

Vulnerability to Depressive Mood Reactions: Toward a More Powerful Test of the Diathesis–Stress and Causal Mediation Components of the Reformulated Theory of Depression

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To provide a more powerful test of the diathesis–stress component of the reformulated theory of depression (Abramson, Seligman, & Teasdale, 1978), we extended and refined the Metalsky, Abramson, Seligman, Semmel, and Peterson (1982) study and examined whether the content of college students' attributional styles (hypothesized attributional diathesis) as measured at Time 1 interacted with the outcomes students received on a class midterm exam to predict their subsequent depressive mood responses. In addition, to test the mediation component of the theory, we examined whether the relation between the hypothesized attributional diathesis and failure students' subsequent depressive mood responses to their low midterm grades was mediated by the particular causal attributions these students made for their low grades. The results partially corroborated the current statement (Abramson, Alloy, & Metalsky, 1986; Abramson, Metalsky, & Alloy, 1986a, 1986b) of the diathesis–stress component of the theory. Whereas students' immediate depressive mood reactions were predicted solely by the outcomes they received on the class midterm exam, their enduring depressive mood reactions were predicted solely by the hypothesized Attributional Diathesis \times Outcome on Midterm Exam interaction. The direction and form of the interaction were in line with prediction. The results fully corroborated predictions derived from the mediation component of the theory as they applied to students' enduring mood responses.

According to the current statement (Abramson, Alloy, & Metalsky, 1986; Abramson, Metalsky, & Alloy, 1986a, 1986b) of the reformulated theory of human helplessness and depression (Abramson, Seligman, & Teasdale, 1978), once people perceive that particular negative life events have occurred, the kinds of causal attributions they make for these events and the degree of importance they attach to them modulate the onset, intensity, and chronicity of their depressive reactions. In brief, depressive reactions are postulated to be more likely to occur, to be more intense, and to last longer when negative life events are attributed to stable and global causes and viewed as important than when negative life events are attributed to unstable, specific causes and viewed as unimportant. Moreover, when negative life events are attributed to internal as well as stable, global causes, depressive reactions are hypothesized to be accompanied by lowered self-esteem. In our view, this current statement (Abramson et al., 1986; Abramson et al., 1986a, 1986b) of the reformulated theory of depression (Abramson et al., 1978) incorporates a number of conceptual refinements over the 1978 statement. Thus, in this article we rely on the

current statement of the theory rather than the 1978 statement in discussing experimental predictions and results.

If causal attributions for negative life events do modulate the onset, intensity, and chronicity of people's depressive reactions to such events, it is important to specify what influences the kinds of causal attributions people will make for negative life events. Complementing social psychologists' work on the causal attribution process (e.g., Heider, 1958; Jones & Davis, 1965; Kelley, 1967), Abramson et al. (1978) speculated that individual differences exist in attributional styles and hypothesized that certain attributional styles are vulnerability factors for *hopelessness depressions* (cf. Abramson et al., 1986; Abramson et al., 1986a, 1986b; Halberstadt, Andrews, Metalsky, & Abramson, 1984). We have suggested that this aspect of the reformulation is best characterized as a *diathesis–stress component*, in which the style to attribute negative events to internal, stable, global causes is a diathesis for depressive reactions accompanied by lowered self-esteem and negative life events are a stress for depressive reactions (Metalsky, Abramson, Seligman, Semmel, & Peterson, 1982; see also Abramson et al., 1986; Abramson et al., 1986a, 1986b; Halberstadt et al., 1984). That is, when confronted with the same negative life event, people who display a generalized tendency to attribute negative events to internal, stable, global causes should be more likely to attribute the particular event to an internal, stable, global cause and therefore more likely to experience depressive reactions accompanied by lowered self-esteem than should people who typically attribute negative events to external, unstable, specific causes. Moreover, the logic of the reformulation suggests that in the presence of positive life events or in the absence of negative life events, peo-

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ple exhibiting the hypothesized attributional diathesis should be no more likely to develop depressive reactions accompanied by lowered self-esteem than should people not displaying the hypothesized attributional diathesis.

