–		
Passive Means (MEPS)	–.09	.11	.05	.33*	.60**	–	
Active Means (MEPS)	.01	.05	.22	–.08	.78**	–.04	–

Note. * $p<.05$, ** $p<.01$.

TABLE 3. Correlations among Measures for Individuals with No Past Suicide Attempt

	1	2	3	4	5	6	7
Suicidal Ideation (BSS)	—						
Hopelessness (BHS)	.71**	—					
Depression Symptoms (BDI)	.23	.50**	—				
Negative Life Event Stress (LES)	.07	.14	.08	—			
Relevant Means (MEPS)	.16	.17	.19	.08	—		
Passive Means (MEPS)	-.16	.16	.24	-.02	.41**	—	
Active Means (MEPS)	.28*	.10	.06	.10	.83**	-.16	—

Note. * $p < .05$, ** $p < .01$.

suicide attempt, life event stress was significantly and positively correlated with passive problem solving but not with any other variable, and problem-solving scores were not correlated with any other variables. Among individuals with no past suicide attempt, suicidal ideation was significantly and positively correlated with active problem solving means.² However, neither life event stress nor passive and overall relevant means were significantly correlated with any other variable. Hopelessness was positively associated with suicidal ideation among individuals with and without a suicide attempt history.

Moderating Role of Relevant Problem Solving

Relevant Means. Regression analyses examining life stress and problem solving

²Further division of the control group into participants who were classified as recent suicide ideators, based on their endorsement of the suicidal ideation question on the PHQ-9 in the initial screening session, revealed no statistically significant association between active means and suicidal ideation, $r(40) = .08$, $p = .60$, among controls who had not reported suicidal ideation, while there was a non-significant positive correlation between active means and ideation among individuals who had endorsed suicidal ideation at screening, $r(15) = .36$, $p = .16$. While neither of these correlations was statistically significant, it appears that the positive association between active means and suicidal ideation was accounted for by the ideation group.

as predictors of suicidal ideation are presented in Table 4. Neither life stress nor total number of relevant means generated statistically predicted suicidal ideation (Block 1). However, their interaction did so, $\beta = -0.29$, $p < .01$ (Block 2). Among individuals who generated fewer relevant means (one standard deviation below the mean), there was a significant positive relation between life event stress and suicidal ideation (simple slope coefficient $b = 0.13$, $p < .01$). This association did not emerge for individuals average in relevant means ($b = 0.04$, $p = .15$), nor for individuals high in relevant means ($b = -0.06$, $p = .08$), providing support for our hypothesis that negative life event stress is most closely associated with suicidal ideation when overall problem solving is impaired.

Relevant Means and Suicide Attempt History.

The interaction among past suicide attempt history, life event stress, and relevant problem-solving means was statistically associated with suicidal ideation in the third block of the regression ($\beta = -0.24$, $p < .05$), with the two-way interaction between life event stress and relevant means no longer a significant predictor after adjusting for the 3-way interaction. Simple effects for the interaction between life event stress and relevant means were examined separately for attempters and non-attempters. Among attempters, there

TABLE 4. Hierarchical Linear Regression using Life Event Stress and Relevant Problem Solving to Predict Suicidal Ideation

Block		<i>B</i>	<i>SE</i>	β	<i>Partial r</i>	<i>F</i> _{Model}
1	Suicide Attempt**	1.68	0.52	0.29	.32	8.26**
	Hopelessness**	.31	0.07	0.50	.42	
	Depression*	-0.08	0.04	-0.23	-.22	
	LES	0.02	0.03	0.08	.09	
	Relevant PS	-0.04	0.10	-0.03	-.04	
2	Suicide Attempt**	1.70	0.49	0.30	.35	7.52**
	Hopelessness**	0.32	0.07	0.52	.47	
	Depression**	-0.09	0.04	-0.28	-.28	
	LES	0.02	0.03	0.06	.06	
	Relevant PS	-0.04	0.13	-0.03	-.03	
	LES \times Attempt	0.04	0.05	0.09	.09	
	Relevant PS \times Attempt	-0.12	0.19	-0.07	-.07	
	LES \times Relevant PS**	-0.04	0.01	-0.29	-.34	
3.	Suicide Attempt**	1.81	0.49	0.32	.37	7.38**
	Hopelessness**	0.31	0.07	0.50	.46	
	Depression*	-0.08	0.04	-0.25	-.24	
	LES	0.00	0.03	0.01	.01	
	Relevant PS	-0.01	0.12	-0.00	-.00	
	LES \times Attempt	0.06	0.05	0.12	.12	
	Relevant PS \times Attempt	-0.18	0.19	-0.11	-.10	
	LES \times Relevant PS	-0.01	0.02	-0.11	-.10	
LES \times Relevant \times Attempt*	-0.04	0.02	-0.24	-.21		

Note. * $p < .05$, ** $p < .01$.

