Vulnerability to Depressive Symptomatology: A Prospective Test of the Diathesis-Stress and Causal Mediation Components of the Hopelessness Theory of Depression

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The diathesis-stress and causal mediation components of the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1989) were tested using a prospective methodology. Measures of the 3 vulnerability factors posited by the theory (cognitive diatheses about cause, consequences, and self) were completed by 152 Ss at Time (T) 1. Ss completed measures of depressive symptoms, anxious symptoms, and hopelessness at T1 and again at T2, 5 weeks later. Naturally occurring stressors were assessed at T2 (covering the T1–T2 interval). Consistent with the diathesis-stress component, each Cognitive Diathesis × Stress (CD × S) interaction predicted onset of depressive symptoms from T1 to T2. In contrast, the CD × S interactions predicted neither state nor trait anxiety. In addition, 2 of the 3 CD × S interactions (those involving cause and self, but not consequences) were partially mediated by hopelessness. Implications for future work on the hopelessness theory of depression are discussed.

Abramson, Metalsky, and Alloy (1989) recently proposed a revision of the reformulated helplessness theory of depression (Abramson, Seligman, & Teasdale, 1978). They referred to the revision as the *hopelessness theory of depression* because (a) hopelessness is viewed as a proximal sufficient cause of the symptoms of the depressive subtype proposed in the theory (hopelessness depression), and (b) hopelessness is viewed as a final common pathway for all of the remaining causes in the theory; thus, attributional styles and other proposed etiological factors are posited to contribute to depressive symptoms through the operation of hopelessness. Hopelessness is defined as an expectation that highly desired outcomes will not occur or that highly aversive outcomes will occur and that nothing is going to change this situation for the better.

One purpose of the present study was to test the diathesis-stress component of the hopelessness theory. This component specifies three vulnerability factors (cognitive diatheses), each of which is posited to interact with negative life events in contributing to the onset of depressive symptoms. The first vulnerability factor includes a style to attribute negative life events to stable and global causes (see Metalsky, Abramson, Seligman, Semmel, & Peterson, 1982, for an early conceptualization of attributional style in a diathesis-stress framework). We refer to this factor as the *attributional diathesis* (Metalsky, Halberstadt, & Abramson, 1987; Metalsky, Joiner, Hardin, & Abramson, in

press). Note that in contrast to the 1978 statement of the theory, stable, global attributions are viewed as contributing to the onset of hopelessness and depressive symptoms regardless of whether the attributions are internal or external (see Abramson et al., 1989).

In addition to the attributional diathesis, the other two vulnerability factors featured in the theory include (a) a generalized tendency to make negative inferences about the self given that a negative life event has occurred (e.g., I failed this exam and therefore am worthless), and (b) a generalized tendency to infer that negative life events are going to lead to dire consequences (e.g., I failed this exam and therefore am never going to get into graduate school). We refer to these as cognitive diatheses about the self and consequences, respectively. Abramson et al. (1989) suggested that although the three cognitive diatheses probably are related, it is important to distinguish between them conceptually and examine whether they each interact with negative life events in contributing to the onset of depressive symptoms. In fact, the cognitive diathesis about consequences was incorporated into the theory on the basis of the work of Hammen and co-workers (e.g., Gong-Guy & Hammen, 1980; Hammen & Cochran, 1981; Hammen & de Mayo, 1982), who argued that perceived consequences may be as, if not more, important than causal attributions in modulating the onset of depressive symptoms.

Although several studies have examined the Attributional Style × Stress interaction (Alloy, Kayne, Romer, & Crocker, 1992; Follette & Jacobson, 1987; Johnson & Miller, 1990; Metalsky et al., 1987, in press; Nolen-Hoeksema, Girgus, & Seligman, 1986; Robins & Block, 1989; Sacks & Bugental, 1987), no study has examined whether the other two vulnerability factors interact with negative life events to predict onset of depressive symptoms. Thus, with respect to evaluating the hopelessness theory, to date, two of the three vulnerability factors have not been tested in a diathesis-stress framework.

A second major purpose of the present study was to test whether the posited Cognitive Diathesis × Stress interactions predict depressive symptoms specifically or whether they predict symptoms of anxiety as well. It is of particular importance to examine the issue of specificity because it has not yet been systematically explored in research on the hopelessness theory. Although Johnson and Miller (1990) did examine specificity with respect to one aspect of the diathesis-stress component (i.e., Attributional Style × Stress interaction), the results were inconclusive in that the interaction predicted neither depression nor anxiety. Thus, the question of specificity remains open with respect to the Cognitive Diathesis × Stress interactions posited by the hopelessness theory.

A third major purpose of the present study was to test the mediation component of the theory. According to this component, each of the Cognitive Diathesis × Stress interactions contributes to the onset of depressive symptoms through the operation of hopelessness. In line with this component of the theory, Metalsky et al. (in press) recently reported that the attributional diathesis predicted depressive reactions to failure on a midterm exam through the mediating role of hopelessness. However, no study to date has tested the mediation component with respect to the other two vulnerability factors featured in the theory.