In an initial test of the diathesis-stress component of the reformulated theory, Metalsky et al. (1982) examined whether college students' attributional styles for negative outcomes at one point in time would predict the severity of their subsequent depressive mood reactions in the presence of a naturally occurring negative life event (i.e., receipt of a low grade on a class midterm examination) but not in the absence of the negative life event (i.e., receipt of a high grade on the class midterm exam). To test their predictions, Metalsky et al. computed correlations between students' attributional styles for negative outcomes on the Attributional Style Questionnaire (ASQ; Seligman, Abramson, Semmel, & von Baeyer, 1979; see also Peterson et al., 1982) at Time 1 and standardized residual changes in depressed mood on the Multiple Affect Adjective Check List (MAACL, Today Form; Zuckerman & Lubin, 1965) from Time 2 (5 days before receipt of the midterm grade) to Time 3 (on the day of receipt of the midterm grade) separately for students who received a low grade and for students who received a high grade on the midterm exam.

Metalsky et al. (1982) reported that the more internal or global students' attributional styles for negative outcomes were at Time 1, the more severe were their depressive mood reactions to receipt of a low midterm grade. However, Metalsky et al. indicated an ambiguity in their results. Although in the absence of the negative life event the correlation between severity of depressive mood response and the tendency to make global attributions for negative outcomes at Time 1 was nonsignificant, as predicted, this correlation was positive. Also pointing to the ambiguity in the interpretation of Metalsky et al.'s results, Williams (1985) noted that although attributional styles for the internality and globality dimensions and residual changes in depressed mood were significantly correlated in the low-grade group and nonsignificantly correlated in the high-grade group, as predicted, the correlations in the two groups did not differ significantly from one another.

Because we were concerned about the ambiguity in Metalsky et al.'s (1982) results as well as some other issues to be discussed, we decided to refine and extend the Metalsky et al. study. This gave us an opportunity to refine the conceptualization guiding the study as well as to make some methodological improvements, thus providing a more powerful test of the diathesis-stress component of the reformulated theory. In line with this component of the theory, we predicted that the content of college students' attributional styles (hypothesized attributional diathesis) as measured at Time 1 would interact significantly with the outcomes students received on a class midterm exam to predict their subsequent depressive mood responses. We further predicted that the hypothesized attributional diathesis as measured at Time 1 would be significantly correlated with students' subsequent depressive mood responses in the presence, but not in the absence, of receipt of a negative outcome on the midterm exam (i.e., that the form of the interaction would be consistent with that predicted by the theory).

A second major purpose of this study was to provide a test of the *causal mediation process* explicated in the reformulated

theory. In accordance with the mediation component, we predicted that the following pattern of results should emerge for students who received a negative outcome on the midterm exam (i.e., failure students). First, failure students' attributional styles as measured at Time 1 should be predictive of the particular attributions they subsequently made for their low midterm grades. Second, failure students' particular attributions for their low midterm grades should be predictive of their subsequent depressive mood responses. Third, failure students' attributional styles should not have a direct effect, beyond that of particular attributions for receipt of a low midterm grade, in predicting their subsequent depressive mood responses.

Method

In conducting our refinement and extension of the Metalsky et al. (1982) study, we incorporated the following conceptual refinements and methodological improvements.

Improvements in Conceptualization and Measurement of Attributional Style

First, to increment reliability, we developed a modified ASQ similar in format to the original but that included 12, rather than 6, negative outcomes. Second, we included a sufficient number of achievement and interpersonal negative outcomes (6 of each) so that achievement and interpersonal subscales could be examined separately (cf. Lefcourt, 1979; Lefcourt, von Baeyer, Ware, & Cox, 1979). Third, to prevent students from realizing that they were in a study relating attributional style and mood, we measured students' attributional styles outside of the classroom in an experimental session that, from the students' perspective, was in no way connected to any of the remaining sessions of the study. In the original Metalsky et al. (1982) study, this precaution was not taken as all measures were administered in class.

Following Abramson et al.'s (1986; Abramson et al., 1986a, 1986b) recommendations, we focused on the Generality (i.e., simple average of stability and globality) subscale for negative achievement outcomes in testing our predictions. This marked a departure from prior research and was more in keeping with the logic of the reformulated theory, allowing for a more precise test of our predictions (see Abramson et al., 1986, and Abramson et al., 1986a, 1986b, for a more complete discussion). Consistent with Abramson et al.'s (1986; Abramson et al., 1986a, 1986b) suggestions, this also allowed for a preliminary examination of the issue of *specific vulnerability* (i.e., whether depressive reactions to stressors falling within the boundaries of a given content domain, such as achievement-related stressors, are best predicted by attributional styles for outcomes in that particular content domain; cf. Beck, 1967, pp. 277-280; Hammen, Marks, Mayol, & deMayo, 1985). We did not focus on the Internality subscale because it was not relevant to testing our hypotheses (i.e., this study was not concerned with development of lowered self-esteem; see Abramson et al., 1986; Abramson et al., 1986a, 1986b).

