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A prospective study of the cognitive-stress model of depressive symptoms in adolescents

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Abstract

This prospective study investigated a cognitive diathesis–stress model of depression in adolescents across the transition from 6th to 7th grade using individual, additive, weakest link, and keystone approaches to operationalizing the cognitive vulnerability. Participants were 240 young adolescents (mean age = 11.87 years, $SD = 0.57$) who differed in risk for mood disorders based on their mother’s history of depression. Results of the hierarchical multiple regression analyses indicated some support for the individual, additive, weakest link, and keystone diatheses. In particular, the weakest link diathesis interacted with stress and gender to predict increases in depressive symptoms in 7th grade; the form of this interaction was consistent with the cognitive diathesis–stress model for boys, whereas for girls the pattern of relations reflected more of a dual-vulnerability model. That is, high levels of depressive symptoms were found for all girls except those with more positive cognitive styles and low stress levels. These findings highlight the utility of examining different approaches to combining measures of cognitive vulnerability in conjunction with stress in predicting depressive symptoms, and the importance of exploring gender differences with regard to the cognitive diathesis–stress model.

Cognitive vulnerability models of depression assert that when individuals are confronted with negative life events, those who have certain cognitive tendencies (e.g., to appraise the events and/or their consequences negatively) are more likely to develop depressive symptoms than are those who do not have such cognitive tendencies (Abramson, Metalsky, & Alloy, 1989; Abramson, Seligman, & Teasdale, 1978; Beck, 1967, 1976; Brown & Harris, 1978; Monroe & Simons, 1991). Although these various models focus on different types of negative cognitions, they share the general perspective that when a cognitive vulnerability interacts with stress, depression can result. The aim of the present study was to examine three types of cognitions that cut across these theories rather than test one specific theory. The three cognitions—attributional style, self-worth, and hopelessness—were selected because they are components of at least two or more of the leading cognitive theories and are among the most central cognitions relevant to depression (Garber, 2007).

The reformulated learned helplessness model of depression (Abramson et al., 1978) asserts that individuals who attribute negative events to global, stable, and internal causes are more vulnerable to becoming depressed when they encounter stressful life events than are

individuals who do not have such a negative attributional style. In the refinement of the helplessness model, the hopelessness theory of depression (Abramson, Metalsky, & Alloy, 1988; Abramson et al., 1989) continued to include attributions as one of three negative inferential styles that were a vulnerability to depression, although Abramson et al. (1989) emphasized the global and stable dimensions in particular. Prior research has shown, however, that the reformulated helplessness and hopelessness theories' operationalizations of attributional style yield similar results in an adolescent sample (Hankin, Abramson, & Siler, 2001).

In addition to attributional style, self-esteem, or the degree to which one values oneself as a person, has been implicated as a vulnerability to depression by several researchers (e.g., Beck, 1967, 1976; Brown & Harris, 1978; Roberts & Monroe, 1992, 1994, 1999). For example, Beck (1976, 1991) suggested that individuals with a latent negative self-schema (e.g., beliefs such as "I am worthless," "I can't do anything right," and "I am unlovable"), which becomes activated when confronted with stressful life events, subsequently will interpret their experiences based on these negative self-perceptions and likely will become depressed (Beck, 1991). Vulnerable self-esteem can be conceptualized as low trait self-esteem (e.g., Brown, Bifulco, Harris, & Bridge, 1986) or differential activation of low self-esteem (Teasdale, 1983, 1988) and is thought to moderate the impact of life stress in predicting depressive symptoms. In the current study, global self-worth was used as the index of self-esteem. Global self-worth is distinct from domain-specific evaluations of the self in that it assesses "the totality of the individual's thoughts and feelings having reference to himself [*sic*] as an object" (Rosenberg, 1979, p. 7). Prospective studies examining global self-worth as a moderator of the relation between stress and depressive symptoms have yielded mixed findings (e.g., Haaga, Dyck, & Ernst, 1991; Hammen, Marks, deMayo, & Mayol, 1985; Robinson, Garber, & Hilsman, 1995).

Hopelessness, or negative expectations about the future, also has been implicated as a cognitive risk factor in several theories. According to Beck (1976), a pessimistic future orientation together with negative views of self and the world, referred to as the *negative cognitive triad*, serve as a vulnerability to depression. Biased interpretations of events that occur in the face of stress are due to the activation of negative representations of the self, the world, and future. Similarly, the hopelessness theory of depression (Abramson et al., 1988, 1989) emphasizes three negative inferential styles: attributing the causes of events to negative factors, perceiving stressful events as having negative consequences for one's future, and inferring negative characteristics about the self following stressful events. Hopelessness theory includes all three constructs (i.e., attributions, self-esteem, and hopelessness) but suggests that attributional style and self-esteem are more distal predictors, and hopelessness is a more proximal factor that presumably mediates this relation.

Hopelessness beliefs have been found to be stable and to persist after remission of depressive symptoms (Szanto, Reynolds, Conwell, Begley, & Houck, 1998), to continue to be a risk factor for depression even after recovery from a depressive episode, and to operate as a moderator (Young et al., 1996). Recent work (Goldston, Reboussin, & Daniel, 2006) has found that the construct of hopelessness as measured with the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974) is associated with substantial trait, state, and residual

(which includes state variance of very brief duration) variance. Thus, hopelessness likely has both trait- and state-like components. The current study examined whether the moderately stable cognitive vulnerabilities of attributional style, self-worth, and hopelessness interacted with stress to predict changes in depressive symptoms in young adolescents.

Operationalizing the Cognitive Vulnerability

Results of prior research in older adolescents and adults have been consistent with cognitive vulnerability models of depression (see Scher, Ingram, & Segal, 2005). Prospective studies designed to test the extent to which cognitive vulnerability temporally precedes and predicts increases in depressive symptoms and the onset of depressive disorder have provided some support for both Beck's (1967) cognitive model (Joiner, Metalsky, Lew, & Klocek, 1999; Kwon & Oei, 1994) and the cognitive diathesis–stress component of the hopelessness theory (Abela, 2002; Abela & Seligman, 2000; Alloy et al., 1999; Alloy & Clements, 1998; Alloy, Just, & Panzarella, 1997; Hankin et al., 2001; Metalsky, Halberstadt, & Abramson, 1987; Metalsky & Joiner, 1992, 1997; Metalsky, Joiner, Hardin, & Abramson, 1993).

Previous research testing cognitive vulnerability models of depression in children and adolescents, however, has yielded more mixed results. Some prospective studies have shown that the interaction of negative cognitions, particularly attributional style, and stress predicts depressive symptoms (e.g., Dixon & Ahrens, 1992; Hilsman & Garber, 1995; Panak & Garber, 1992), and others have found partial support (Abela, 2001; Conley, Haines, Hilt, & Metalsky, 2001; Lewinsohn, Joiner, & Rohde, 2001; Nolen-Hoeksema, Girgus, & Seligman, 1986, 1992; Robinson et al., 1995; Turner & Cole, 1994). For example, negative inferential styles about the self or consequences (Abela, 2001), hopelessness (Chang & Sanna, 2003), and dysfunctional attitudes (Lewinsohn et al., 2001) in interaction with negative life events predict depressive symptoms (e.g., Abela, 2001) and diagnoses (Lewinsohn et al., 2001), controlling for prior levels of depression. Some other prospective studies, however, have failed to show that a depressive inferential style about self, future, or causes (Abela & Sarin, 2002), or negative beliefs about the self or future predict depressive symptoms (Bennett & Bates, 1995) or diagnoses (Hammen, Adrian, & Hiroto, 1988).

Several factors have been suggested to account for inconsistencies in the results of studies testing cognitive vulnerability models in youth, including small sample sizes, failure to test the interaction of cognitions and stress, the need to prime negative cognitions with mood or stress inductions, cognitive developmental limitations, and the use of samples receiving treatment (Persons & Miranda, 1992; Robertson & Simons, 1989). According to developmental researchers (e.g., Cole et al., 2008; Gibb & Alloy, 2006), studies investigating cognitive diathesis–stress models in children have failed to provide consistent support because attributional style only emerges as a vulnerability factor to depression once children develop abstract reasoning and formal operational thinking during the transition from late childhood to early adolescence.