To test the two main components of the theory, we used a prospective design consisting of measurement of the cognitive diatheses as well as depressive symptoms, anxious symptoms, and hopelessness at one point in time (T1). Depressive symptoms, anxious symptoms, and hopelessness were assessed again 5 weeks later (T2). Negative life events were assessed at T2, covering the 5-week interval between T1 and T2. A 5-week interval was chosen to minimize underreporting of negative life events that may occur with longer time intervals (Monroe, 1982).

In line with the diathesis-stress component of the theory, we predicted that each of the cognitive diatheses at T1 would interact with negative life events to predict onset of depressive symptoms from T1 to T2. Insofar as the symptom constellation posited by the theory does not include symptoms of anxiety, we further predicted that each of the diathesis-stress effects would be specific to depressive symptoms. Finally, in line with the mediation component of the theory, we predicted that each of the Cognitive Diathesis × Stress interactions would predict onset of depressive symptoms through the mediating role of hopelessness.

Method

Subjects and Procedure

One hundred seventy-one students taking an introductory psychology course at the University of Texas at Austin participated in the study for course credit. Of these, 19 students did not return for Session 2 (attrition = 11.11%), leaving a final sample of 152 students who completed both sessions. Subjects who missed Session 2 did not differ from subjects who completed both sessions on any of the cognitive or symptom measures at T1. Correlational analysis indicated that none of the T1 measures were associated with whether subjects completed the study. Finally, for completers, means and standard deviations on the T2 measures were within the range typically obtained among college stu-

dents (see Table 1). Thus, it is unlikely that attrition influenced the results in any significant way.

When they arrived at Session 1, subjects were informed that they would be filling out questionnaires about their personal views and feelings. They also were asked to return for a second session in 5 weeks. When subjects returned, they completed questionnaire packets and were debriefed and excused.

Measures

Extended Attributional Style Questionnaire (EASQ; Metalsky et al., 1987). The EASQ consists of 12 hypothetical negative life events. Similar to the original ASQ (Peterson et al., 1982; Seligman, Abramson, Semmel, & von Baeyer, 1979), subjects write down the one major cause of a given event, in an open-ended format, and then rate the cause on a 1–7 scale separately for degree of internality, stability, and globality. Consistent with Abramson et al. (1989), we used the generality subscale (GEN; average of stability and globality) to test our predictions. Scores can range from 1 to 7, with higher scores corresponding to a more stable, global attributional style. Internal consistency typically falls between .80 and .90 for GEN (see Metalsky et al., 1987, in press; and Needles & Abramson, 1990, for reliability as well as validity data for GEN). The EASQ was administered at T1.

Cognitive Style Questionnaire (CSQ; Abramson & Metalsky, 1986). The CSQ was used to assess cognitive styles about consequences and self. For each of the 12 outcomes contained in the EASQ, subjects were asked "How likely is it that the [negative event] will lead to other negative things happening to you?" (consequences) and "To what degree does the [negative event] mean that you are flawed in some way?" (self). Scores were averaged across the 12 negative outcomes, yielding subscales for consequences (CONSEQ) and self (SELF). Scores on each subscale can range from 1 to 7, with higher scores corresponding to a more negative cognitive style. The CSQ was administered at T1.

Negative Life Events Questionnaire (NLEQ; Saxe & Abramson, 1987). The NLEQ was developed specifically for use with college students and includes several categories to ensure broad coverage (e.g., school, work, parents and family, romantic partner, etc.). Similar to Needles and Abramson (1990), we condensed the scale to include 66 negative life stressors (e.g., "Fight or disagreement with romantic partner"). Scores consisted of the number of events endorsed as having been present at least once during the preceding 5 weeks. Thus, scores can range from 0–66, with higher scores corresponding to higher levels of negative life events. The original scale was found to have a test-retest reliability (for events during the same time period assessed 2–3 weeks apart) of .82 (Saxe & Abramson, 1987). Its validity is supported by the finding that scores interacted with a measure of negative cognitive schema to predict concurrent and future depressive symptoms (McClain & Abramson, 1988); that decreases in negative events on Needles and Abramson's (1990) condensed version interacted with attributional style for positive outcomes to predict recovery from depressive symptoms; and that scores on the present version interacted with interpersonal vulnerability factors (e.g., reassurance seeking) to predict future depressive symptoms (Metalsky, Joiner, Potthoff, & Pacha, 1992). The NLEQ, therefore, seems to reliably capture important negative life events related to the onset of and recovery from depressive symptoms (see also Alloy & Clements, 1992, for additional validity data). The NLEQ was administered at T2, covering the 5-week interval between T1 and T2, similar to the procedure used by several other investigators (e.g., Alloy & Clements, 1992; Barnett & Gotlib, 1988, 1990; Needles & Abramson, 1990).

Extended Hopelessness Scale (EHS; Abramson & Metalsky, 1985). We assessed subjects' levels of hopelessness with an extended version of the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974).

Beck et al. (1974) reported an internal consistency of .93, indicating high reliability and a correlation with clinical ratings of hopelessness of .74, indicating high validity. Abramson and Metalsky (1985) increased the number of items from 20 to 60 to permit examination of hopelessness in specific content domains. Subjects rate each item in a true–false format. Thus, scores can range from 0–60, with higher scores reflecting greater levels of hopelessness. Needles and Abramson (1990) reported an internal consistency of .95, and with respect to validity, found that decreases in scores on the EHS mediated recovery from depressive symptoms (see also Metalsky et al., in press, for additional reliability and validity data). The EHS was administered at T1 and T2.

Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Depressive symptoms were assessed with the BDI. Each of the 21 items is rated on a 0–3 scale; thus, scores can range from 0–63. Although the BDI is not indicative of the full clinical syndrome of depression, it is a reliable and well-validated measure of depressive symptomatology (see Beck, Steer, & Garbin, 1988, for a review). The BDI was administered at T1 and T2.

Several of the items on the BDI overlap in content with the causal factors posited by the hopelessness theory (e.g., cognitive diathesis about self). To avoid tautology resulting from this overlap, we deleted the following items from the BDI: Items 2 ("hopelessness"), 3 ("failure as a person"), 5 ("feel worthless"), 7 ("hate myself"), 8 ("self-blame"), and 14 ("feel ugly or repulsive looking"). It is important to note, however, that the same pattern of results was obtained regardless of whether we used the adjusted or full BDI. Nevertheless, we focus on the adjusted BDI in reporting our results because it avoids the problem of overlap in item content. Scores on the adjusted BDI can range from 0–45.

State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). The STAI is a widely used measure of transient and more enduring symptoms of anxiety. It contains 40 items (20 for state and 20 for trait anxiety). Each item is rated on a 1–4 scale. Thus, scores can range from 20–80 for each subscale. As reported by Foa, Feske, Murdock, Kozak, and McCarthy (1991), internal consistency ranges from .83–.92. The STAI was administered at T1 and T2.

Results

Descriptive and Reliability Data

Means, standard deviations, and coefficient alpha reliabilities (Cronbach, 1951) are presented in Table 1. As can be seen, all of the measures possessed adequate reliability.

Zero-order correlations between all measures are presented in Table 2. As can be seen, the cognitive diathesis and life stress measures correlated significantly with the BDI and STAI. As expected, the cognitive diathesis measures were moderately to highly correlated with one another as were the BDI and STAI.

Overview of Statistical Analysis

To test our predictions, we used a setwise hierarchical multiple regression procedure, analysis of partial variance (APV), described by Cohen and Cohen (1983, pp. 402–422). In APV, a set of covariates is entered into the regression equation first, followed by entry of a set (or sets) of independent variables. In the case in which the dependent variable is a postscore measure and the prescore measure is used as a covariate, APV may be used to predict residual change scores (i.e., change from prescore to postscore adjusted for subjects' prescore status).

Table 1
Means, Standard Deviations, and Coefficient Alpha Reliabilities for All Measures

Measure	M	SD	α
T1 GEN	3.65	0.84	.87
T1 SELF	3.20	1.24	.91
T1 CONSEQ	3.23	1.13	.89
T2 NLEQ	12.76	9.99	NA
T1 EHS	8.28	10.09	.95
T2 EHS	7.27	12.08	.98
T1 BDI (adjusted)	4.97	5.32	.86
T2 BDI (adjusted)	3.38	4.69	.89
T1 STAI-S	39.34	10.96	.91
T2 STAI-S	35.89	14.17	.96
T1 STAI-T	40.77	11.49	.92
T2 STAI-T	36.92	12.24	.94

Note. GEN = Generality subscale of the Extended Attributional Style Questionnaire; SELF = Cognitive Diathesis About Self on the Cognitive Style Questionnaire; CONSEQ = Cognitive Diathesis About Consequences on the Cognitive Style Questionnaire; NLEQ = Negative Life Events Questionnaire; EHS = Extended Hopelessness Scale; BDI = Beck Depression Inventory (cognitive items deleted); STAI-S = State–Trait Anxiety Inventory—State subscale; STAI-T = State–Trait Anxiety Inventory—Trait subscale. All *p*s < .01.

In the present context, APV allowed us to predict residual changes in BDI scores from T1 to T2. For these analyses, the dependent variable consisted of the T2 BDI. The T1 BDI was entered first, thereby creating the residual change scores. The same procedure was used to examine residual changes in state and trait anxiety. The remaining predictors were entered in the manner described later in this article. Consistent with Cohen and Cohen (1983), for all analyses, individual predictors within a given set were entered simultaneously and were not interpreted unless the set as a whole was significant. In addition, the homogeneity of regression assumption associated with APV was tested and successfully met in all cases.

Test of the Diathesis-Stress Component

The results pertaining to the predicted GEN × NLEQ interaction are presented in Table 3. Consistent with Cohen and Cohen (1983), the T1 BDI covariate was entered first, followed by entry of the GEN and NLEQ main effect set (Step 2), and finally the critical GEN × NLEQ interaction (Step 3).