Improvements in Conceptualization and Measurement of the Outcome

Before taking their midterm exam, students completed an aspirations questionnaire in which they were asked to indicate the grade that they personally would consider a failure. Students circled 1 of 13 possible grades (A+, A, A-, . . . , F) and these responses were transformed to a 13-point scale (A+ = 1, F = 13). Students' actual grades on the midterm exam were transformed to the same 13-point scale. Aspiration scores then were subtracted from actual exam grade scores so that high

scores on the resulting measure would correspond to receipt of a more negative outcome on the midterm exam. Applying Tabachnik, Alloy, Romer, and Crocker's (1986) weighting procedure, we then multiplied students' scores on this measure by their scores on the Importance subscale for negative achievement outcomes of the modified ASQ. This procedure included a number of improvements over that used by Metalsky et al. (1982; e.g., it allowed us to include all students in relevant analyses and therefore to increase the power of our statistical tests; the weighting procedure was in keeping with Abramson et al.'s, 1978, suggestion that the relation between negative life events and depressive reactions may be mediated in part by the degree of importance people attach to these events).

Examination of the Causal Mediation Process Explicated in the Reformulated Theory

Reliable measurement was particularly important in testing the mediation component because investigators who have measured particular attributions for real-life stressors typically have failed to demonstrate reliability (see Peterson & Seligman, 1984, for a discussion of this point). Toward this aim, we developed a Particular Attributions Questionnaire (PAQ) to assess students' attributions for their performance on the midterm exam. In a format similar to the ASQ, students were asked to write down the one major cause of receiving a low grade (or a high grade) on the midterm exam and then to rate this cause along the attributional dimensions of internality (1 item), stability (2 items), and globality (3 items). We used the Generality (i.e., simple average of stability and globality) subscale of the PAQ in testing the mediation hypothesis.

Examination of Temporal Parameters

Although the reformulated theory specifies a causal chain or sequence of events hypothesized to culminate in depressive symptoms, it is silent about the temporal aspects of this causal sequence (see also Cochran & Hammen, 1985). To begin to examine these temporal parameters, we measured students' levels of depressed mood at a number of different points in time preceding and following the point at which students received their midterm grades. In addition to these administrations of the MAACL, we administered a number of bogus MAACLs at various other times during the semester so that students would not think we were particularly interested in their emotional reactions to their grades.

Improvements in Translating the Logic of the Reformulated Theory Into More Powerful Statistical Techniques

As will become evident, the statistical procedure used in this study incorporated the advantages of the procedure used by Metalsky et al. (1982; e.g., it allowed prediction of residual as opposed to simple changes in depressed mood) but included a number of additional advantages as well.

Subjects and Procedure

An initial pool of 226 undergraduate students taking one of several introductory psychology courses offered at the University of Wisconsin—Madison participated in the first session of the study. Of these students, 94 were taking the particular course in which subsequent sessions occurred, and these students participated in the remaining sessions of the study.¹

At Time 1 (February 8–21, 1982), before taking their midterm exam, students' attributional styles were assessed. With the exception of this

first session, all sessions took place in class. On February 15, 1982, before taking their midterm exam, students' aspirations for their performance on the exam were assessed. Students' levels of transient depressive mood on the MAACL were assessed at Time 2 (February 22, 1982), 7 days before receipt of their midterm grades; at Time 3 (February 26, 1982), 3 days before receipt of their grades; at Time 4 (March 1, 1982), on the day of, immediately after, receipt of their grades; and at Time 5 (March 3, 1982), 2 days after receipt of their grades. Note that the two pregrade assessments of depressed mood at Time 2 and Time 3 occurred 2 days before and 2 days following the day on which students took their midterm exam, respectively. Students' attributions for their performance on the exam were assessed on the day of receipt of their midterm grades at Time 4, following administration of the MAACL.