In addition, Abela and colleagues (Abela, 2001; Abela & D'Alessandro, 2001; Abela & Sarin, 2002) suggested that some of the failure to find support for cognitive-stress models in children has been because researchers examine different types of cognitions separately rather

than in relation to each other. That is, discrepancies in previous research with child samples may be due, in part, to methodological shortcomings of approaches that examined cognitive vulnerability factors in isolation. Although research in adults generally has not distinguished among the highly interrelated inferential styles about causes, consequences, and the self (Abela, 2002; Abela & Seligman, 2000; Metalsky & Joiner, 1992), studies have revealed differences among the relation of these different cognitive styles to depression in children (Abela, 2001; Abela & Sarin, 2002). Abela and Sarin (2002) argued that children who have only one negative inferential style and exhibit an increase in depressive symptoms following stressful events will either support or contradict the cognitive vulnerability theory being tested (e.g., hopelessness theory), depending on whether or not the study assessed the person's particular type of cognitive vulnerability. Thus, according to Abela and Sarin, tests of the diathesis–stress component of the hopelessness theory should include all three inferential styles and examine their interrelations rather than focusing on each separately.

The pattern of correlations among different measures of cognitive vulnerability should influence theories attempting to integrate them. If the correlations are extremely high, then the measures likely tap a similar vulnerability and as such could be added or averaged together. Their unique variances would be theoretically uninteresting, and adding multiple vulnerabilities separately to a model would result in their being unable to uniquely predict depression over and above the influence of the others (due to multicollinearity).

On the other hand, if these cognitive vulnerabilities are more independent, then it is possible that their unique variances contain theoretically useful information. They may have unique direct effects, or alternatively, an individual's greatest vulnerability or strength could be more important than his or her average vulnerability. Prior factor-analytic studies have indicated that measures of cognitive risks featured in diathesis–stress models of depression are correlated, although still relatively independent (Gotlib, Lewinsohn, Seeley, Rohde, & Redner, 1993; Hankin, Lakdawalla, Carter, Abela, & Adams, 2007; Joiner & Rudd, 1996; although see Garber, Weiss, & Shanley, 1993). Thus, the picture is mixed. Whereas some evidence supports a general vulnerability hypothesis (e.g., Hankin, Abramson, Miller, & Haefel, 2004), other evidence is more consistent with a specific vulnerabilities perspective (e.g., Lewinsohn et al., 2001).

The cognitive vulnerability to depression can be combined in several different ways. First, an “additive” approach examines vulnerability factors in concert by creating a composite score for each individual based on the mean (or sum) of his or her cognitive diatheses. This is consistent with a general model of cognitive vulnerability because it emphasizes the shared variance. One study using such an additive approach, however, did not find that a cognitive composite interacted with stress to predict depressive symptoms in children (Abela & Sarin, 2002).

As an alternative, Abela and Sarin (2002) proposed the “weakest link” approach, drawing from the analogy “A chain is only as strong as its weakest link.” According to this perspective, an individual's degree of vulnerability should be determined by his or her most negative cognitive style. In a study of 79 children in seventh grade over a 10-week period, Abela and Sarin showed that although none of the individual depressive inferential styles

interacted with negative events to predict increases in depressive symptoms in all students, children's individual weakest links interacted with negative events to predict increases in hopelessness depression symptoms. Similarly, in a study of 130 students in third grade and 184 in seventh grade over a 6-week period, Abela and Payne (2003) found that children's weakest links interacted with negative events to predict increases in hopelessness, but not nonhopelessness, depression symptoms.

Finally, we propose yet another way of combining cognitions, labeled here as the *keystone* approach. The keystone draws from architectonics and refers to the wedge-shaped stone, positioned at the apex of an arch, that locks the other stones in place and serves as the principal supporting element. According to this perspective, which mirrors the weakest link, an individual's degree of resilience in the face of stress is determined by his or her most positive cognitive style. That is, when confronted with stressful life events, individuals will depend on their strongest cognitions to buffer against the onset and maintenance of depressive symptoms. Prior research investigating cognitive moderators of the relation between stressful life events and depressive symptoms has provided some evidence that control beliefs (Herman-Stahl & Petersen, 1999), coping competence (Schroder, 2004), solace seeking (Rohde, Lewinsohn, Tilson, & Seeley, 1990), and positive illusions (Mazur, Wolchik, Virdin, Sandler, & West, 1999) buffer against the effects of stress on depression. Studies, however, have not yet examined composite indices of cognitive protective factors.

The Present Study

The present study builds on existing research on cognitive diathesis–stress models of depression in adolescents in several ways. First, this study attempted to replicate and extend the findings of Abela and colleagues (Abela & Payne, 2003; Abela & Sarin, 2002) regarding the weakest link hypothesis. In particular, we tested the most negative cognitions (i.e., weakest link) as well as the possible buffering role of the most positive cognitions (i.e., keystone) each in interaction with stress to predict changes in depressive symptoms. Second, although the weakest link approach was originally conceived as a test of the hopelessness model, we included a variety of cognitive vulnerability measures, thereby permitting a broader investigation of cognitive diathesis–stress interactions. Beck (as cited in Haaga et al., 1991) has previously suggested that the necessary condition for depression is an elevation on at least one, but not all, legs of the cognitive triad, which is consistent with the weakest link perspective. Whereas Abela and Sarin (2002) used the weakest link approach to test inferential style as defined by the hopelessness theory, the present study examined whether the merit of this methodological advance transcends hopelessness theory and can be applied to measures of negative cognitions (i.e., attributions, self-worth, and hopelessness) that are common to several cognitive-stress theories of depression.

In addition, Abela and colleagues (Abela & D'Alessandro, 2001; Abela, Gagnon, & Auerbach, 2007) have suggested that inconsistent support for the hopelessness theory in children may be resolved by specifying hopelessness depression symptoms rather than depressive symptoms in general as the dependent variable. Although the aim of the current study was not to test the hopelessness theory in particular, we conducted exploratory analyses to examine whether the different negative cognitions included here and the various

methods of operationalizing the cognitive vulnerability also predicted hopelessness depression symptoms as defined by Abela and colleagues (Abela & D'Alessandro, 2001; Abela & Sarin, 2002).

Third, this study used a moderate size sample of same-age youth who varied with regard to risk as a function of their mother's history of depression. This sampling strategy was used because children of depressed mothers are known to be at increased risk for depression (e.g., Beardslee, Versage, & Gladstone, 1998; Goodman & Gotlib, 1999), are exposed to high levels of stress (e.g., Billings & Moos, 1983; Hammen, 1988; Hammen, Shih, & Brennan, 2004), and the relation between stress and depressive symptoms has been found to be significant in these children (e.g., Jaser et al., 2005; Langrock, Compas, Keller, Merchant, & Copeland, 2002). Such a high-risk research design provides increased variability in the constructs of primary interest—negative cognitions, stressful life events, and depressive symptoms—thereby reducing potential problems associated with restriction of range, which is a particular concern when testing models that involve interactions. In order to have sufficient power to detect an interaction, it is necessary to have adequate coverage over the “space” implied by the two variables in the interaction term (McClelland & Judd, 1993). Whereas normative samples are likely to have individuals who are primarily low–low, or low–high/high–low on negative cognitions and stress, oversampling children at risk for depression increases the chances of including individuals who are high on both and thereby improving the chances of finding an interaction between these variables. According to McClelland and Judd (1993), sampling observations from the more extreme ends can facilitate the detection of statistically reliable interactions in field studies by reducing standard errors without biasing parameter estimates. Thus, including a sample of both high- and low-risk participants increases power to detect moderation.

Fourth, the current study tested the cognitive-stress model using an objective, interview-based measure of stressful life events. Such contextual threat interviews (e.g., Brown & Harris, 1978; Hammen, 1988; Williamson et al., 1998) facilitate the gathering of detailed information about the contextual factors surrounding the environment and their impact on the participant, and they overcome problems of counting, recalling, and dating of events often found with checklists (Duggal et al., 2000). Despite their promise, however, contextual threat interviews rarely have been used in tests of the cognitive diathesis–stress model in youth. Hammen and colleagues (Hammen, 1988; Hammen, Gordon, et al., 1987) used a contextual threat interview but did not find a significant cognitive-stress interaction, although they may have had limited power due to their small sample. The present study tested the cognitive-stress model using objective ratings of stressful events in a larger sample of adolescents who varied in their risk for depression.

