

Hopelessness Theory and the Approach System: Cognitive Vulnerability Predicts Decreases in Goal-Directed Behavior

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Abstract The study tested an integration of the hopelessness theory of depression (Abramson et al. 1989) and Davidson's (1994) approach/withdrawal theory of depression in a sample of undergraduates ($N = 248$). According to this integrated theory (Abramson et al. 2002), cognitive vulnerability to depression interacts with stress to produce hopelessness, which signals a shut-down of the approach system. A shut-down of the approach system is reflected by decreases in goal-directed behavior, and in turn, the symptoms of depression. The study tested the hypothesized etiological chain of cognitive vulnerability-stress, hopelessness, goal-directed behavior, and depressive symptoms. Consistent with hypotheses, cognitive vulnerability interacted with stress to predict changes in goal-directed behavior. Importantly, the relationship between the cognitive vulnerability-stress interaction and goal-directed behavior was mediated by hopelessness. Participants who experienced a decrease in goal-directed behavior had higher levels of depressive symptoms than those who did not experience a decrease in goal-directed behavior.

Keywords Cognitive vulnerability · Hopelessness ·
Approach system · Depression

Introduction

Depression is a complex disorder, which likely results from the interaction of environmental, cognitive, motivational, and biological risk factors. Although each

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of these factors likely contributes to depression, most studies have focused on only one of these factors (e.g., cognitive risk factors). It is critical to begin to integrate these diverse approaches in order to develop a more comprehensive theory of depression. The goal of the present research was to provide a preliminary test of an integrated theory of depression that incorporates both cognitive and motivational perspectives.

Abramson and colleagues (2002) recently proposed an integration of the hopelessness theory of depression with Davidson's (1994) approach/withdrawal theory of depression. The hopelessness theory (Abramson et al. 1989) underscores the importance of cognitive processes in the etiology, maintenance, and treatment of depression. According to this theory, some individuals have a *cognitive vulnerability* that interacts with stress to produce depression. Specifically, the hopelessness theory posits that people are vulnerable to depression because they tend to generate interpretations of stressful life events that have negative implications for their future and for their self-worth. People who generate these negative interpretations develop hopelessness, which is a proximal and sufficient cause of hopelessness depression (a theoretically derived subtype of depression characterized by symptoms such as retarded initiation of responses, lack of energy, sad affect, and apathy; see Abramson et al. 1989). Recent research has provided strong support for hopelessness theory and has highlighted the important role that cognition plays in the development of depression (see Abramson et al. 2002 for review).

In contrast to the hopelessness theory, Davidson's approach/withdrawal theory emphasizes motivational factors in depression. Experimental psychologists have converged on the conclusion that there are at least two fundamental motivational systems that are critical in regulating behavior. One system regulates approach behavior to attain rewards and goals; it is typically referred to as the approach system¹ (Davidson 1994). The other system regulates withdrawal and/or inhibition of behavior in response to threat and punishment and, accordingly, is referred to as the withdrawal system². Within this motivational perspective, depression is most often viewed as a dysregulation of the approach system (see Shankman and Klein 2003 for review).

Davidson and colleagues have investigated the relationship between approach motivation and depression by delineating the neural circuitry implementing the approach and withdrawal systems. Specifically, Davidson (1994) contends that approach motivation is implemented in the left prefrontal cortex whereas the withdrawal system is implemented in the right prefrontal cortex. Recent research supports this hypothesis. For example, the approach system, as measured by Carver and White's (1994) BIS/BAS scale, is associated with increased left frontal cortical activity during resting baseline (Harmon-Jones and Allen 1997; Sutton and Davidson 1997). In regard to depression, Davidson and colleagues (see Davidson et al. 2002 for review) have consistently shown that depressed individuals exhibit less relative left-sided frontal activation than nondepressed individuals. This frontal asymmetry appears to be state-independent because asymptomatic remitted depressed individuals also exhibit less relative left-sided frontal activation than never depressed individuals (e.g., Gotlib et al. 1998; Henriques and Davidson 1990). Based on these and other findings, Davidson and colleagues (e.g., Davidson 1994) and Gotlib et al. (1998) have argued that relative less left frontal activation represents an impaired approach system and a vulnerability to depression.