LES = Negative Life Event Stress; Relevant PS = Relevant Problem Solving Means; Attempt = Any Past Attempt.

was a positive relation between life event stress and suicidal ideation ($b = 0.21$, $p < .05$) among individuals low on relevant means, but not among those average ($b = 0.06$, $p = .34$) or high ($b = -0.09$, $p = .32$) in relevant means. However, for non-attempters, life events did not statistically predict suicidal ideation at low ($b = 0.02$, $p = .16$), average ($b = 0.00$, $p = .78$), or high ($b = -0.02$, $p = .13$) levels of relevant means. Thus, consistent with our hypothesis, negative life stress is most strongly associated with suicidal ideation when the individual is impaired in generating relevant solutions—but this pattern is

apparent only among individuals with a past suicide attempt, and not among those with no past attempt.

Moderating Role of Active and Passive Problem Solving

Passive Means. The results of the regressions entering passive means are presented in Table 5. Contrary to our hypotheses, neither life event stress nor passive means was associated with suicidal ideation after adjusting for suicide attempt, depression, and hopelessness. There was a statistically

TABLE 5. Hierarchical Linear Regression using Life Event Stress and Passive Problem Solving to Predict Suicidal Ideation

Block		<i>B</i>	<i>SE</i>	β	<i>Partial r</i>	<i>F_{Model}</i>
1	Suicide Attempt**	1.80	0.52	0.32	.34	8.76**
	Hopelessness**	0.31	0.07	0.50	.43	
	Depression*	-0.07	0.04	-0.22	-.21	
	LES	0.03	0.03	0.09	.10	
	Passive PS	-0.23	0.17	-0.12	-.14	
2	Suicide Attempt**	1.98	0.51	0.35	.38	6.79**
	Hopelessness**	0.30	0.07	0.49	.44	
	Depression*	-0.08	0.04	-0.24	-.23	
	LES	-0.03	0.04	-0.10	-.09	
	Passive PS	-0.04	0.23	-0.02	-.02	
	LES \times Attempt*	0.15	0.06	0.32	.26	
	Passive PS \times Attempt	-0.31	0.34	-0.11	-.10	
LES \times Passive PS*	-0.04	0.02	-0.20	-.21		
3.	Suicide Attempt**	2.16	0.51	0.38	.41	6.67**
	Hopelessness**	0.28	0.07	0.46	.42	
	Depression*	-0.07	0.04	-0.22	-.22	
	LES	-0.01	0.04	-0.04	-.03	
	Passive PS	-0.10	0.23	-0.05	-.05	
	LES \times Attempt**	0.16	0.06	0.35	.29	
	Passive PS \times Attempt	-0.08	0.35	-0.03	-.03	
	LES \times Passive PS	-0.01	0.02	-0.04	-.03	
LES \times Passive \times Attempt ⁺	-0.08	0.04	-0.28	-.21		

Note. ⁺ $p = .05$, * $p < .05$, ** $p < .01$.

LES = Negative Life Event Stress; Passive PS = Passive Problem Solving Means; Attempt = Any Past Attempt.

significant two-way interaction between life stress and passive means in Block 2, $\beta = -0.20$, $p < .05$, and there was also a two-way interaction between life stress and suicide attempt history, $\beta = 0.32$, $p < .05$. However, examination of simple effects revealed no statistically significant effects of life stress on suicidal ideation at low, average, and high levels of passive problem solving, nor among suicide attempters versus non-attempters.

Passive Means and Suicide Attempt History.