Additionally, the present study focused on a developmental period—the transition to junior high school—that has been found to be associated with increased levels of stress in some adolescents. The transition to junior high school marks a time of significant change in academic environment, social activities, and physical development (Elias, Gara, & Ubriaco, 1985; Felner, Ginter, & Primavera, 1982; Harter, Whitesell, & Kowalski, 1992; Wigfield, Eccles, MacIver, Reuman, & Midgley, 1991). Differences in the level of stress around this normative transition (Simmons, Burgeson, Carlton-Ford, & Blyth, 1987) and the presence of

stress-moderating factors (e.g., cognitive appraisal, self-esteem, social support) have been hypothesized to explain variation in the amount of psychological distress experienced by young adolescents during this transition (Fenzel & Blyth, 1986; Hirsch & Rapkin, 1987; Leahy & Shirk, 1985; Schulenberg, Asp, & Petersen, 1984; Seidman, Allen, Aber, Mitchell, & Feinman, 1994; Windle, 1992). Some prior studies have shown that cognitive diathesis–stress interactions may begin to predict depressive symptoms during this developmental period (e.g., Abela, 2001; Nolen-Hoeksema et al., 1992). Given that school transitions have been found to be particularly difficult for adolescents who are simultaneously experiencing high levels of other stressors (Simmons et al., 1987), we focused on this salient developmental epoch because it is likely to be characterized by considerable individual variability in levels of stress and depression.

Finally, the present study provided an opportunity to examine gender differences in the relations among negative cognitions, stress, and depression. Gender differences in depression begin to emerge during early adolescence (e.g., Hankin et al., 1998; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993) and have been associated with a variety of psychosocial risk factors (e.g., see Hankin & Abramson, 2001; Nolen-Hoeksema & Girgus, 1994; Rudolph, 2002, for reviews). Some studies investigating cognitive vulnerability, however, have not found gender differences in measures of attributional style among children or adolescents (Gladstone, Kaslow, Seeley, & Lewinsohn, 1997; Hankin et al., 2001; Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). Moreover, vulnerability factors such as attributional style, ruminative coping, and peer popularity have been found to be related to depression in both boys and girls (e.g., Girgus, Nolen-Hoeksema, & Seligman, 1989; Nolen-Hoeksema, Girgus, & Seligman, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993). Other studies, however, have reported gender differences in some cognitive variables. For example, compared to boys, girls have been found to have more negative self-perceptions of physical appearance (Allgood-Merten, Lewinsohn, & Hops, 1990) and more negative general cognitive styles, attributional styles, and inferences about the self (Hankin & Abramson, 2002). Moreover, such negative self-perceptions have been found to partially mediate gender differences in adolescent depression (Allgood-Merten et al., 1990; Hankin & Abramson, 2002; Hankin, Roberts, & Gotlib, 1997).

Few studies, however, have examined gender differences in cognitive diathesis–stress models of depression in youth. Abela and Payne (2003) showed that children’s weakest links interacted with negative events to predict increases in depressive symptoms in boys with low but not high self-esteem, whereas for girls, their weakest links interacted with negative events to predict increases in hopelessness depression symptoms among those with high but not low self-esteem. That is, the weakest link by stress interaction was found for both boys and girls, although it was further moderated by self-esteem differentially by gender. The current study examined whether the cognitive diathesis–stress model varied by gender for each of the different operationalizations of the cognitive-vulnerability variable.

In summary, the purpose of the current study was to test the cognitive diathesis–stress model of depression in a high-risk sample during the transition to junior high school using individual (i.e., attributional style, self-esteem, hopelessness) and composite (i.e., additive, weakest link, keystone) approaches. We hypothesized that the individual cognitive diatheses

and the composite indices would interact with stress to predict depressive symptoms and diagnoses 1-year later, and these interactions would be moderated by gender. In exploratory analyses, we also examined the following: (a) whether the individual and composite cognitive diatheses interacted with stress and gender to predict hopelessness depression symptoms in particular; (b) whether the spread of standardized cognitive-vulnerability scores interacted with mean level of stress to predict depressive symptoms; and (c) how well each of the individual and composite approaches performed relative to one other.

Method

Participants

The sample, which was part of a larger, 6-year longitudinal study of children at risk for psychopathology, consisted of 240 mothers and 1 biological offspring from each. The current article specifically focuses on the transition from sixth to seventh grade, which covers Waves 1 and 2. Children were first assessed in sixth grade (M age = 11.87 years, SD = 0.57). The child sample was 54.2% girls and 82% Caucasian, 14.7% African American, and 3.3% Hispanic, Asian, or Native American. The sample was predominantly lower-middle to middle class, with a mean socioeconomic status (Hollingshead, 1975) of 38.84 (SD = 13.27).

Procedure

Parents of fifth grade children from metropolitan public schools were invited to participate in a study about parents and children. A brief health history questionnaire comprised of 24 medical conditions (e.g., diabetes, heart disease, depression) and 34 medications (e.g., Prozac, Elavil) was sent along with a letter describing the project to over 3,500 families. Of the 1,495 mothers who indicated an interest in participating, the 587 who had endorsed either a history of depression, use of antidepressants, or no history of psychopathology were interviewed further by telephone. The remaining families were excluded because the mother either did not indicate depression or indicated other kinds of serious health problems (e.g., cancer, multiple sclerosis). Based on the screening calls of the 587 families, 349 had mothers who reported either a history of depression or no history of psychiatric problems. The 238 families not further screened were excluded because they did not indicate sufficient symptoms to meet criteria for a depressive disorder (38%), they had other psychiatric disorders that did not also include a depressive disorder (19%), they or the target child had a serious medical condition (14%), they were no longer interested (21%), the target child was in the wrong grade (6%), or the family had moved out of the area (2%). The Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders* diagnoses (Spitzer, Williams, Gibbon, & First, 1990) was then conducted with the 349 mothers who had indicated during the screening calls that they had had a history of some depression or had had no psychiatric problems. Interrater reliability was calculated on a random subset of 25% of these interviews. There was 94% agreement (κ = .88) for diagnoses of depressive disorders. The final sample of 240 families consisted of 185 mothers who had a history of a mood disorder (high-risk group) and 55 mothers who were lifetime free of psychopathology (low-risk group).

In the current study, children were first assessed in sixth grade (Time 1) and again during the first semester of seventh grade (Time 2). A research assistant, unaware of the mothers' psychiatric history, interviewed and administered a battery of questionnaires separately to the mother and adolescent. Only those measures relevant to the current study are described here (see also Bohon, Garber, & Horowitz, 2007; Carter, Garber, Ciesla, & Cole, 2006).

Measures

Depressive symptoms were assessed annually with a modified Children's Depression Rating Scale—Revised (CDRS–R; Poznanski, Mokros, Grossman, & Freeman, 1985) and with the Children's Depression Inventory (CDI; Kovacs, 1981). Adolescents were interviewed with the CDRS–R regarding the extent of their depressive symptoms during the previous 2 weeks. Eleven depressive symptoms (e.g., anhedonia, insomnia, suicidal ideation) were rated on a 7-point severity scale (1 = *no sign of abnormality*, 7 = *severe abnormality*); total scores could range from 11 to 77. Stability from Time 1 to Time 2 was .25 ($p < .001$). Coefficient alpha for the CDRS–R was .72 at Time 1 and .73 at Time 2.

The CDI is a 27-item self-report measure of cognitive, affective, and behavioral symptoms of depression. Each item lists three statements, scored 0 to 2, with higher scores indicating greater severity; total scores can range from 0 to 54. Children were asked to select the statement that most accurately described how they were thinking and feeling in the past 2 weeks. The CDI has good internal consistency, test–retest reliability, and convergent validity with other self-report measures (Carey, Faulstich, Gresham, Ruggiero, & Enyart, 1987; Kazdin, French, Unis, & Esveltd-Dawson, 1983; Saylor, Finch, Baskin, Furey, & Kelly, 1984; Saylor, Finch, Spirito, & Bennett, 1984). Stability from Time 1 to Time 2 was .52 ($p < .001$). Coefficient alpha for the CDI in this sample was .81 at Time 1 and .80 at Time 2.