Results

Reliability of Attribution Measures

Nunnally's (1978) formula for the reliability of a linear combination of measures was used to estimate the reliability of the two generality subscales of interest (see Formula 7-11, p. 248; Cronbach's, 1951, coefficient alpha was used to estimate the reliability of the individual attributional subscales going into the linear combination). Both of these subscales yielded satisfactory reliability coefficients. ASQ generality for negative achievement outcomes yielded a reliability coefficient of .79. PAQ generality yielded a reliability coefficient of .81. Note that ASQ generality for negative interpersonal outcomes yielded a reliability coefficient of .77.

Overview of Statistical Analyses

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). An APV may be viewed as a generalization of conventional analysis of covariance, in which a set of covariates first is entered into the regression equation followed by entry of a set or sets of research factors of interest, where sets of covariates and research factors each may include $k \geq 1$ variables of any formal type (e.g., linear as well as nonlinear aspects of quantitative scales, nominal scales representing aspects of group membership, etc.). In the special case of a simple pre–post design in which the dependent measure is a postscore measure of a given variable and the covariate set consists of a single prescore measure of the same variable, APV may be used to predict residual change scores, that is, scores reflecting change from prescore to postscore measures adjusted for subjects' prescore status.

In the context of this study, APV was used to predict residual changes in MAACL depression from before to after students' re-

¹ Some students from the initial pool were not taking the particular course in which subsequent sessions occurred and thus, by our experimental design, could not participate in these remaining sessions. These additional subjects were run in Session 1 for the purpose of assessing the reliability of the modified ASQ. Other students from the initial pool were taking the particular course in which subsequent sessions occurred but did not participate in some or all of these remaining sessions for various reasons (e.g., dropped course, missed class, etc.). Data obtained from these subjects were used for assessing the reliability of the modified ASQ and PAQ but were excluded from all other analyses.

Table 1
Diathesis–Stress Analyses: Prediction of Residual Change in MAACL Depression From Time 3 to Time 4

| Order of entry of set | Predictor(s) in set | Cumulative R^2 | Increment in R^2 for set (sr^2) | F for increment in R^2 for set | t for within-set predictors | df | Partial correlation (pr) | Squared partial correlation (pr^2) |
|-----------------------|---|------------------|---------------------------------------|------------------------------------|-------------------------------|-------|------------------------------|--|
| 1 | Time 3 MAACL depression ($k = 1$) | .032 | .032 | 3.06 | | 1, 92 | .179 | .032 |
| 2 | ASQ generality and outcome on midterm exam ($k = 2$) | .223 | .191 | 11.04* | 1.23 | 2, 90 | .444 | .197 |
| | ASQ generality* Outcome on midterm exam* | | | | 4.51* | 90 | .128 | .016 |
| 3 | ASQ Generality \times Outcome on Midterm Exam interaction ($k = 1$) | .226 | .003 | .41 | | 1, 89 | -.068 | .005 |

Note. MAACL depression = Multiple Affect Adjective Check List, Depression subscale. ASQ generality = average of scores on the Stability and Globality subscales for negative achievement outcomes of the modified Attributional Style Questionnaire. Outcome on midterm exam = deviation between aspiration for performance on midterm exam and actual grade received on midterm exam weighted by Importance subscale for negative achievement outcomes of the modified ASQ.

* ASQ generality and outcome on midterm exam entered simultaneously.

* $p < .001$.

ceipt of their midterm grades. In any given analysis, the covariate was one of the pregrade measures of depressed mood (Time 2 or Time 3 MAACL depression) and the dependent measure was one of the postgrade measures of depressed mood (Time 4 or Time 5 MAACL depression). Subsequent to entry of the covariate, variables were entered into the regression equation in the manner to be described. The results were similar regardless of whether Time 2 or Time 3 MAACL depression was used as the pregrade measure of depressed mood. For the sake of brevity, we report only the latter results. Note also that for all analyses reported here, tests of the assumption of homogeneity of regression associated with APV were conducted in accordance with the specifications of Cohen and Cohen (1983), and results were found to be consistent with this assumption in every case. In addition, in no case were predictor variables significantly correlated with Time 3 MAACL depression. It also is important to note in interpreting our results that the correlation between the midterm exam outcome measure and ASQ generality for negative achievement outcomes at Time 1 was .03, *ns*.

Tests of the Diathesis–Stress Component of the Theory

To test the diathesis–stress component with respect to students' immediate mood reactions, Time 3 MAACL depression was entered first into the regression equation, followed by entry (simultaneously) of the Generality subscale for negative achievement outcomes of the modified ASQ and the midterm exam outcome measure, followed by entry of the ASQ Generality \times Outcome on Midterm Exam interaction term (see Table 1). For the purpose of brevity, we refer to the Generality subscale for negative achievement outcomes of the modified ASQ as *ASQ generality* unless otherwise specified.