As can be seen in Table 3, the NLEQ had a main effect, independent of GEN, in predicting residual changes in BDI scores from T1 to T2 (*pr* = .36, *p* < .0001). In contrast, the effect for GEN, independent of the NLEQ, was not significant (*pr* = .11, *ns*). More central to the hopelessness theory, however, the posited GEN × NLEQ interaction significantly predicted residual changes in BDI scores from T1 to T2 (*pr* = .24, *p* < .005).[1]

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[1] Consistent with the APV procedure, we focus on the partial correlation (*pr*) rather than the semipartial correlation (*sr*) in reporting our results. The *pr* provides the effect size with respect to the prediction of residual changes in BDI scores from T1 to T2 (i.e., T1 BDI is partialed from T2 BDI, thereby yielding the residual change scores). In contrast,

Table 2
Intercorrelations Between All Measures

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 GEN	—											
2. T1 SELF	.48	—										
3. T1 CONSEQ	.62	.76	—									
4. T2 NLEQ	.23	.24	.28	—								
5. T1 EHS	.26	.34	.33	.40	—							
6. T2 EHS	.21	.26	.22	.54	.57	—						
7. T1 BDI	.37	.39	.48	.39	.65	.43	—					
8. T2 BDI	.33	.34	.43	.49	.53	.72	.65	—				
9. T1 STAI–S	.33	.40	.48	.30	.40	.23	.58	.41	—			
10. T2 STAI–S	.30	.36	.40	.52	.47	.64	.44	.67	.53	—		
11. T1 STAI–T	.42	.57	.59	.39	.62	.43	.69	.61	.75	.57	—	
12. T2 STAI–T	.35	.48	.49	.54	.66	.74	.61	.73	.55	.77	.75	—

Note. GEN = Generality subscale of the Extended Attributional Style Questionnaire; SELF = Cognitive Diathesis About Self on the Cognitive Style Questionnaire; CONSEQ = Cognitive Diathesis About Consequences on the Cognitive Style Questionnaire; NLEQ = Negative Life Events Questionnaire; EHS = Extended Hopelessness Scale; BDI = Beck Depression Inventory (cognitive items deleted); STAI–S = State–Trait Anxiety Inventory—State subscale; STAI–T = State–Trait Anxiety Inventory—Trait subscale. All $ps < .01$.

Results pertaining to the posited SELF × NLEQ interaction are presented in Table 4. For this analysis, the T1 BDI covariate was entered first, followed by the SELF and NLEQ main effect set, and finally the SELF × NLEQ interaction. As can be seen in Table 4, the effect for NLEQ was significant ($pr = .35$, $p < .0001$), whereas the effect for SELF was not ($pr = .05$, ns). In addition, the SELF × NLEQ interaction significantly predicted residual changes in BDI scores from T1 to T2 ($pr = .21$, $p < .01$).

The results for the posited CONSEQ × NLEQ interaction are presented in Table 5. For this analysis, the T1 BDI covariate was entered first, followed by the CONSEQ and NLEQ main effect set, and at the last step, the CONSEQ × NLEQ interaction. As can be seen in Table 5, the NLEQ was significant ($pr = .34$, $p < .0001$), whereas CONSEQ was not ($pr = .11$, ns). More central to the hopelessness theory, the CONSEQ × NLEQ interaction significantly predicted residual changes in BDI scores from T1 to T2 ($pr = .27$, $p < .001$).

Descriptive analyses for the interactions. To depict the interactions, we followed the procedure recommended by Cohen and Cohen (1983, pp. 323, 419) and computed residual change scores by inserting specific values for predictor variables (i.e., 1 *SD* above and below the mean) into the regression equations coinciding with the analyses reported in Tables 3–5 (see also Metalsky et al., 1987, in press; and Needles & Abramson, 1990, for this procedure). In addition, for a given interaction (e.g., GEN × NLEQ), the remaining two diatheses (e.g., SELF and CONSEQ) were included as additional covariates, allowing us to depict the effect of a given vulnerability while controlling for the other two.

Figure 1 shows the results of these calculations. As can be seen in the upper left portion of the figure, students who did not exhibit the attributional diathesis showed little change in BDI scores from T1 to T2, regardless of whether they experienced high or low levels of stress (residual changes = −.59 and −1.38, respectively). In contrast, among students who exhibited the attributional diathesis, those who experienced high levels of stress showed an increase in symptoms from T1 to T2 (residual change = 4.20), whereas those who experienced low levels of stress showed a reduction in symptoms (residual change = −2.97). A similar pattern of results was obtained for the SELF × NLEQ and CONSEQ × NLEQ interactions (see upper right and bottom portions of Figure 1, respectively).

Examining unique effect of each interaction. Because the three vulnerability factors were moderately to highly correlated with one another (see Table 2), we examined the effect of each

Table 3
Attributional Diathesis, Negative Life Events, and Interaction Predicting Residual Changes in BDI Scores From Time 1 to Time 2

Order of entry of set	Predictors in set	*F* for set	*t* for within-set predictors	*df*	*pr*
1.	Time 1 BDI covariate	107.38**		1, 150	.65
2.	Main effect variables	12.14**		2, 148	.38
	GEN		1.39	148	.11
	NLEQ		4.63**	148	.36
3.	GEN × NLEQ interaction	9.25*		1, 147	.24

Note. BDI = Beck Depression Inventory (cognitive items deleted); GEN = Generality subscale of the Extended Attributional Style Questionnaire; NLEQ = Negative Life Events Questionnaire.
* $p < .005$. ** $p < .0001$.

the *sr* provides the effect size with respect to the prediction of T2 BDI without T1 BDI partialed from it (and hence does not provide the effect size with respect to residual change). Note also that in spite of their differences, the *pr* and *sr* share the same *t* value. Thus, when one is significant, the other also is significant and to the same exact degree (see Cohen & Cohen, 1983).