Analyses were run using a composite depression symptoms measure (Dep-Sxs) created by standardizing the CDRS–R and CDI scores and taking their mean. A composite measure was used in order to reduce monomethod bias, increase variability in scores, and allow an evaluation of more aspects of depression than were assessed by either measure alone. The CDRS–R and CDI were significantly correlated at Time 1 ($r = .37$, $p < .001$) and Time 2 ($r = .56$, $p < .001$). These modest correlations suggest that the CDRS–R and CDI measures overlap as well as some different features of depression. Reliability of the composite measure at Time 1 was $r_{YY} = .83$ and at Time 2 was $r_{YY} = .58$ (Nunnally & Bernstein, 1994). Stability from Time 1 to Time 2 of Dep-Sxs was $r = .42$ ($p < .001$).

In an attempt to replicate the original weakest link approach with different, although related, measures of the cognitive diatheses, we created a measure of hopelessness depression (CDI-H) from the CDI, as per Abela and D'Alessandro (2001), by calculating the mean of the relevant items: motivational deficit (Items 13 and 15), sad affect (Items 1 and 10), lack of energy (Item 17), sleep disturbance (Item 16), low self-esteem (Items 3, 7, 8, 14, and 24), and loneliness (Items 20, 22, and 25). In the current study, coefficient alpha for the CDI-H was .72 at Time 1 and .65 at Time 2.

Depressive disorders were diagnosed with the Schedule for Affective Disorders and Schizophrenia for School-Aged Children—Present and Lifetime Version (Kaufman et al.,

1997), which involves interviewing mothers and adolescents separately. All interviews were audiotaped. A second rater who was unaware of the ratings of the primary interviewer reviewed a random 25% of the interview audiotapes. Interrater reliability for depression yielded a kappa of .81.

Attributional style was assessed with the revised Children's Attributional Style Questionnaire (CASQ-R; Thompson et al., 1998), which contains 12 positive and 12 negative items; 12 additional negative items from the original CASQ (Seligman et al., 1984) also were included. ^[1] Each item varies one causal dimension (locus, stability, globality) while holding the other two dimensions constant. A mean negative composite score was created by dividing the number of internal, stable, and global responses to all negative events by the total number of negative events.

Reliability for the negative composite was calculated using a tetrachoric correlation matrix to account for the artificial attenuation that occurs when a continuous construct (i.e., attributional style) is assessed with a forced-choice dichotomous response format. This method yields a coefficient alpha of .68 at Time 1 and .75 at Time 2, which is consistent with what has been found elsewhere in the literature (Gladstone & Kaslow, 1995; Robins & Hinkley, 1989). Stability from Time 1 to Time 2 in the current study was moderate ($r = .44$, $p < .001$). Consistent with the helplessness model (Abramson et al., 1978) and with other studies that have tested the attribution by stress interaction in youth (e.g., Gladstone & Kaslow, 1995; Joiner & Wagner, 1995), the current study used the negative composite of global, stable, and internal attribution factors.

Global perception of self-worth was assessed with the Self-Perception Profile for Children (Harter, 1982). The six items of the Global Self-Worth subscale assess the extent to which children are satisfied with themselves, like the way they are leading their lives, like the kind of person they are, and think the way they do things is fine. Each item is presented in a structured alternative format (i.e., "Some kids are often unhappy with themselves BUT Other kids are pretty pleased with themselves.") Participants were read both statements and then were asked to select the one that most accurately described them and whether the chosen statement was "really true" or "sort of true" of them. Responses were scored on a 4-point scale, with lower scores indicating poorer global self-worth. In this sample, coefficient alpha for the Global Self-Worth subscale was .82 at Time 1 and .81 at Time 2. Stability from Time 1 to Time 2 was moderate ($r = .41$, $p < .001$).

Hopelessness was assessed with the Children's Hopelessness Scale (CHS; Kazdin, Rodgers, & Colbus, 1986), which is based on the Hopelessness Scale for adults (Beck et al., 1974). The 17 true-false items measure the extent to which children are generally pessimistic about their future and are scored either as 0 for the optimistic direction or 1 for the pessimistic direction. The CHS has adequate reliability and construct validity (Kazdin, French, Unis, Esveltd-Dawson, & Sherick, 1983; Kazdin et al., 1986). In this sample, internal consistency of the CHS was .58 at Time 1 and .71 at Time 2. Stability from Time 1 to Time 2 was

¹The CASQ given to the first third of the sample at Time 1 inadvertently did not include these 12 additional items. Therefore, mean negative composite scores were used.

moderate ($r = .50, p < .001$), which is consistent with the conceptualization of hopelessness as a relatively stable vulnerability factor.

The Life Events Interview for Adolescents (Garber & Robinson, 1997), which is based on the Life Events and Difficulties Schedule (Brown & Harris, 1989; Williamson et al., 1998) and the Life Stress Interview (Hammen, 1988), was used to assess stressful life events. Mothers and adolescents were interviewed separately regarding events that had occurred for the adolescent during the previous year (from Time 1 to Time 2). The Life Events Interview for Adolescents is a semistructured interview that allows for more precise dating of events and the assessment of objective consequences of events, given the particular context in which they occurred. Following the widely-used procedure regarding parent- and child-report, if either person indicated that an event had occurred, then it was rated. If their accounts of the event were very discrepant or if one person reported an event and the other did not, then the interviewer attempted to clarify the information at the time by asking both individuals more questions. Interviewers always first checked with the adolescent and parent separately about whether either objected to the interviewer's asking the other person about the event.

Interviewers presented to a group of trained raters information about each adolescent's life events. Based on all information from both sources, the group then rated the event with regard to the degree of objective threat the event had for the adolescent, using a scale ranging from 1 (*none*) to 7 (*severe*). Raters were unaware of any information about the mothers' or adolescents' psychopathology. Interrater reliability of the objective stress ratings were obtained by having interviewers present the information about each event simultaneously to two different groups who then independently rated the event. Based on 202 events, agreement among raters was 89.6% ($\kappa = .79$). Because the two stress variables (i.e., total level of stress and total event count) were highly correlated ($r = .92$), analyses were conducted using only one indicator of stress, the total level of stress rating.

Results

Descriptive Analyses

Table 1 presents the means, standard deviations, and correlations of the study variables. Table 2 presents rates of major depressive disorder (MDD) and proportions of participants scoring in the clinical range on the CDI and CDRS-R at both time points. To compute the additive, weakest link, and keystone composite scores, we first standardized scores on the CHS, the CASQ negative composite, and the Global Self-Worth subscale of the Self-Perception Profile for Children. The Self-Perception Profile for Children scores were multiplied by -1 so that higher scores indicated lower self-worth, consistent with the direction of the other cognitive measures. Each child's additive composite score was computed by taking the mean of the three cognitive measures at that time point. Each child's weakest link composite score was equal to the highest of his or her standardized scores at that time point; the keystone composite score was equal to the lowest of his or her standardized scores at that time point. At Time 1, the weakest link was attributional style for 38% of the children, global self-worth for 29%, and hopelessness for 34%. The keystone

was attributional style for 32% of the children, global self-worth for 35%, and hopelessness for 33%.

Overview of Statistical Analyses: Diathesis–Stress Component

Hierarchical multiple regression analyses (Cohen & Cohen, 1983) were used to test the cognitive diathesis–stress interactions (see Tables 3 and 4). For all analyses, the dependent variables were Time 2 Dep-Sxs scores and CDI-H scores. All variables included in interactions were centered. In the first block, gender, risk, and the prior score for the dependent variable (i.e., Time 1 Dep-Sxs) were entered as covariates, and cognitive diatheses and stress scores were entered as main effect variables. Two-way interactions were entered in the second block. In the final block, the cognitions by stress by gender interaction was entered. All variables within each block were entered simultaneously and were not interpreted unless the block itself was significant (Cohen & Cohen, 1983). Simple slope analyses were conducted on all significant interactions, per Aiken and West (1991). Higher-order interactions with risk were tested, but none were significant.