¹ It is important to recognize that this system also has been called the Behavioral Approach System (Gray 1994), Behavioral Activation System (Cloninger 1987; Fowles 1980), and the Behavioral Facilitation System (Depue and Iacono, 1989).

² The withdrawal system also has been called the Behavioral Inhibition System (Gray 1994).

Does Davidson's impaired approach system constitute a vulnerability to depression that is independent from the cognitive vulnerability factor featured in hopelessness theory? According to Abramson and colleagues (2002), the answer is "no." They propose that cognition may influence the functioning of the biologically based motivational system described by Davidson. Specifically, *hopelessness* may "shut down" the approach system so that an individual is no longer motivated to pursue rewards and goals. Hopelessness is the expectation that highly desired outcomes will not occur or that highly aversive outcomes will occur and that one cannot change this situation. It is the expectation to which cognitively vulnerable individuals are hypothesized to be predisposed. Abramson and colleagues argue that as expectancies of hopelessness increase, goal-directed behavior will decrease (see also Fowles 1993). Consistent with this reasoning, many of the symptoms of the hopelessness depression (e.g., apathy, lack of energy, and retarded initiation of responses) appear to reflect deficits in approach motivation.

According to this integrated framework, when cognitively vulnerable individuals encounter a stressful life situation, they tend to generate negative inferences about their future and self-worth. These inferences lead to hopelessness about achieving current and future life goals. As hopelessness increases, the approach system shuts down. This shut-down is reflected by decreases in goal-directed behavior. Put more simply, the interaction of cognitive vulnerability and stress should predict hopelessness, and in turn, lead to decreases in goal-directed behavior.

The current study tested Abramson and colleagues' (2002) hypothesis that cognitively vulnerable individuals are at risk for decreased approach behavior in the presence of stress. The study used a 5-week prospective longitudinal design and tested a mediation model of cognitive vulnerability and goal-directed behavior. Specifically, we hypothesized that cognitive vulnerability would interact with stress to predict hopelessness, and in turn, lead to decreases in goal-directed behavior. In addition, we tested the hypothesis that changes in goal-directed behavior are associated with increases in depressive symptoms.

Method

Participants

Participants were 261 unselected undergraduates from the Introductory to Psychology participant pool at the University of Wisconsin-Madison. Participants were recruited through a volunteer folder sign-up procedure and were given extra credit points for their participation. A total of 248 (165 F) participants (M age = 18.68) completed both the T1 and T2 assessments. There were no significant differences on any T1 measures between participants who completed both assessments and those who did not complete the T2 assessment ($n = 13$).

Materials

Acute Life Events Questionnaire (ALEQ)

A modified Life Events Questionnaire (Needles and Abramson 1990) was used to assess naturally occurring *acute* stressful life events important to college students. Items

assessed a broad range of life events from school/achievement to interpersonal/romantic. Participants were instructed to indicate which of the negative life events had occurred to them over the previous 5 weeks (i.e., the time since their first assessment). Participants simply marked yes or no to indicate the occurrence of the event. To aid accurate recall, participants were given calendars with the 5-week interval highlighted. The calendar included the dates of school-related activities and holidays to create memory “anchors” that would help students determine whether particular life events occurred during the 5-week interval. Scores can range from 0 to 30 with higher scores indicating the occurrence of more negative events. The ALEQ was administered at T2.

Beck Depression Inventory (BDI; Beck et al. 1979)

The BDI is a 21-item self-report inventory that assesses depressive symptoms. Total scores on the BDI can range from 0 to 63, with higher scores indicating greater levels of depressive symptoms. The BDI has high internal consistency, test-retest reliability, and validity with both psychiatric and normal samples (Beck et al. 1988). The BDI was administered at T1 and T2.