The two-way interactions in Block 2 were qualified by a three way interaction between life stress, passive means, and

suicide attempt history in Block 3, $\beta = -0.28$, $p = .05$. Among participants with a past suicide attempt who were low on passive problem solving (one standard deviation below the mean), there was a positive relation between life event stress and suicidal ideation ($b = 0.23$, $p = .05$). However, the relation was not significant for individuals average in passive problem solving ($b = 0.12$, $p = .09$) or high in passive problem solving ($b = 0.00$, $p = .97$). Thus, somewhat surprisingly, among suicide attempters, life event stress was associated with suicidal ideation only among those low in passive problem solving. Among non-attempters, the simple effects of life

event stress on suicidal ideation were not statistically significant, for individuals low ($b = 0.00$, $p = .78$), average ($b = -0.01$, $p = .47$), or high ($b = -0.01$, $p = .25$) in passive problem solving.

Active Means. In the regression entering active means, again, neither active means, $\beta = 0.04$, $p = .64$, nor life event stress $\beta = 0.07$, $p = .41$, were directly associated with suicidal ideation (Block 1). The two-way interactions between life event stress and suicide attempt history, $\beta = 0.05$, $p = .69$, between active problem-solving and suicide attempt history, $\beta = 0.03$, $p = .82$, and between life event stress and active problem solving, $\beta = -0.18$, $p = .09$, were not statistically significant (Block 2).

Active Means and Suicide Attempt History. The 3-way interaction among life event stress, suicide attempt history, and active problem solving, $\beta = -0.17$, $p = .22$ (Block 3) was not statistically significant. Thus, contrary to our hypotheses, active problem solving played neither a direct nor a buffering role in the relation between life event stress and suicidal ideation.

DISCUSSION

Diathesis-stress models of suicide (Schotte & Clum, 1982, 1987) suggest that suicidal ideation and behavior arise when an individual who is under high levels of stress also has poor problem-solving skills. The present findings support the notion that the ability to generate relevant solutions to problems may, in fact, be protective against the effects of stress. However, they also suggest a more complicated pattern, in which the protective role of problem solving may be more specific to suicide attempters, where even passive problem solving can be protective. When considering the role of problem solving in individuals'

suicidal responses following life events, suicide attempt history may be a critical variable.

In accordance with a diathesis-stress approach, life stress was not statistically associated with suicidal ideation among individuals who generated more relevant solutions to problems, but was associated with ideation among individuals who generated fewer solutions. Interestingly, this finding held among individuals with a suicide attempt history, but not for individuals without an attempt history, even though the groups did not differ in life event stress or overall (relevant) problem solving. A diathesis-stress model may thus be most applicable to individuals already at risk due to past suicide attempts—who are also at risk for future attempts (Lewinsohn, Rohde, & Seeley, 1994)—and may not adequately explain the role of problem solving among individuals with no suicide attempt history.

Contrary to predictions, among participants with a suicide attempt history, negative life stress was associated with higher suicidal ideation among individuals *low* on passive problem solving but not among individuals *high* in passive problem solving. This surprising result suggests that even passive problem solving may be protective for individuals with a past suicide attempt in the presence of life event stress. Notably, active problem solving did not moderate the relation between life event stress and suicidal ideation, as was hypothesized.

Thus, diathesis-stress explanations of problem solving may overestimate the maladaptive effects of passivity among attempters. Previous investigations on passive problem solving have focused on group differences between attempters and nonattempters (Dieserud, Røysamb, Ekeberg et al., 2001; Linehan, Camper, Chiles et al., 1987; Pollock & Williams, 2004; Sadowski & Kelley, 1993), and our results support their conclusions that individuals with a past attempt solve problems

more passively. However, such studies have not typically examined the effects of problem solving among attempters in the context of life stress, nor have they emphasized suicidal ideation as an outcome. Problem solving and life stress may play different roles in ideation for individuals with versus without a past attempt, a potentially important finding given that current suicidal ideation is a risk factor for a future suicide attempt (Lewinsohn, Rhode, & Seeley, 1994).