Logistic regression analyses were used to test the cognitive diathesis–stress interactions predicting MDD at Time 2. According to Hosmer and Lemeshow (2000), approximately 10 “events” are needed to estimate each parameter in logistic regressions. At Time 2, there were 12 new cases of MDD, all in the high-risk group. With 12 new cases at Time 2, however, these analyses only had sufficient power to estimate the intercept; all failed to converge on solutions for the blocks that included predictors. Therefore, no further analyses of depression diagnoses were conducted.

Do the Individual Cognitive Diatheses Moderate the Relation Between Stress and Depressive Symptoms?

The Time 1 CHS $\times$ Stress Level $\times$ Gender interaction significantly predicted the Time 2 depressive symptoms composite score ($\beta = -.15$, $pr = -.16$, $p = .022$; see Table 3). Simple slope analyses revealed that for boys, the Hopelessness $\times$ Stress interaction significantly predicted higher levels of depressive symptoms ($\beta = .30$, $pr = .251$, $p < .001$), such that at high levels of hopelessness, stress significantly predicted increases in depressive symptoms ($\beta = .46$, $pr = .24$, $p = .001$). For girls, stress level significantly predicted high levels of depressive symptoms for those with both low ($\beta = .33$, $pr = .16$, $p = .025$) and high ($\beta = .35$, $pr = .22$, $p = .002$) levels of hopelessness. In the analyses of attributional style, stress level ($\beta = .21$, $pr = .21$, $p < .01$) significantly predicted Time 2 depressive symptoms. Regarding global self-worth, stress ($\beta = .21$, $pr = .21$, $p < .01$) and low self-worth significantly predicted Time 2 depressive symptoms ($\beta = -.29$, $pr = -.29$, $p < .001$). The interactions of attributions or self-worth with stress did not significantly predict change in level of depressive symptoms.

Does the Additive Cognitive Diathesis Moderate the Relation Between Stress and Depressive Symptoms?

The Time 1 Additive $\times$ Stress $\times$ Gender interaction significantly predicted Time 2 depressive symptoms ($\beta = -.24$, $pr = -.27$, $p < .001$; see Table 4). Simple slope analyses revealed that the interaction of the additive cognitive diatheses and stress significantly predicted increases

in depressive symptoms for boys ($\beta = .27$, $pr = .22$, $p = .002$); that is, for boys, higher additive (i.e., more negative) cognitions ($\beta = .40$, $pr = .22$, $p = .002$) at higher stress levels significantly predicted higher levels of depressive symptoms. For girls, the interaction of the additive diatheses and stress also was significant ($\beta = -.20$, $pr = -.17$, $p = .015$) such that at lower additive cognitions, higher stress levels predicted a significant increase in depressive symptoms ($\beta = .55$, $pr = .29$, $p < .001$).

Does the Weakest Link Diathesis Moderate the Relation Between Stress and Depressive Symptoms?

The Time 1 Weakest Link $\times$ Stress $\times$ Gender interaction significantly predicted increases in depressive symptoms at Time 2 ($\beta = -.20$, $pr = -.17$, $p = .021$; see Table 4). Simple slope analyses revealed that higher levels of stress significantly predicted increases in depressive symptoms ($\beta = .29$, $pr = .16$, $p = .026$) for boys with more negative (i.e., higher) weakest links (Figure 1). For girls, the relation between stress and depressive symptoms was significant for those with less negative (i.e., lower) weakest links ($\beta = .48$, $pr = .22$, $p = .001$); this relation was not significant for girls with more negative weakest links who were already high in depressive symptoms (see Figure 1).

Does the Keystone Diathesis Moderate the Relation Between Stress and Depressive Symptoms?

Results of regression analyses revealed significant main effects for Time 1 Dep-Sxs ($\beta = .29$, $p < .001$) and keystone cognitions ($\beta = -.16$, $p < .05$), and the Stress $\times$ Gender interaction ($\beta = .14$, $pr = .16$, $p = .025$) significantly predicted Time 2 depressive symptoms (see Table 4). Simple slope analyses revealed that higher stress levels predicted increases in depressive symptoms for girls ($\beta = .38$, $pr = .27$, $p < .001$); this relation was not significant for boys. The Keystone $\times$ Stress $\times$ Gender interaction was not significant.

Do the Individual and Composite Cognitive Diatheses Moderate the Relation Between Stress and Hopelessness Depression Symptoms?

The Time 1 CHS $\times$ Stress $\times$ Gender interaction significantly incremented the prediction of Time 2 CDI-H ($\beta = -.15$, $pr = -.16$, $p = .021$). Simple slope analyses revealed that for boys, the interaction of hopelessness and stress significantly predicted change in depressive symptoms ($\beta = .23$, $pr = .19$, $p = .007$) such that at higher levels of hopelessness, stress significantly predicted higher levels of hopelessness depression symptoms ($\beta = .42$, $pr = .21$, $p = .002$). For girls, at low levels of hopelessness, the relation between stress and hopelessness depression symptoms was significant ($\beta = .29$, $pr = .14$, $p = .045$).

The Time 1 CASQ $\times$ Stress $\times$ Gender interaction significantly incremented the prediction of Time 2 CDI-H ($\beta = -.12$, $pr = -.14$, $p = .048$). Simple slope analyses revealed that higher levels of stress significantly predicted increases in hopelessness depression symptoms ($\beta = .29$, $pr = .18$, $p = .009$) for boys with more negative attributional styles. For girls, the relation between stress and hopelessness depression symptoms was significant for those with less negative attributional styles ($\beta = .29$, $pr = .18$, $p = .012$); this relation was not significant for girls with more negative attributional styles who were already high in depressive symptoms. The Self-Worth $\times$ Gender interaction significantly predicted decreases in CDI-H ($\beta = -.14$,

$pr = -.18, p = .012$), such that higher self-worth predicted decreases in hopelessness depression symptoms for girls ($\beta = -.40, pr = -.30, p < .001$); this relation was not significant for boys.

Regarding the additive composite cognitive measures, the Time 1 Additive $\times$ Stress Level $\times$ Gender interaction significantly incremented the prediction of Time 2 CDI-H ($\beta = -.16, pr = -.19, p = .006$). Among boys, the interaction of the additive cognitive diathesis and stress significantly predicted change in hopelessness depressive symptoms ($\beta = .26, pr = .21, p = .003$). Higher levels of stress significantly predicted higher levels of depressive symptoms for boys with higher additive cognitions (i.e., more negative; $\beta = .45, pr = .25, p < .001$) and for girls with lower additive (less negative; $\beta = .27, pr = .15, p = .033$) cognitions.

The Time 1 Weakest Link $\times$ Stress $\times$ Gender interaction significantly incremented the prediction of Time 2 CDI-H ($\beta = -.26, pr = -.26, p = .001$). Simple slope analyses indicated that the interaction of weakest link diatheses and stress significantly predicted change in CDI-H scores for boys ($\beta = .36, pr = .22, p = .002$). Higher levels of stress significantly predicted higher levels of hopelessness depression symptoms among boys with more negative (i.e., higher) weakest links ($\beta = .44, pr = .24, p = .001$). For girls, the relation between stress and CDI-H was significant for those with more positive (i.e., lower) weakest links ($\beta = .34, pr = .17, p = .014$) but not for those with more negative (i.e., higher) weakest links who were already high on hopelessness depression symptoms.

Finally, the Keystone $\times$ Stress $\times$ Gender interaction also significantly predicted Time 2 CDI-H ($\beta = .18, pr = .21, p = .003$). According to the simple slope analyses, for boys, the Keystone $\times$ Stress interaction significantly predicted change in CDI-H ($\beta = -.24, pr = -.20, p = .006$). The relation between stress and hopelessness depression symptoms was significant among boys with lower (i.e., negative) keystone diatheses ($\beta = .46, pr = .23, p = .001$; see Figure 2). For girls, the relation between stress and CDI-H was significant for those with higher (i.e., positive) keystone diatheses ($\beta = .36, pr = .22, p = .002$), whereas this relation was not significant for girls with lower (i.e., negative) keystone diatheses who were already high on hopelessness depression symptoms (see Figure 2).

Does the Distinctiveness of an Individual's Weakest Link or Keystone Moderate the Relation Between Mean Level of Cognitive Vulnerability, Stress, and Depressive Symptoms?