Table 4

Cognitive Diathesis About Self, Negative Life Events, and Interaction Predicting Residual Changes in BDI Scores From Time 1 to Time 2

Order of entry of set	Predictors in set	F for set	t for within-set predictors	df	pr
1.	Time 1 BDI covariate	107.38**		1, 150	.65
2.	Main effect variables	11.45**		2, 148	.37
	SELF		.85	148	.05
	NLEQ		4.48**	148	.35
3.	SELF × NLEQ interaction	6.63*		1, 147	.21

Note. BDI = Beck Depression Inventory (cognitive items deleted); SELF = Cognitive Diathesis About Self on the Cognitive Style Questionnaire; NLEQ = Negative Life Events Questionnaire.
* $p < .01$. ** $p < .0001$.

Vulnerability × Stress interaction while controlling for the other two (e.g., GEN × NLEQ was examined, controlling for the SELF × NLEQ and CONSEQ × NLEQ interactions). For this analysis, the T1 BDI covariate was entered first, followed by entry of GEN, SELF, CONSEQ, and NLEQ (main effects), which in turn was followed by entry of the three interaction terms. Results indicated that the GEN × NLEQ interaction did not have a unique effect independent of the remaining two interactions ($pr = .10$, ns). The same was found for the SELF × NLEQ interaction ($pr = .07$, ns) and the CONSEQ × NLEQ interaction ($pr = .10$, ns).

Test of Specificity Hypothesis

The results were fully in line with the specificity hypothesis. With respect to the Attributional Diathesis × Stress interaction, the same analysis as that reported in Table 3 was conducted for the state and trait anxiety measures separately. With respect to state anxiety, the NLEQ predicted residual changes in state anxiety from T1 to T2 independent of GEN ($pr = .41$, $p < .0001$). In contrast, GEN did not have a significant effect independent of the NLEQ ($pr = .12$, ns). Additionally, the GEN × NLEQ interaction did not predict residual changes in state anxiety from T1 to T2 ($pr = -.0003$, ns). The same pattern of results was obtained for trait anxiety, with a significant effect for the NLEQ ($pr = .43$, $p < .0001$) but not for GEN ($pr = .08$, ns) or the GEN × NLEQ interaction ($pr = -.03$, ns).

With respect to the Self × Stress analysis (as conducted in Table 4), the same pattern of results emerged. The NLEQ had a significant effect, independent of SELF, in predicting residual changes in state and trait anxiety ($prs = .41$ and .42, respectively, both $ps < .0001$). In contrast, SELF did not have a significant effect independent of the NLEQ ($prs = .09$ and .05, respectively, both $ps = ns$). Similarly, the SELF × NLEQ interaction did not predict residual changes in state or trait anxiety ($prs = .09$ and .06, respectively, both $ps = ns$).

With respect to the Consequences × Stress analysis (as conducted in Table 5), the NLEQ had a significant effect, indepen-

dent of CONSEQ, in predicting residual changes in state and trait anxiety ($prs = .39$ and .42, respectively, both $ps < .0001$). In contrast, CONSEQ did not have an effect independent of the NLEQ ($prs = .08$ and .03, respectively, both $ps = ns$). In addition, the CONSEQ × NLEQ interaction did not predict residual changes in state or trait anxiety ($prs = .03$ and $-.06$, respectively, both $ps = ns$).

Test of the Mediation Component

Following the reasoning presented by Baron and Kenny (1986), if T2 hopelessness mediates the GEN × NLEQ interaction, then the following conditions should hold: (a) The GEN × NLEQ interaction should predict T2 hopelessness after controlling for T1 hopelessness, GEN, and NLEQ; (b) when added at Step 4 to the analysis reported in Table 3, T2 hopelessness should predict residual changes in BDI scores from T1 to T2 after controlling for T1 hopelessness, GEN, NLEQ, and the GEN × NLEQ interaction; and (c) the addition of T2 hopelessness as described in Condition 2 should decrease the effect of the GEN × NLEQ interaction. With respect to Condition 3, Baron and Kenny distinguished between partial and complete mediation. In the case of partial mediation, the effect of the GEN × NLEQ interaction would be reduced but would continue to serve as a significant predictor. In contrast, for complete mediation, the GEN × NLEQ interaction would no longer serve as a significant predictor. The same logic applies to testing the mediation component with respect to the CONSEQ × NLEQ and SELF × NLEQ interactions (see the paragraphs that follow; see also Alloy & Clements, 1992; Metalsky et al., 1987, in press; and Needles & Abramson, 1990, for a similar procedure).