For individuals with a suicide attempt history, passive problem solving may actually protect against the effects of negative life event stress on suicidal ideation. Passive problem solving may represent a first coping step among attempters, who may be cognitively rigid, and who may thus find it difficult to generate alternative and active solutions to problems. Alternatively, these responses may reflect dispositional optimism, rather than passive problem solving, per se (although we would note that suicide attempters were higher in both hopelessness and passive problem solving, and that there was no correlation between the two), or they may reflect coping styles involving the expectation that situations may resolve themselves, or that others will help solve the individual's problem (e.g., as in positive religious coping responses; see Ano & Vasconcelles, 2005), and these may weaken the association between life stress and suicidal ideation among attempters. Finally, it is possible that generating even passive means reflects a certain degree of cognitive flexibility that overrides the potential negative impact of passivity on ideation (see Miranda, Gallagher Bauchner et al., 2012, on cognitive inflexibility).

Limitations

Although this study provides some evidence that a diathesis-stress approach to problem solving in suicide is most

applicable in individuals with a past attempt, and that passive problem solving may be less maladaptive than typically thought, it also has several limitations. The nonclinical, undergraduate nature of this sample limits generalization to wider age ranges or more clinically severe populations. In addition, the sample was predominantly female. Although no gender differences were found, our findings may not be as generalizable to men as to women. The ethnic diversity of the sample, however, increases the ability to generalize the findings to young adults of varying race/ethnic groups.

Stressful life events were assessed retrospectively with respect to the year prior to the survey, but life events that occurred earlier may also impact problem solving and suicidal ideation. Further, because the study is cross-sectional, it is difficult to draw conclusions about causality. Perhaps suicidal ideation and hopelessness contribute to an individual's motivation or cognitive ability to generate solutions in the wake of life event stress. Alternatively, suicidal ideation may decrease the desire or ability to generate problem-solving alternatives, because the ultimate solution of suicide is already available. While past studies have found problem solving to be stable over some periods of time (Pollock & Williams, 2004), future research would benefit from measuring problem solving, life event stress, and suicidal ideation in a prospective design that includes attempters and non-attempters. It is quite plausible, for instance, that while passive problem solving buffers against the impact of life event stress on suicidal ideation in the short run, it may actually have a more detrimental effect on attempters over time.

Unfortunately, because the majority of participants in the sample who endorsed any ideation had a past suicide attempt, it is difficult to draw conclusions about individuals who have ideation but no past attempt. Future research may seek to

examine the interaction between problem solving and life event stress among suicide ideators without an attempt history to see if they differ from non-attempters who have not previously thought about suicide. Further, while the MEPS has been questioned for its ability to measure real-life problem solving, studies that have used other problem-solving measures (e.g., Grover, Green, Pettit et al., 2009) have found similar results for the relation between deficient problem solving and life events in predicting suicidality. Nevertheless, different patterns in the literature on problem-solving appraisal versus performance suggest that it would be informative to have convergent measures of problem-solving ability in future research.

Conclusion

In sum, the present study supports past research identifying a relation between negative life event stress and problem-solving abilities in suicidal ideation and extends previous research by suggesting that this relation exists independently of depressive symptoms and hopelessness. Our results point to the protective role of generating multiple alternatives in the face of life event stress, and indicate that this ability is particularly protective among individuals most at risk for suicidal behavior due to an attempt history. This study also examined more closely how the active versus passive nature of problem solving might moderate the effect of negative life event stress on suicidal ideation. Among individuals with a past attempt, whether active or passive solutions are generated may not be as important as the fact that some problem solving is taking place. Although clinicians may view passive solutions as maladaptive, the generation of any alternative may have a buffering impact on the relation between stressful life events and suicidal ideation for vulnerable individuals. Clinical assessment and inter-

vention may benefit from an understanding that problem solving is especially important in responding to life stress among individuals with a past attempt, and moreover, that passive problem solving among this population may be protective rather than maladaptive. Clinicians working with suicide attempters may assist these individuals in generating possible solutions to problems, even if these solutions are initially passive, in order to mitigate the impact of life stress on risk for further suicidal ideation and attempts.

AUTHOR NOTE

Wendy P. Linda, Department of Psychology, Hunter College, City University of New York, New York, New York, USA.

Brett Marroquín, Department of Psychology, Yale University, New Haven, Connecticut, USA.

Regina Miranda, Department of Psychology, Hunter College and The Graduate Center, City University of New York, New York, New York, USA.

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Correspondence concerning this article should be addressed to Regina Miranda, Department of Psychology, Hunter College, CUNY, 695 Park Ave., Room 611HN, New York, NY 10065. E-Mail: regina.miranda@hunter.cuny.edu.

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