As seen in Table 1, the ASQ generality and outcome on midterm exam set uniquely accounted for a significant 19.7% of the variance in residual changes in MAACL depression from Time 3 to Time 4 (on the day of, immediately following, receipt of midterm grades), $F(2, 90) = 11.04$, $p < .001$. It is important to emphasize that there are two things actually being predicted here: Time 4 MAACL depression and residual change in MAACL depression from Time 3 to Time 4. The squared multiple semi-partial correlation (sr^2) for the set focuses on prediction of the former, reflecting the percentage of the total variance in Time 4 MAACL depression accounted for uniquely by the set (i.e., Time 3 MAACL depression is partialled from the set but not from Time 4 MAACL depression). In contrast, the squared multiple partial correlation (pr^2) for the set focuses on prediction of the latter, reflecting the percentage of the variance in Time 4 MAACL depression that is unrelated to Time 3 MAACL depression (i.e., variance in residual change) accounted for uniquely by the set (i.e., Time 3 MAACL depression is partialled not only from the set but from Time 4 MAACL depression as well). Thus, although the sr^2 was used to test the significance of the set, as is customary, this should not deter the reader from the fact that the chief result of interest for the set is given by the pr^2 . For the reader not familiar with regression, note also that in spite of their differences, sr^2 and pr^2 yield the same F (or t) value. Thus, when one is significant, the other also is significant, and to the same degree (see Cohen & Cohen, 1983, for a discussion of these points).

Within-set analyses revealed that the midterm exam outcome measure was primarily responsible for the significance of the ASQ generality and outcome on midterm exam set ($pr = .429$), $t(90) = 4.51$, $p < .001$ (see Table 1), uniquely accounting

Table 2
Diathesis–Stress Analyses: Prediction of Residual Change in MAACL Depression From Time 3 to Time 5

| Order of entry of set | Predictor(s) in set | Cumulative R^2 | Increment in R^2 for set (sr^2) | F for increment in R^2 for set | t for within-set predictors | df | Partial correlation (pr) | Squared partial correlation (pr^2) |
|-----------------------|---|------------------|---------------------------------------|------------------------------------|-------------------------------|-------|------------------------------|--|
| 1 | Time 3 MAACL depression ($k = 1$) | .026 | .026 | 2.45 | | 1, 92 | .161 | .026 |
| 2 | ASQ generality and outcome on midterm exam ($k = 2$) | .032 | .006 | .29 | | 2, 90 | .080 | .006 |
| | ASQ generality ^a | | | | .66 | 90 | .070 | .005 |
| | Outcome on midterm exam | | | | .35 | 90 | .037 | .001 |
| 3 | ASQ Generality \times Outcome on Midterm Exam interaction ($k = 1$) | .113 | .081 | 8.12* | | 1, 89 | .289 | .084 |

Note. MAACL depression = Multiple Affect Adjective Check List, Depression subscale. ASQ generality = average of scores on the Stability and Globality subscales for negative achievement outcomes of the modified Attributional Style Questionnaire. Outcome on midterm exam = deviation between aspiration for performance on midterm exam and actual grade received on midterm exam weighted by Importance subscale for negative achievement outcomes of the modified ASQ.

^a ASQ generality and outcome on midterm exam entered simultaneously.

* $p < .01$.

for a significant 18.4% of the variance in residual changes in MAACL depression from Time 3 to Time 4. At odds with the prediction derived from the current statement of the diathesis–stress component of the reformulated theory, Table 1 shows that the ASQ Generality \times Outcome on Midterm Exam interaction was not a significant predictor of students' immediate mood reactions.

Whereas the outcome measure was the sole predictor of students' immediate mood reactions, the hypothesized ASQ Generality \times Outcome on Midterm Exam interaction was the sole predictor of students' more enduring depressive mood reactions from Time 3 to Time 5 (2 days following receipt of midterm grades), $F(1, 89) = 8.12, p < .01$, uniquely accounting for a significant 8.4% of the variance (see Table 2). As the sign of the partial correlation indicates, the direction of the interaction was in line with prediction: ASQ generality at Time 1 was more highly associated with residual changes in MAACL depression from Time 3 to Time 5 for students who received a relatively negative outcome on the midterm exam than for students who did not.