Cognitive Style Questionnaire (CSQ; Alloy et al. 2000)

The CSQ assesses the cognitive vulnerability factor featured in the hopelessness theory of depression. The CSQ is an expanded and modified version of the Attributional Style Questionnaire (ASQ; Peterson et al. 1982). The ASQ is a well-established instrument with good reliability and validity that assesses participant’s attributions for hypothetical positive and negative events on dimensions of stability, and globality. The CSQ was modified from the ASQ by increasing the number of events to 12 negative events and by additionally including ratings (on 7-point scales) of the probable consequences of each event and the implications of each event for the self-concept. Thus, participants’ inferences regarding the cause, consequence, and self-worth implications of each hypothetical negative event are assessed. Mean-item scores can range from 1 to 7, with higher scores reflecting more negative cognitive styles. The CSQ was administered at T1.

Measure of Dynamic Goal Focus (DGF; Shah and Bodmann 2005)

The DGF was used to assess participants’ goal-directed behavior. Participants list three goals and then make ratings on a nine point Likert Scale on their progress toward achieving each goal (1 = No Progress, 9 = Great Progress) as well as their proximity to attaining the goal (1 = Far from Achieving, 9 = Close to Achieving). Goal-directed behavior was operationalized as participants’ average rating of progress and proximity to goals. The DGF was administered at T1 and T2.

Hopelessness Scale (HS; Beck et al. 1974)

The HS is a 20-item measure that assesses participants’ levels of hopelessness. Participants rate each item in a true-false format. Score can range from 0 to 20 with higher scores indicating greater levels of hopelessness. The HS has good internal consistency and validity (Beck et al. 1974). The HS was administered at T1 and T2.

Procedure

The study consisted of two time points separated by 5 weeks. At Time 1, participants were administered a brief demographics questionnaire, a measure of cognitive vulnerability (CSQ), a measure of hopelessness (HS), and a measure of goal-directed behavior (DGF). Five weeks later (Time 2) participants completed the HS, DGF, and a measure of stressful life events (ALEQ).

Results

Data analyses tested the hypothesized mediation model of cognitive vulnerability-stress, hopelessness, and goal-directed behavior (see Fig. 1). Following the criteria for mediation set forth by Baron and Kenny (1986), if hopelessness mediates the relationship between the cognitive vulnerability-stress interaction and goal-directed behavior, then the following four conditions should hold: (a) the cognitive vulnerability X stress interaction should predict T2 goal-directed behavior when controlling for T1 goal-directed behavior (link “a” in Fig. 1); (b) the cognitive-vulnerability X stress interaction should predict T2 hopelessness when controlling for T1 hopelessness (link “b” in Fig. 1); (c) Time 2 hopelessness should predict T2 goal directed behavior when