For some adolescents, their scores on the cognitive measures may be very homogeneous (either in a positive or negative direction), whereas for others their scores may be highly heterogeneous or spread out such that their weakest link is very distinct from their other scores. To examine whether the degree of homogeneity moderated the level of vulnerability, we tested a three-way interaction of average vulnerability (within-individual mean), variability of vulnerability scores (within-individual standard deviation), and stress level. This interaction did not significantly predict depressive symptoms (Dep-Sxs or CDI-H), indicating that the degree of within-individual variation in cognitive vulnerability scores did not moderate the cognitive diathesis–stress interaction.

How Do the Individual and Composite Approaches Perform Relative to One Another?

To compare the individual and composite approaches, we examined confidence intervals for differences between independent R^2 s, per Olkin and Finn (1995). We adopted this approach, rather than including multiple three-way interaction terms in the same model, due to concerns about multicollinearity. Analyses conducted between models did not distinguish between any of the individual and composite approaches. In addition, analyses conducted within models failed to detect significant differences between the amounts of variance accounted for in depressive symptoms versus hopelessness depression symptoms.

Discussion

This 1-year prospective study contributed to the literature on cognitive diathesis–stress models of adolescent depression in several ways. First, we replicated findings regarding the weakest link hypothesis as well as the symptom component of the hopelessness theory (Abela & Payne, 2003; Abela & Sarin, 2002) in a sample that varied in their risk for depression. Second, the measures of cognitive vulnerability used in this study differed from those examined by Abela and Sarin (2002) in their original formulation of the weakest link. This suggests that the weakest link approach generalizes to other measures of negative cognitions. Third, the cognitive diathesis–stress model was examined with regard to several different cognitive constructs (i.e., attributions, self-worth, and hopelessness) that are common to more than one theory. These measures were tested individually and using different combination approaches. In addition, we introduced the keystone approach, which tested whether one's most positive cognitions serve as a buffer against depression in the context of stress. Fourth, we found that gender moderated the cognitive diathesis–stress interactions; this result may further our understanding of gender differences in depression that emerge during adolescence. Fifth, this study tested the cognitive-stress model using an objective, interview-based measure of stressful life events that occurred during a developmentally salient transition period. Finally, the index of depressive symptoms was based on both a self-report and a clinician interview measure.

Overall, there was some evidence consistent with the cognitive diathesis–stress model for each way negative cognitions were operationalized. Regarding the individual cognitive diatheses, hopelessness interacted with stress and gender to predict increases in depressive symptoms, and low self-worth incremented the prediction of depressive symptoms in seventh grade, over and above depression in sixth grade. For the composite cognitive diatheses, both the additive and the weakest link approaches interacted with stress and gender to predict increases in depressive symptoms a year later. These findings support the further use of the weakest link method, even for cognitions that are not derived directly from the hopelessness theory. That is, the innovative idiographic approach suggested by Abela and Sarin (2002) for testing the hopelessness theory can be applied to tests of a more general cognitive diathesis–stress model.

Following the logic of the weakest link, the present study also tested whether the keystone approach could be used. An individual's keystone was defined as his or her most positive cognitive style. Some support for the keystone by stress interaction predicting hopelessness depression symptoms was found. In addition, a stress by gender interaction was detected

after controlling for the keystone diathesis, such that stress predicted increases in depressive symptoms for girls but not for boys. This interaction pattern may be explained, in part, by a stress reactivity model, in which girls exhibit greater increases in depressive symptoms than boys do following similar levels of stress. Such gender differences are consistent with findings of several other studies (e.g., Achenbach, Howell, McConaughy, & Stanger, 1995; Ge, Lorenz, Conger, Elder, & Simons, 1994; Hankin, Mermelstein, & Roesch, 2007; Rudolph, 2002), although not others (e.g., Burt, Cohen, & Bjorck, 1988; Larson & Ham, 1993; Leadbeater, Kuperminc, Hertzog, & Blatt, 1999; Wagner & Compas, 1990).

In addition, the relations among the cognitive diatheses, stress levels, and depressive symptoms varied as a function of gender. Examining the interaction plots revealed two distinct patterns for boys versus girls. According to the cognitive diathesis–stress model, higher levels of depressive symptoms are expected to be found for individuals who have more negative cognitions and have experienced higher levels of stress. This was indeed the pattern for boys (e.g., upper portions of Figures 1 and 2) for the interactions with hopelessness and the composite cognitions. In contrast, high levels of depressive symptoms were found for all girls except those with more positive cognitive styles who experienced lower levels of stress (see lower portions of Figures 1 and 2). In girls, high negative cognitions (i.e., high weakest link or low keystone) predicted high levels of depressive symptoms, at both high and low stress levels, whereas more positive cognitions in the context of low stress predicted the lowest depression levels. That is, high levels of stress predicted increases in depressive symptoms in girls regardless of their cognitions, but even at low levels of stress, more negative cognitions predicted depression. The form of these interactions is similar to those found in a study by Hankin et al. (2001) in which cognitive vulnerability moderated the relation of stress to depressive symptoms for boys but not for girls. However, another study of gender moderation found the opposite pattern, with a negative inferential style interacting with stress to predict depressive symptoms in girls but not in boys (Abela, 2001). These results suggest that both cognitions and stress may be important for predicting changes in depressive symptoms in young adolescents, although the specific relations among these constructs may differ by gender.

These distinct interaction patterns suggest possible gender differences in mechanisms of vulnerability. For boys, cognitive vulnerability may constitute a necessary, but not sufficient, risk for depressive symptoms. Of the boys with more negative cognitive styles, only those who experienced high levels of stress showed increases in depressive symptoms. In contrast, for girls, cognitive vulnerability may constitute a sufficient, but not necessary, risk for depressive symptoms. That is, even those girls with more positive cognitive styles were vulnerable to depressive symptoms under conditions of high stress. This dual vulnerability in girls may partially contribute to the higher rates of depression in girls than in boys during adolescence.

Overall, the individual and composite models of cognitive vulnerability were statistically indistinguishable with regard to the proportion of outcome variance they explained. The particular approach future researchers take to operationalize the cognitive diathesis will depend on the specific questions being addressed; no clear answer emerged as to which approach best characterizes the cognitive vulnerability in tests of the cognitive-stress model.

More research is needed to determine whether, for whom, and at what age certain composite indices exhibit unique interaction effects with stress in predicting change in depressive symptoms.

The present study also found evidence consistent with the symptom component of the hopelessness theory (Abramson et al., 1989), although using different, but related, measures of the inferential style constructs. Increases in hopelessness depression symptoms in seventh grade were predicted by the interaction of stress and gender with the individual measures of hopelessness and attributional style, the additive cognitive vulnerability composite, the weakest link, and the keystone diatheses. The form of these interactions basically paralleled the pattern of results found predicting the composite depressive score, which is not surprising given that the CDI-H was derived from the larger CDI. For hopelessness depression symptoms, we again found that the traditional diathesis–stress model was characteristic of boys, whereas girls showed the alternative, dual-vulnerability pattern.

Adopting the measure of hopelessness depression used by Abela and colleagues (Abela & D'Alessandro, 2001; Abela & Sarin, 2002) allowed for greater comparability between their original tests of the weakest link hypothesis and the more general cognitive vulnerability model examined in the current study. However, this measure assessed only four of the nine core symptoms originally hypothesized to comprise hopelessness depression and included two additional symptoms (i.e., low self-esteem, loneliness) not considered essential (Abramson et al., 1989). The validity of this measure of hopelessness depression needs to be studied further.

Other limitations of the current study should be noted as they provide directions for future research. First, the subtle interplay among cognitions, stressors, and depressive symptoms may be better captured with a more time-sensitive design than the annual assessments used in the present study did. Nevertheless, our ability to detect an association between stress and depression with this long interval suggests that these findings likely are robust. Multiple and more frequent waves of data collection during the course of this year would have permitted a more fine-grained examination of the impact of stressful life events and negative cognitions on depressive symptoms. For example, assessing adolescents before the start of the school year could provide a useful index of baseline functioning and then reassessing them every 6 to 8 weeks could provide a more in depth look at this developmentally salient transition period. Moreover, future research on this normative transition should consider using prospective designs that incorporate ecological momentary assessments (EMA; Stone & Shiffman, 1994) rather than only annual reports. EMA could lessen retrospective bias and increase ecological validity because behavioral and cognitive processes would be recorded as they happened in real time. Further, EMA would allow for more sophisticated examination of linear and nonlinear models. Third, stronger support for the cognitive diathesis–stress model may have been found if we had matched specific classes of stressors (e.g., interpersonal, achievement) with specific types of cognitive vulnerability.