To analyze whether the form of the interaction conformed to prediction, we conducted two separate regression analyses, one for failure students and one for nonfailure students, in which the Time 3 MAACL depression measure was entered first into the regression equation, followed by entry of the ASQ Generality subscale. For these analyses, subjects were considered to be failure students if their actual midterm grade was less than or equal to the grade that they previously had indicated they would consider a failure. Nonfailure students received a midterm grade that was greater than the grade that they previously had indicated they would consider a failure. As seen in Table 3, the results conformed to the predicted pattern: ASQ generality at

Time 1 correlated significantly with residual changes in MAACL depression from Time 3 to Time 5 for failure students ($pr = .478$), $t(20) = 2.43, p < .05$, but not for nonfailure students ($pr = -.084$), $t(68) = -.70, p > .10$. Although the obtained interaction already provided the relevant test for the entire sample, it is worth noting that these correlations differed significantly from one another ($z = 2.32, p < .05$).

To understand more fully the direction and degree of depressive mood responses, we followed Cohen and Cohen's (1983, pp. 323, 419) recommendations and computed residual change indices by plugging specific values for predictor variables (i.e., 1 standard deviation above and below the mean) into the regression equations associated with the analyses reported in Tables 1 and 2. The following pattern of results emerged from these descriptive analyses. Stable, global students became depressed in mood upon learning that they had done poorly on the midterm exam (residual change in MAACL depression from Time 3

Table 3
Diathesis–Stress Analyses: Partial Correlations of ASQ Generality and Residual Change in MAACL Depression From Time 3 to Time 5 for Failure Students and Nonfailure Students

| Students | pr | pr^2 | t | df | p |
|------------|-------|--------|-------|------|-----------|
| Failure | .478 | .228 | 2.43 | 20 | < .05 |
| Nonfailure | -.084 | .007 | -0.70 | 68 | <i>ns</i> |

Note. MAACL depression = Multiple Affect Adjective Check List, Depression subscale. ASQ generality = average of scores on the Stability and Globality subscales for negative achievement outcomes of the modified Attributional Style Questionnaire.

Table 4
Mediation Analyses: Prediction of Residual Change in MAACL Depression From Time 3 to Time 5 for Failure Students

| Order of entry | Predictor | Cumulative R^2 | Increment in R^2 (sr^2) | F for increment in R^2 | df | Partial correlation (pr) | Squared partial correlation (pr^2) |
|----------------|------------------|------------------|-------------------------------|--------------------------|-------|------------------------------|--|
| 1 | Time 3 | | | | | | |
| | MAACL depression | .123 | .123 | 2.95 | 1, 21 | -.351 | .123 |
| 2 | PAQ generality | .315 | .192 | 5.60* | 1, 20 | .468 | .219 |
| 3 | ASQ generality | .369 | .054 | 1.61 | 1, 19 | .280 | .078 |

Note. Correlation of ASQ generality with PAQ generality for failure students: $r = .593$, $t(21) = 3.37$, $p < .01$. MAACL depression = Multiple Affect Adjective Check List, Depression subscale. PAQ generality = average of scores on the Stability and Globality subscales of the Particular Attributions Questionnaire, which measured students' attributions for receipt of a low midterm grade. ASQ generality = average of scores on the Stability and Globality subscales for negative achievement outcomes of the modified Attributional Style Questionnaire.

* $p < .05$.

to Time 4 = 6.83) and continued to exhibit a depressive mood reaction 2 days later (residual change in MAACL depression from Time 3 to Time 5 = 3.91). In contrast, unstable, specific students also became depressed in mood upon learning that they had done poorly (residual change in MAACL depression from Time 3 to Time 4 = 6.29) but recovered completely from this depressive mood reaction within the course of 2 days (residual change in MAACL depression from Time 3 to Time 5 = -1.99). In the absence of receipt of a negative outcome on the midterm exam, students did not exhibit appreciable changes in their levels of depressed mood.

Although not directly relevant to testing our hypotheses, it is worth noting that ASQ internality for negative achievement outcomes did not significantly predict failure students' immediate or more enduring depressive mood reactions (both $ps > .10$).

Tests of the Causal Mediation Component of the Theory

Insofar as failure students' attributional styles were predictive not of immediate mood reactions but of more enduring mood reactions, the important question of interest in our mediation analyses is whether the latter relation was mediated by failure students' particular attributions for their low midterm grades.