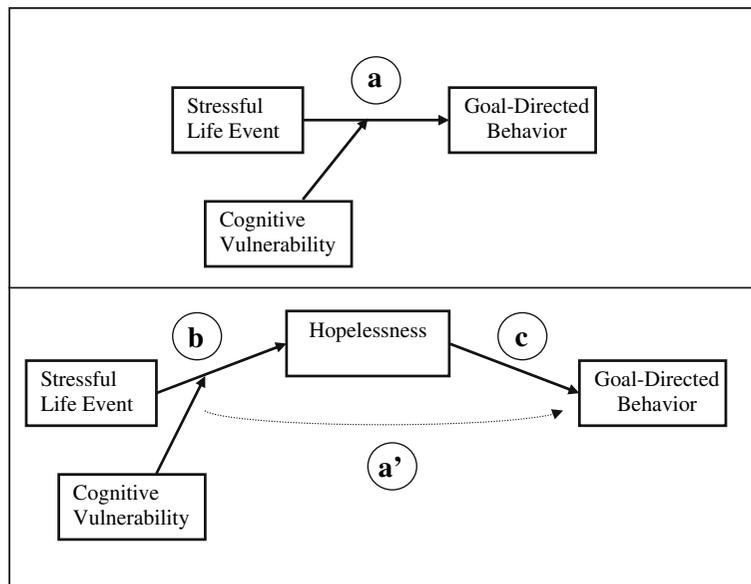


Fig. 1 A four-step mediation analysis (Baron and Kenny, 1986) was used to Abramson et al.’s (2002) integrated theory of depression. First, the initial variable (cognitive vulnerability-stress interaction) predicted the outcome variable (goal-directed behavior). This relationship is shown as link “a” in the top panel. Next, the initial variable (cognitive vulnerability-stress interaction) predicted the mediator (hopelessness); this relationship is shown by link “b” in the bottom panel. Third, the mediator (hopelessness) predicted the outcome variable (goal-directed behavior) when controlling for the initial variable (cognitive vulnerability-stress interaction); this is shown by link “c” in the bottom panel. Finally, the relationship between the initial variable and outcome variable (link a’) should no longer be significant when the mediator is in the model

controlling for T1 goal directed behavior, T1 hopelessness, and the cognitive vulnerability-stress interaction (link “c” in Fig. 1); (d) the cognitive vulnerability-stress interaction in the third condition should no longer be a significant predictor when controlling for changes in hopelessness (link “a” Fig. 1).

We used hierarchical multiple regression (Cohen et al. 2003) to test predictions. Consistent with the recommendations of Cohen et al. (2003), all continuous variables were centered and individual variables within a given set were not interpreted unless the set as a whole was significant, thereby reducing Type I errors. Descriptive statistics and correlations for the measures are listed in Table 1. Mediation results are shown in Table 2. Consistent with hypotheses, results met criteria for mediation: (a) the cognitive vulnerability X stress interaction predicted changes in goal-directed behavior ($b = -0.12$, $t = -2.46$, $p = .01$); (b) the cognitive vulnerability X stress interaction predicted changes in hopelessness ($b = 0.28$, $t = 2.72$, $p = .007$); (c) changes in hopelessness predicted changes in goal-directed behavior ($b = -0.12$, $t = -3.94$, $p < .001$); and (d) the cognitive-vulnerability X stress interaction was no longer a significant predictor of goal directed behavior ($p = .34$) when controlling for hopelessness. The statistical significance of the mediation effect was confirmed using Sobel’s t -test (Baron and Kenny 1986; Sobel 1982), $t = 2.24$, $p = .02$.

To determine the pattern of the vulnerability-stress interaction, we computed T2 goal-directed behavior scores by inserting specific values for predictor variables (i.e., 1 SD above and below the mean) into the regression equation. As shown in Fig. 2, participants with high CSQ scores and high stress exhibited the lowest level of goal-directed behavior at T2, even after controlling for T1 goal-directed behavior scores.

The primary goal of the current study was to determine whether hopelessness mediates the relationship between vulnerability-stress and goal-directed behavior. However, Abramson et al.’s (2002) integrated theory also makes predictions about the relationship between goal-directed behavior and depressive symptoms. If goal-directed behavior reflects a shut-down of the approach system, then decreases in goal-directed behavior should be accompanied by increases in depressive symptoms. Specifically, cognitive vulnerability should interact with stressful life events to predict depressive symptoms, and this relationship should be mediated by decreases in goal-directed behavior. We tested

Table 1 Means, standard deviations, and correlations between measures

	1	2	3	4	5	6
1 CSQ	–					
2 ALEQ	.22	–				
3 HS T1	.36	.20	–			
4 GOAL T1	-.23	-.07	-.34	–		
5 HS T2	.28	.35	.61	-.22	–	
6 GOAL T2	-.17	-.13	-.40	.44	-.42	–
M	4.10	2.88	2.81	5.65	3.35	5.66
SD	.73	2.46	3.01	1.64	3.46	1.45