Mediation of the GEN × NLEQ interaction. Consistent with criteria for partial mediation (a) the GEN × NLEQ interaction predicted T2 hopelessness after controlling for T1 hopelessness, GEN, and NLEQ ($pr = .16$, $p < .05$); (b) when added at Step 4 (see Table 3), T2 hopelessness predicted residual changes in BDI scores from T1 to T2 after controlling for T1 hopeless-

Table 5

Cognitive Diathesis About Consequences, Negative Life Events, and Interaction Predicting Residual Changes in BDI Scores From Time 1 to Time 2

Order of entry of set	Predictors in set	F for set	t for within-set predictors	df	pr
1.	Time 1 BDI covariate	107.38**		1, 150	.65
2.	Main effect variables	12.02**		2, 148	.37
	CONSEQ		1.31	148	.11
	NLEQ		4.33**	148	.34
3.	CONSEQ × NLEQ interaction	11.75*		1, 147	.27

Note. BDI = Beck Depression Inventory (cognitive items deleted); CONSEQ = Cognitive Diathesis About Consequences on the Cognitive Style Questionnaire; NLEQ = Negative Life Events Questionnaire.
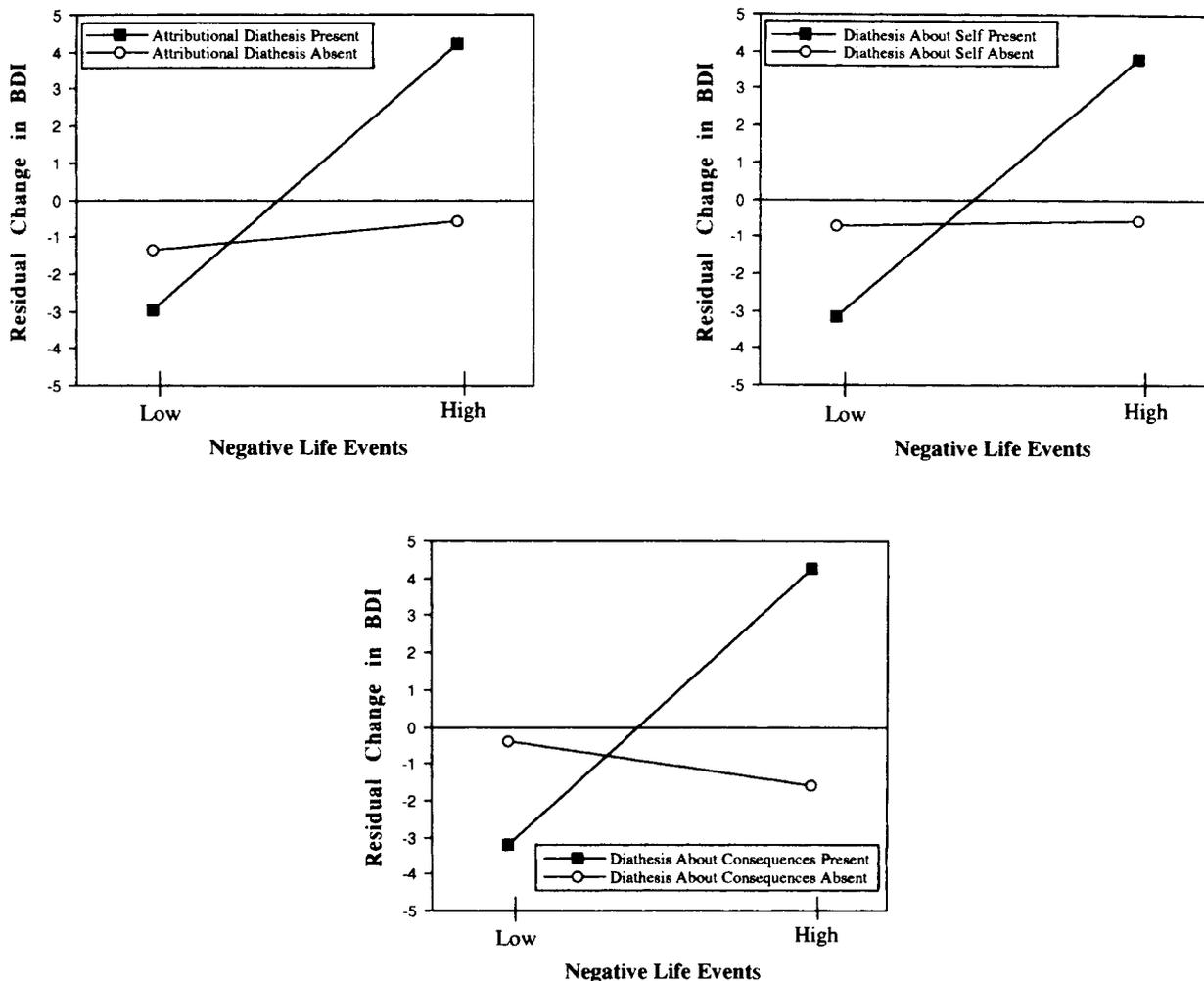* $p < .001$. ** $p < .0001$.

Figure 1. Regression equations plotting residual changes in Beck Depression Inventory (BDI) scores from Time 1 to Time 2 as a function of negative life events and the attributional diathesis (upper left panel), cognitive diathesis about self (upper right panel), and cognitive diathesis about consequences (bottom panel).

ness, GEN, NLEQ, and the GEN × NLEQ interaction ($pr = .58$, $p < .0001$); and (c) when T2 hopelessness was added at Step 4, the GEN × NLEQ interaction was reduced, although it remained significant ($pr = .19$, $p < .01$). With respect to the third criterion, it should be noted that the effect for the interaction was only slightly reduced (from .24 to .19). It also is of interest to note that the same pattern of results was obtained when CONSEQ and SELF were included as additional covariates at Step 1 of the preceding analyses.