As seen in Table 4, the results supported the mediation component of the theory as they applied to students' enduring mood responses. For failure students, ASQ generality at Time 1 correlated significantly with PAQ generality at Time 4 ($r = .593$), $t(21) = 3.37$, $p < .01$ (see the bottom of Table 4). Second, for failure students, PAQ generality correlated significantly with residual changes in MAACL depression from Time 3 to Time 5 ($pr = .468$), $F(1, 20) = 5.60$, $p < .05$, accounting for a significant 21.9% of the variance. Finally, for failure students, although ASQ generality accounted for a significant portion of the variance in residual changes in MAACL depression from Time 3 to Time 5 ($pr^2 = .228$; see Table 3), it did not account for a significant portion of the variance beyond that accounted for by PAQ generality ($pr^2 = .078$), $F(1, 19) = 1.61$, $p > .10$ (see Table 4). Although consistent with the mediation component of the theory, these results should be interpreted with caution in view of the small sample size in the failure group ($N = 23$) and the small

subject-to-variable ratio (approximately 8 subjects per variable).

Although not directly relevant to testing the mediation hypothesis, it is worth noting that PAQ generality did not account for a significant portion of the variance, beyond that accounted for by ASQ generality, in predicting failure students' enduring depressive mood responses ($pr^2 = .067$), $F(1, 19) = 1.35$, $p > .10$. In view of work in social psychology on the causal attribution process, one might expect factors in addition to attributional style (e.g., situational information; Kelley, 1967) also to influence failure students' particular attributions for their low midterm grades and thus for PAQ generality to account for additional variance beyond that accounted for by ASQ generality. Nevertheless, in this study ASQ generality accounted for a substantial portion of the variance in PAQ generality to the extent that the latter did not account for additional unique variance in failure students' enduring mood reactions.

Specific Vulnerability

The results provided preliminary support for the concept of specific vulnerability. Whereas ASQ generality for negative achievement outcomes predicted students' enduring depressive mood reactions to receipt of an achievement-related negative life event ($pr = .478$, $p < .05$; see Table 3), ASQ generality for negative interpersonal outcomes did not ($pr = .135$, $p > .10$; $t = 2.28$, $p < .05$ for the difference between these correlations). Along similar lines, although ASQ generality for negative achievement outcomes was a strong predictor of the particular causal attributions students made for their low midterm grades ($r = .593$, $p < .01$; see the bottom of Table 4), ASQ generality for negative interpersonal outcomes was not ($r = .297$, $p > .10$; $t = 2.13$, $p < .05$ for the difference between these correlations; see Steiger, 1980, for procedures for testing differences between dependent correlations).

Discussion

The results partially corroborated the current statement (Abramson et al., 1986; Abramson et al., 1986a, 1986b) of the diathesis-stress component of the reformulated theory. At odds

with the theory, students' immediate (Time 3 to Time 4) depressive mood reactions were predicted solely by the outcomes they received on the midterm exam. In contrast, and consistent with the theory, students' more enduring (Time 3 to Time 5) depressive mood reactions were predicted solely by the hypothesized Attributional Style \times Outcome on Midterm Exam interaction. The direction and form of the interaction conformed to that predicted by the theory. Descriptive analyses revealed that students who were stable and global and students who were unstable and specific in their attributional styles for negative achievement outcomes at Time 1 both became depressed in mood, to a comparable degree, immediately following receipt of the low midterm grade. However, 2 days following receipt of the low midterm grade, students who were stable and global at Time 1 continued to exhibit a depressive mood response, whereas students who were unstable and specific at Time 1 had recovered completely from their initial depressive mood response. In the absence of receipt of a negative outcome on the midterm exam, students did not exhibit appreciable changes in their levels of depressed mood.

In line with the mediation component of the reformulated theory, the results suggested that failure students' attributional styles predicted their subsequent enduring depressive mood responses through the operation of the particular attributions they made for their low midterm grades. The corroborative findings for the mediation component of the theory argue against Brewin's (1985) recent suggestion that the agreement between attributional styles and attributions for specific events is likely to be low and challenge his conclusion that there is little to suggest that attributions are important because of their relation to specific events in people's lives.