Note. $N = 248$. CSQ = Cognitive Style Questionnaire. ALEQ = Acute Life Events Questionnaire (given at T2). HS T1 = Hopelessness Scale at Time 1. GOAL T1 = Measure of Dynamic Goal Focus rating at Time 1. HS T2 = Hopelessness Scale at Time 2. GOAL T2 = Measure of Dynamic Goal Focus rating at Time 2

Note that mean item scores are presented for the CSQ whereas total scores are presented for all other measures. Higher scores on the CSQ, ALEQ, HS, DGF Goal-Directed Behavior indicate greater levels of the construct being measured. Correlations greater than or equal to .13 are significant to the .05 level

Table 2 Hopelessness mediates the relationship between cognitive vulnerability-stress and goal-directed behavior

Predictor	<i>b</i>	<i>pr</i>	<i>t</i>	Step <i>R</i> ² Change
<i>Goal-directed behavior (Mediation Condition a)</i>				
Step 1				.20
T1 Goal	.39	.44	7.76***	
Step 2				.01
ALEQ	-.05	-.10	-1.49	
CSQ	-.11	-.06	-.96	
Step 3				.02
CSQ × ALEQ	-.12	-.16	-2.46*	
Model <i>R</i> ² = .23, <i>F</i> (4, 247) = 18.02, <i>p</i> < .001				
<i>Hopelessness (Mediation Condition b)</i>				
Step 1				.37
T1 Hopelessness	.70	.61	12.06***	
Step 2				.05
ALEQ	.32	.27	4.45***	
CSQ	.21	.05	.85	
Step 3				.02
CSQ × ALEQ	.28	.17	2.72**	
Model <i>R</i> ² = .44, <i>F</i> (4, 247) = 47.96, <i>p</i> < .001				
<i>Goal-directed behavior (Mediation Conditions c and d)</i>				
Step 1				.27
T1 Goal	.31	.36	6.01***	
T1 Hopelessness	-.13	-.29	-4.76***	
Step 2				.00
ALEQ	-.03	-.06	-.93	
CSQ	.03	.02	.25	
Step 3				.05
CSQ × ALEQ	-.04	-.06	-.70	
T2 Hopelessness	-.12	-.25	-3.94***	
Model <i>R</i> ² = .32 <i>F</i> (6, 247) = 18.81, <i>p</i> < .001				

Note. ALEQ = Acute Life Events Questionnaire (given at T2). CSQ = Cognitive Style Questionnaire. T1 Goal = Measure of Dynamic Goal Focus rating at Time 1. T1 Hopelessness = Hopelessness Scale at Time 1. T2 Hopelessness = Hopelessness Scale at Time 2. * *p* < .05. ** *p* < .01. *** *p* < .001

this hypothesis using the hierarchical multiple regression procedures described earlier. Consistent with hypotheses, results showed that the cognitive vulnerability X stress interaction predicted changes in depressive symptoms ($b = .561$, $t = 3.13$, $p = .002$). Participants with high CSQ scores and high stress exhibited the greatest level of depressive symptoms. Further, the relationship between the cognitive-vulnerability stress and depression was mediated by decreases in goal-directed behavior (the mediation effect was confirmed using Sobel's *t*-test, $t = 2.08$, $p = .03$).