Mediation of the CONSEQ × NLEQ interaction. The results did not support this aspect of the theory. Condition 2 was met, whereas Conditions 1 and 3 were not: (a) The CONSEQ × NLEQ interaction did not significantly predict T2 hopelessness after controlling for T1 hopelessness, CONSEQ, and NLEQ ($pr = .07$, *ns*); (b) when added at Step 4 (in Table 5), T2 hopelessness did predict residual changes in BDI scores from T1 to T2 after controlling for T1 hopelessness, CONSEQ, NLEQ, and the CONSEQ × NLEQ interaction ($pr = .61$, $p <$

.0001); and (c) when T2 hopelessness was added at Step 4, the CONSEQ × NLEQ interaction was not reduced and remained a significant predictor ($pr = .30$, $p < .0005$). The same pattern of results was obtained when GEN and SELF were included as additional covariates at Step 1 of the preceding analyses.

Mediation of the SELF × NLEQ interaction. Consistent with all three criteria (a) the SELF × NLEQ interaction predicted T2 hopelessness after controlling for T1 hopelessness, SELF, and NLEQ ($pr = .17$, $p < .05$); (b) when added at Step 4 (in Table 4), T2 hopelessness predicted residual changes in BDI scores from T1 to T2 after controlling for T1 hopelessness, SELF, NLEQ, and the SELF × NLEQ interaction ($pr = .58$, $p < .0001$); and (c) when T2 hopelessness was added at Step 4, the SELF × NLEQ interaction was reduced and no longer served as a significant predictor ($pr = .13$, *ns*). However, insofar as the effect for the interaction was only slightly reduced (from .21 to .13), and to about the same degree as in the GEN × NLEQ analysis, these results may best be viewed as being consistent with partial as

opposed to complete mediation. As before, the same pattern of results emerged when GEN and CONSEQ were included as additional covariates at Step 1 of the preceding analyses.

Complete versus partial mediation. The mediation analyses suggest that the GEN × NLEQ and SELF × NLEQ interactions were partially, but not completely, mediated by hopelessness. To further examine this issue, we conducted goodness-of-fit tests comparing the complete and partial mediation models (for complete mediation, there is no direct path from the interaction term to depressive symptoms, whereas for partial mediation, the model is fully recursive and includes this path; see Pedhazur, 1982, pp. 580–588, 594–600, 614–623, Formula 15.21). Results indicated that the partial mediation model provided a better fit to the data than the complete mediation model with respect to the GEN × NLEQ interaction, χ^2 (1, N = 152) = 87.37, $p < .0001$, as well as the SELF × NLEQ interaction, χ^2 (1, N = 152) = 85.13, $p < .0001$.

Discussion

The results of the present prospective study were fully in line with predictions derived from the diathesis-stress component of the hopelessness theory. Of particular note, the present study was the first to examine the two new vulnerability factors in a diathesis-stress framework. Consistent with prediction, the cognitive diatheses about self and consequences, as well as the attributional diathesis, each interacted with negative life events to predict onset of depressive symptoms. Of importance to the hopelessness theory, subjects who exhibited a given cognitive diathesis did not show increases in depressive symptoms under low levels of stress; instead, it was only when the cognitive diathesis was combined with high levels of stress that depressive reactions ensued.

It should be noted that the Cognitive Diathesis × Stress effects were statistically reliable but modest, accounting for 4% to 7% of the variance in residual changes in BDI scores. One reason these effects may have been small is that the T1 to T2 autocorrelation for the BDI was robust (.65), placing a constraint on the amount of additional variance that could be accounted for (beyond the 42% already explained). An additional issue involves the time lag of 5 weeks. Specifically, for subjects who experienced negative life events early (but not late) in the 5-week interval, depressive reactions may have developed and dissipated before the T2 assessment (i.e., may have been "missed"). Thus, the greater the number of subjects who experienced negative life events early (but not late) in the 5-week interval, the smaller would be the effect of the Diathesis × Stress interactions. Although speculative, in our view future work would benefit by examining the extent to which shorter versus longer time lags impact on the magnitude of the Diathesis × Stress effects.

The results also indicated that each of the Cognitive Diathesis × Stress interactions predicted neither state nor trait anxiety, suggesting specificity to depressive symptoms. These results are noteworthy in view of the moderate to high correlations between the anxiety and depression measures. Moreover, these results do not appear to reflect a limitation of measurement in that the negative life event measure predicted onset of anxious and depressive symptoms to about the same degree. Thus,

whereas stress was associated with onset of anxious as well as depressive symptoms, only depressive symptoms were predicted by the Cognitive Diathesis × Stress interactions. These results are consistent with a growing body of work suggesting that anxiety and depression each may have a specific cognitive profile (e.g., Beck, Brown, Steer, Eidelson, & Riskand, 1987; D. A. Clark, Beck, & Brown, 1989; D. A. Clark, Beck, & Stewart, 1990; L. A. Clark & Watson, 1991).