Second, although low levels of internal consistency of the CASQ are well-documented (e.g., Joiner & Wagner, 1995; Thompson et al., 1998), measurement error in predictor variables can be exacerbated when they are multiplied to form interaction terms. As previously noted,

this can reduce statistical power and complicate the interpretability of the findings. Hence, we were unable to determine whether not finding a significant attribution by stress interaction to predict changes in depressive symptoms (although it did predict hopelessness depression symptoms) reflects a shortcoming of the theory or the measure. Future studies should use more reliable and valid measures of cognitive vulnerability, such as the Adolescent Cognitive Style Questionnaire (Hankin & Abramson, 2002). Priming before assessing cognitions also may increase the likelihood of tapping the latent vulnerability (Persons & Miranda, 1992).

Third, using a sample that varied in risk for depression had both advantages and disadvantages. On the one hand, this type of sample increased the range of scores on measures of depressive symptoms, stress levels, and negative cognitions, thereby increasing power to detect effects. On the other hand, the findings might not generalize to a purely normative sample. Moreover, the comparatively smaller number of low-risk participants likely reduced the chances of finding any significant moderating effects of risk. The absence of significant interactions with risk should not be interpreted to mean that such effects do not exist.

Interestingly, risk also was not a significant predictor of depressive symptoms in the regression analyses when it was entered simultaneously with measures of stress and cognitions. When we ran the regressions with just risk by itself, however, it did significantly predict change in the composite depression index ($\beta = .20$, $t = 3.21$, $p = .002$). Thus, it is possible that stress and cognitions mediated the effect of risk. That is, although by itself risk was a significant predictor of change in depressive symptoms, adding stress and the cognitions reduced its effect.

Finally, the small number of new cases of MDD assessed at Time 2 precluded our testing whether the individual and composite cognitive vulnerability models predicted depressive diagnoses. Therefore, this study is silent with regard to the validity of cognitive models in predicting depressive diagnoses in young adolescents. The rate of MDD at Time 2 (5.2%) in this sample of young adolescents (i.e., ages 12 to 13 years) is consistent with other studies of youth this age (see Costello, Erkanli, & Angold, 2006, for a review) and from community samples (e.g., Albert & Beck, 1975; Bird, Gould, Yager, Staghezza, & Canino, 1989; Fleming, Offord, & Boyle, 1989; Graham & Rutter, 1973; Kandel & Davies, 1982; Kashani et al., 1987; Velez, Johnson, & Cohen, 1989), although this rate is lower than that generally found in other high-risk samples (e.g., Beardslee, Schultz, & Selman, 1987; Hammen, Gordon, et al., 1987; Klein, Clark, Dansky, & Margolis, 1988; Pilowsky et al., 2006; Weissman, 1988). This may be partially due to differences in the current diagnostic status of the parents. Previous studies (e.g., Hammen, Adrian, et al., 1987) have demonstrated that parents' current levels of depressive symptoms predict children's behavior and school problems better than does parents' lifetime history of mood disorders. Whereas most prior offspring studies have assessed children when their parents were currently depressed and typically treatment-seeking, in the present study only 13% of the mothers had current depression at the Time 2 assessment. Future studies testing individual and composite models of cognitive vulnerability in the prediction of major depressive episodes in high-risk youth should use large samples of parents currently experiencing a depressive episode.

In conclusion, results from the current study highlight the utility of examining different methods of combining measures of cognitive vulnerability in conjunction with stressful life events to predict depressive symptoms. Future studies should explore the developmental trajectories of the weakest link and keystone diatheses. Understanding how cognitive styles emerge as vulnerability or resilience factors, along with what accounts for individual differences in these styles, will help clinicians better identify children at greatest risk for depression. This, in turn, will facilitate the development of more effective interventions that target an individual's weakest link and bolster idiographic resilience factors. Finally, the present study found that the cognitions by stress interaction yielded different patterns for boys versus girls. Future researchers should investigate links between gender and the "typical" cognitive diathesis–stress versus a dual-vulnerability model in order to identify the risk and protective mechanisms that contribute to gender differences in depression.

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References

- Abela JRZ. The hopelessness theory of depression: A test of the diathesis–stress and causal mediation components in third and seventh grade children. *Journal of Abnormal Child Psychology*. 2001; 29:241–254. [PubMed: 11411786]
- Abela JRZ. Depressive mood reactions to failure in the achievement domain: A test of the integration of the hopelessness and self-esteem theories of depression. *Cognitive Therapy and Research*. 2002; 26:531–552.
- Abela JRZ, D'Alessandro DU. An examination of the symptom component of the hopelessness theory of depression in a sample of school children. *Journal of Cognitive Psychotherapy: An International Quarterly*. 2001; 15:33–47.
- Abela JRZ, Gagnon H, Auerbach RP. Hopelessness depression in children: An examination of the symptom component of the hopelessness theory. *Cognitive Therapy and Research*. 2007; 31:401–417.
- Abela JRZ, Payne AVL. A test of the integration of the hopelessness and self-esteem theories of depression in school children. *Cognitive Therapy and Research*. 2003; 27:519–535.
- Abela JRZ, Sarin S. Cognitive vulnerability to hopelessness depression: A chain is only as strong as its weakest link. *Cognitive Therapy and Research*. 2002; 26:811–829.
- Abela JRZ, Seligman MEP. The hopelessness theory of depression: A test of the diathesis–stress component in the interpersonal and achievement domains. *Cognitive Therapy and Research*. 2000; 24:361–378.
- Abramson LY, Metalsky GI, Alloy LB. Hopelessness depression: A theory-based subtype of depression. *Psychological Review*. 1988; 96:358–372.
- Abramson, LY., Metalsky, GI., Alloy, LB. The hopelessness theory of depression: Does the research test the theory?. In: Abramson, LY., editor. *Social cognition and clinical psychology: A synthesis*. New York: Guilford; 1989. p. 33-65.
- Abramson LY, Seligman MEP, Teasdale J. Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology*. 1978; 87:49–74. [PubMed: 649856]

- Achenbach TM, Howell CT, McConaughy SH, Stanger C. Six-year predictors of problems in a national sample of children and youth: I. Cross-informant syndromes. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1995; 34:336–347. [PubMed: 7896676]
- Aiken, LS., West, SG. Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage; 1991.
- Albert N, Beck AT. Incidence of depression in early adolescence: A preliminary study. *Journal of Youth and Adolescence*. 1975; 4:301–307. [PubMed: 24414811]
- Allgood-Merten B, Lewinsohn PM, Hops H. Sex differences and adolescent depression. *Journal of Abnormal Psychology*. 1990; 99:55–63. [PubMed: 2307767]
- Alloy LB, Abramson LY, Whitehouse WG, Hogan ME, Tashman NA, Steinberg DL, et al. Depressogenic cognitive styles: Predictive validity, information processing and personality characteristics, and developmental origins. *Behaviour Research and Therapy*. 1999; 37:503–531. [PubMed: 10372466]
- Alloy LB, Clements CM. Hopelessness theory of depression: Tests of the symptom component. *Cognitive Therapy and Research*. 1998; 22:303–335.
- Alloy LB, Just N, Panzarella C. Attributional style, daily life events, and hopelessness depression: Subtype validation by prospective variability and specificity of symptoms. *Cognitive Therapy and Research*. 1997; 21:321–344.
- Beardslee WR, Schultz LH, Selman RL. Level of social-cognitive development, adaptive functioning, and DSM–III diagnoses in adolescent offspring of parents with affective disorders: Implications of the development of the capacity for mutuality. *Developmental Psychology*. 1987; 23:807–815.
- Beardslee WR, Versage EM, Gladstone TRG. Children of affectively ill parents: A review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1998; 37:1134–1141. [PubMed: 9808924]
- Beck, AT. Depression: Clinical, experimental and theoretical aspects. New York: Hoeber; 1967.
- Beck, AT. Cognitive therapy and the emotional disorders. New York: International Universities Press; 1976.
- Beck AT. Cognitive therapy: A 30-year retrospective. *American Psychologist*. 1991; 46:368–375. [PubMed: 2048795]
- Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: The Hopelessness Scale. *Journal of Consulting and Clinical Psychology*. 1974; 42:861–865. [PubMed: 4436473]
- Bennett DS, Bates JE. Prospective models of depressive symptoms in early adolescence: Attributional style, stress, and support. *Journal of Early Adolescence*. 1995; 15:299–315.
- Billings AG, Moos RH. Comparisons of children of depressed and nondepressed parents: A social–environmental perspective. *Journal of Abnormal Child Psychology*. 1983; 11:463–485. [PubMed: 6655148]
- Bird HR, Gould MS, Yager T, Staghezza B, Canino G. Risk factors for maladjustment in Puerto Rican children. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1989; 28:847–850. [PubMed: 2808253]
- Bohon C, Garber J, Horowitz JL. Predicting school dropout and early sexual behavior in offspring of depressed and nondepressed mothers. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2007; 46:15–24. [PubMed: 17195725]
- Brown GW, Bifulco A, Harris T, Bridge L. Life stress, chronic subclinical symptoms and vulnerability to clinical depression. *Journal of Affective Disorders*. 1986; 11:1–19. [PubMed: 2944923]
- Brown, GW., Harris, TO. Social origins of depression: A study of psychiatric disorder in women. New York: Free Press; 1978.
- Brown, GW., Harris, TO., editors. Life events and illness. New York: Guilford; 1989.
- Burt CE, Cohen LH, Bjorck JP. Perceived family environment as a moderator of young adolescents' life stress adjustment. *American Journal of Community Psychology*. 1988; 16:101–122. [PubMed: 3369377]
- Carey MP, Faulstich ME, Gresham FM, Ruggiero L, Enyart P. Children's Depressive Inventory: Construct and discriminant validity across clinical and nonreferred (control) populations. *Journal of Consulting and Clinical Psychology*. 1987; 55:755–761. [PubMed: 3454787]