Discussion

The results of the current study provide preliminary support for an integrated theory of depression combining cognitive and motivational perspectives. According to this integrated theory, cognitively vulnerable individuals are at heightened risk for developing hopelessness, which signals a shutdown of the approach system (i.e., decreased goal-directed behavior). Consistent with hypotheses, results showed that

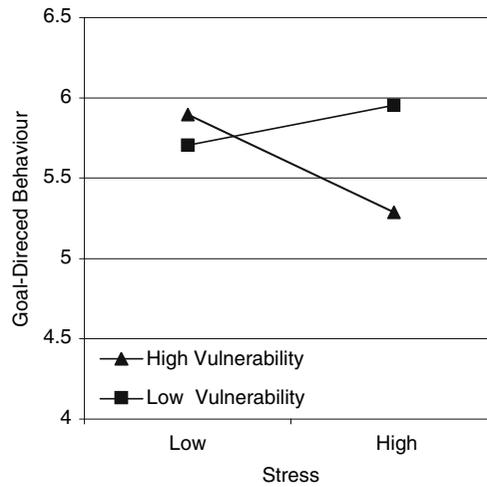


Fig. 2 Goal-directed behavior as a function of Cognitive Vulnerability score (high vs. low) and Life Stress (high vs. low). Higher scores indicate greater levels of the construct being measured. High and low levels of independent variables were specified as 1 SD above and below the mean

cognitive vulnerability interacted with stress to predict decreases in goal-directed behavior. Most importantly, the association between the cognitive vulnerability-stress interaction and goal-directed behavior was fully mediated by hopelessness. These results support the hypothesis that hopelessness provides a signal to shut down the approach system.

This study also provided preliminary support for the relationship between cognitive vulnerability, goal-directed behavior, and depressive symptoms. Cognitive vulnerability interacted with stress to predict depressive symptoms; and, as hypothesized, this relationship was mediated by changes in goal-directed behavior. Participants who experienced a decrease in goal-directed behavior over the prospective interval had significantly greater levels of depressive symptoms than participants who did not experience a decrease in goal directed behavior.

At least two limitations of the current study should be noted. First, the study used only a single measure of goal-directed behavior. It will be important for future research to examine alternative operationalizations of goal-directed behavior, such as Carver's (1994) BIS/BAS scale or Davidson's cortical activation asymmetries. A second limitation is the use of retrospective report of stress (negative life events). By using stress interviews or daily diary assessments to measure stressful events, future studies can more clearly delineate the temporal relationship among cognitive vulnerability, stress, hopelessness, and goal-directed behavior.

Although preliminary, the current results support the integration of hopelessness theory (Abramson et al. 1989) and Davidson's approach/withdrawal theory of depression (Davidson 1994) as well as indicate directions for future research. If hopelessness is related to an impaired approach system, then we can speculate about the biology involved in cognitive vulnerability to depression. It is reasonable to hypothesize that individuals exhibiting cognitive vulnerability should be associated with the same frontal cortical asymmetries as found by Davidson in his studies of the approach system. Thus, the next step for testing Abramson and colleagues (2002) integrated theory of

depression is to examine whether cognitively vulnerable individuals exhibit less relative left cortical activation than individuals without cognitive vulnerability. It also will be important for future research to delineate more precisely the nature of the relationship between hopelessness and the approach system. For example, experimental designs that manipulate level of hopelessness (e.g., a hope inducing intervention) can be used to clarify whether hopelessness is a causal contributor to changes in approach behavior.

It also will be critical to integrate recent work from social psychology on motivation. For example, research by Shah and others has begun to elucidate the factors that influence the maintenance of goal pursuit such as social support, goal shielding, and self-regulation (see Shah 2005). It is possible that some of these factors (e.g., social support) may buffer a cognitively vulnerable individual from generating the negative inferences that contribute to decreases in goal-directed behavior and depressive symptoms.

Conclusion

The hopelessness theory of depression and Davidson's approach/withdrawal theory of depression have each received compelling empirical support. However, each theory only explains one aspect of depression. The hopelessness theory explains the role of cognition in the etiology of depression, but it does not address motivational aspects of the disorder. On the other hand, Davidson's theory explains motivational aspects of depression, but does not address the cognitive factors implicated in depression. The goal of the present research was to try to bridge the gap between cognition and motivation by testing Abramson and colleagues (2002) integrated theory of depression. The results of this study provide initial support for this integrated theory of depression and provide a building block for future investigations.

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