Interestingly, each Diathesis × Stress combination predicted onset of depressive symptoms when examined separately. In contrast, each Diathesis × Stress combination did not contribute to depressive symptoms beyond the effect of the remaining two. Taken together, these findings suggest that it was the variance shared by the three vulnerability factors that conferred a risk for depressive reactions. Thus, the variance shared by the three vulnerability factors may constitute a common "core" liability. Insofar as the present study was the first to examine the two new vulnerability factors posited by the hopelessness theory, these findings are in need of replication and should be interpreted accordingly.

With respect to the mediation component of the theory, the present study was the first to test whether the Cognitive Diathesis × Stress interactions each contribute to depressive symptoms through the mediating role of hopelessness. The finding that two of the three Cognitive Diathesis × Stress interactions (those involving cognitive styles about cause and self, but not consequences) were partially mediated by hopelessness provides some preliminary support for this aspect of the theory. On the other hand, failure to find complete mediation, and no mediation for consequences, suggests that the Diathesis × Stress interactions may contribute to onset of depressive symptoms through some additional factor or factors (Baron & Kenny, 1986). With respect to other mediators, Beck's (1967) theory features a proximal cause that includes not only a negative view of the future (hopelessness) but a negative view of the self and the world as well (i.e., negative cognitive triad; see Alloy, Clements, & Kolden, 1985, for a discussion of the triad as a mediator). Thus, future researchers might benefit by examining all three elements of Beck's cognitive triad.

It is of interest to compare the Attributional Diathesis × Stress results with those reported by other investigators. Whereas some investigators have reported results consistent with this aspect of the theory (Alloy et al., 1992; Metalsky et al., 1987, in press; Nolen-Hoeksema et al., 1986; Sacks & Bugental, 1987), others have not (Follette & Jacobson, 1987; Johnson & Miller, 1990; Robins & Block, 1989). Two issues may help explain this inconsistency in findings across studies, one conceptual and one psychometric.

Conceptually, in the studies that have reported negative findings, investigators have examined each of the individual attributional dimensions separately, or the full composite (i.e., combination of internality, stability, and globality), or both. Whereas this approach is appropriate for testing the reformulated helplessness theory (Abramson et al., 1978), it is not relevant to evaluating the hopelessness theory. The revised theory specifies that it is the combination of making both stable and global attributions that should contribute to hopelessness and depressive symptoms, regardless of whether the attribution is internal or external. We therefore recommend using the general-

ity subscale in future tests of the theory. Interestingly, the generality subscale was used in virtually all studies that reported supportive findings (see Nolen-Hoeksema et al., 1986, for an exception), whereas the individual dimensions in isolation, or full composite was used in all studies that reported negative findings.

From a psychometric perspective, it is noteworthy that virtually all studies that have reported positive findings have used one of the extended versions of the ASQ (see Sacks & Bugental, 1987, for an exception), whereas all studies that have reported negative findings have used the original scale. As several investigators have pointed out (Johnson & Miller, 1990; Robins & Block, 1989), the reliability of the original scale is less than optimal, with internal consistencies typically ranging between .40 and .70. In contrast, internal consistency typically ranges between .80 and .90 for the extended versions of the scale (Metalsky et al., 1987; Peterson & Villanova, 1988). We therefore recommend using one of the extended versions in future tests of the theory.

In closing, we highlight limitations with the study and some additional implications for future work. First, the student sample is not representative of adults in the community or of clinical depressives, and therefore the results should not be generalized to these populations. Second, the present study included only one follow-up session at a 5-week lag. To examine not only onset but maintenance of depressive symptoms, more frequent follow-up sessions over a longer period of time would be needed. Third, the present study did not test whether domain-specific cognitive diatheses combine with corresponding domain-specific stressors to predict onset of depressive symptoms (see Hammen, Marks, Mayol, & de Mayo, 1985; Metalsky et al., 1987). Finally, in our view, future work on the hopelessness theory would benefit by incorporating work from theories that highlight personality and interpersonal depressive processes. In this context, Metalsky, Potthoff, and Joiner (1992) reported that subjects who displayed the attributional diathesis were low in sociability and dominance, and high in social introversion and submissiveness, on subscales of the California Psychological Inventory (Gough, 1957, 1975; Hase & Goldberg, 1967). Moreover, they reported that subjects with the attributional diathesis exhibited an excessive need for approval from others. Taken together, the picture that emerges is similar to the dominant-other, sociotropic, anaclitic, and dependent type of depression proposed by a number of investigators (Arieti & Bemporad, 1980; Beck, 1983; Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982; Hirschfeld et al., 1977). Thus, in future work, it would be of interest to examine whether the depressive subtype posited by the hopelessness theory "maps onto" the depressive personality type proposed by these as well as other investigators (e.g., Coyne, 1976; Paykel, Klerman, & Prusoff, 1976). In addition, it would be important to examine whether the Attributional Diathesis × Stress combination continues to be associated with the onset of depressive symptoms after controlling for the aforementioned introverted-submissive-needy interpersonal style. It also would be of interest to examine whether this interpersonal style, taken together with the attributional diathesis, places people at double jeopardy for depression in the face of negative interpersonal events (e.g., rejection). We eagerly await future work that integrates the hopelessness theory of depression with basic work in personality and interpersonal processes.

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