Insofar as different factors predicted immediate versus enduring depressive reactions, our results highlight how crucial the issue of timing can be in tests of the reformulated theory. If we had assessed only students' immediate mood reactions, we would have observed the initial outcome effect but would have missed completely the hypothesized diathesis-stress interaction (see Table 1). In contrast, if we had assessed only students' enduring mood reactions, we would have observed the predicted diathesis-stress interaction but would have missed completely the initial outcome effect (see Table 2). In view of this, the results also demonstrate the fruitfulness of a microanalysis of the temporal parameters of people's reactions to negative life events.

From the standpoint of the current statement (Abramson et al., 1986; Abramson et al., 1986a, 1986b) of the reformulated theory, an important question raised by the results is why attributional styles predicted students' more enduring depressive responses, but not their immediate depressive responses, to a low grade on the midterm exam. Recent work by Weiner (1986) suggests one possible explanation for this finding. Weiner proposed that once people perceive that an event has occurred, they initially may experience a primitive emotional response. These primitive emotions, which include *happy* for success and *sad* or *frustrated* for failure, are labeled "outcome-dependent, attribution-independent" by Weiner because in his view they are determined by the attainment or nonattainment of a desired goal and not by the causal attribution for the outcome. Weiner further argued that following the immediate emotional reac-

tion, a causal attribution will be sought (particularly if the outcome is negative, unexpected, or important; see Pittman & Pittman, 1980; Pyszczynski & Greenberg, 1981; Wong & Weiner, 1981) and a more differentiated set of emotions then will be generated by the chosen attribution ("attribution-dependent" emotions).

The parallels between Weiner's (1986) proposal and the results of our investigation are striking. Taken together, they suggest that people who exhibit the hypothesized attributional diathesis and people who do not both may be likely to experience a depressive mood response immediately following receipt of a negative life event. This immediate depressive mood response may occur before people have arrived at a causal attribution for the negative event, as Weiner suggested, and may be determined simply by the nonattainment of a highly desired goal or perhaps by some other causal process (e.g., conditioning, neurotransmitter depletion, etc.). Alternatively, causal attributions for the negative life event may be made before the occurrence of the immediate depressive mood response but may be overridden by the causal processes that lead to the immediate depressive mood response. In either case, once causal attributions for the negative life event have been made and the immediate depressive mood response has begun to subside, the hypothesized attributional diathesis then may begin to operate (through particular causal attributions) to predict how enduring the depressive mood response will be. People without the diathesis may experience merely the immediate depressive mood response, whereas people with the diathesis may experience a depressive mood response that endures over time beyond the point at which the immediate depressive mood response subsides. Future work is needed to test this hypothesis and, if necessary, revise the current statement of the reformulated theory accordingly.

In designing this study, we did not assume that people exhibit consistency in attributional patterns across all situations. Instead, similar to some personality theorists (e.g., Mischel, 1968), we allowed for the possibility that people may show some situational specificity in attributional patterns (e.g., achievement domain vs. interpersonal domain; see Abramson et al., 1986; Abramson et al., 1986a, 1986b; Metalsky & Abramson, 1981). Our specific-vulnerability results point to the potential usefulness of this approach. Although our approach marks a narrowing of the attributional-style concept, we suggest that this concept continues to be useful insofar as people may exhibit consistency in causal attributions across relatively broad content domains such as across achievement-related situations and across interpersonal-related situations.

To conclude, a few cautions should be kept in mind in interpreting our results. First, because we did not anticipate our temporal parameter finding (i.e., initial outcome effect and subsequent diathesis-stress effect), this result needs replication. Second, insofar as this study focused on depressive mood responses to a single negative life event, an important question for future research is whether the predictions of the reformulated theory apply to the development of the clinical syndrome of depression when people are confronted with major or cumulative life stressors. Third, although we obtained preliminary support for the concept of specific vulnerability (Abramson et al., 1986; Abramson et al., 1986a, 1986b; Beck, 1967), future work needs to examine not only whether depressive reactions to stressors in

the achievement domain are best predicted by attributional styles for negative achievement outcomes but, in addition, whether depressive reactions to stressors in the interpersonal domain are best predicted by attributional styles for negative interpersonal outcomes. Finally, similar to other investigators, we treated depression as a unitary phenomenon and did not search for hopelessness depression (Abramson et al., 1986; Abramson et al., 1986a, 1986b). A major challenge is to determine whether this theoretically proposed subtype of depression exists in nature and conforms to its description in the reformulation (see Abramson et al., 1986; Abramson et al., 1986a, 1986b).

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