- Carter JS, Garber J, Ciesla J, Cole DA. Modeling relations between hassles and internalizing and externalizing symptoms in adolescents: A 4-year prospective study. *Journal of Abnormal Psychology*. 2006; 115:428–442. [PubMed: 16866584]
- Chang EC, Sanna LJ. Experience of life hassles and psychological adjustment among adolescents: Does it make a difference if one is optimistic or pessimistic? *Personality and Individual Differences*. 2003; 34:867–879.
- Cohen, J., Cohen, P. *Applied multiple regression/correlation analysis for the behavioural sciences*. 2. Hillsdale, NJ: Erlbaum; 1983.
- Cole DA, Ciesla J, Dallaire DH, Jacquez FM, Pineda A, LaGrange B, et al. Emergence of attributional style and its relation to depressive symptoms. *Journal of Abnormal Psychology*. 2008; 117:16–31. [PubMed: 18266483]
- Conley CS, Haines BA, Hilt LM, Metalsky GI. The Children's Attributional Style Interview: Developmental tests of cognitive diathesis-stress theories of depression. *Journal of Abnormal Child Psychology*. 2001; 29:445–463. [PubMed: 11695545]
- Costello EJ, Erkanli A, Angold A. Is there an epidemic of child or adolescent depression? *Journal of Child Psychology and Psychiatry*. 2006; 47:1263–1271. [PubMed: 17176381]
- Dixon JF, Ahrens AH. Stress and attributional styles as predictors of self-reported depression in children. *Cognitive Therapy and Research*. 1992; 16:623–634.
- Duggal S, Malkoff-Schwartz S, Birmaher B, Anderson BP, Matty MK, Houck PR, et al. Assessment of life stress in adolescents: Self-report versus interview methods. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2000; 39:445–452. [PubMed: 10761346]
- Elias MJ, Gara M, Ubriaco M. Sources of stress and support in children's transition to middle school: An empirical analysis. *Journal of Clinical Child Psychology*. 1985; 14:112–118.
- Felner RD, Ginter M, Primavera J. Primary prevention during school transitions: Social support and environmental structure. *American Journal of Community Psychology*. 1982; 10:277–290. [PubMed: 7113991]
- Fenzel LM, Blyth DA. Individual adjustment to school transitions: An exploration of the role of supportive peer relations. *Journal of Early Adolescence*. 1986; 6:315–329.
- Fleming JE, Offord DR, Boyle MH. Prevalence of childhood and adolescent depression in the community: Ontario Child Health Study. *British Journal of Psychiatry*. 1989; 155:647–654. [PubMed: 2611594]
- Garber, J. Depression in youth: A developmental psychopathology perspective. In: Masten, A., Sroufe, A., editors. *Multilevel dynamics in developmental psychopathology: Pathways to the future*. Vol. 34. New York: Erlbaum; 2007. p. 181–242.
- Garber J, Robinson NS. Cognitive vulnerability in children at risk for depression. *Cognition and Emotion*. 1997; 11:619–635.
- Garber J, Weiss B, Shanley N. Cognitions, depressive symptoms, and development in adolescents. *Journal of Abnormal Psychology*. 1993; 102:47–57. [PubMed: 8436699]
- Ge X, Lorenz FO, Conger RD, Elder GH, Simons RL. Trajectories of stressful life events and depressive symptoms during adolescence. *Developmental Psychology*. 1994; 30:467–483.
- Gibb BE, Alloy LB. A prospective test of the hopelessness theory of depression in children. *Journal of Clinical Child and Adolescent Psychology*. 2006; 35:264–274. [PubMed: 16597222]
- Girgus, JS., Nolen-Hoeksema, S., Seligman, MEP. Why do sex differences in depression emerge during adolescence?. Paper presented at the 97th annual convention of the American Psychological Association; New York, NY. 1989 Aug.
- Gladstone TRG, Kaslow NJ. Depression and attributions in children and adolescents: A meta-analytic review. *Journal of Abnormal Child Psychology*. 1995; 23:597–606. [PubMed: 8568082]
- Gladstone TRG, Kaslow NJ, Seeley JR, Lewinsohn PM. Sex differences, attributional style, and depressive symptoms among adolescents. *Journal of Abnormal Child Psychology*. 1997; 25:297–306. [PubMed: 9304446]
- Goldston DB, Reboussin BA, Daniel SS. Predictors of suicide attempts: State and trait components. *Journal of Abnormal Psychology*. 2006; 115:842–849. [PubMed: 17100542]

- Goodman SH, Gotlib IH. Risk for psychopathology in the children of depressed mothers: A developmental model for understanding mechanisms of transmission. *Psychological Review*. 1999; 106:454–490.
- Gotlib IH, Lewinsohn PM, Seeley JR, Rohde P, Redner JE. Negative cognitions and attributional style in depressed adolescents: An examination of stability and specificity. *Journal of Abnormal Psychology*. 1993; 102:607–615. [PubMed: 8282931]
- Graham P, Rutter M. Psychiatric disorders in the young adolescent: A follow-up study. *Proceedings of the Royal Society of Medicine*. 1973; 6:1226–1229.
- Haaga DAF, Dyck MJ, Ernst D. Empirical status of cognitive theory of depression. *Psychological Bulletin*. 1991; 110:215–236. [PubMed: 1946867]
- Hammen CL. Self-cognitions, stressful events, and the prediction of depression in children of depressed mothers. *Journal of Abnormal Child Psychology*. 1988; 16:347–360. [PubMed: 3403815]
- Hammen CL, Adrian C, Gordon D, Burge D, Jaenicke C, Hiroto D. Children of depressed mothers: Maternal strain and symptom predictors of dysfunction. *Journal of Abnormal Psychology*. 1987; 96:190–198. [PubMed: 3680756]
- Hammen CL, Adrian C, Hiroto D. A longitudinal test of the attributional vulnerability model of depression in children at risk for depression. *British Journal of Clinical Psychology*. 1988; 27:37–46. [PubMed: 3355906]
- Hammen CL, Gordon G, Burge D, Adrian C, Jaenicke C, Hiroto G. Maternal affective disorders, illness, and stress: Risk for children's psychopathology. *American Journal of Psychiatry*. 1987; 144:736–741. [PubMed: 3591993]
- Hammen CL, Marks T, deMayo R, Mayol A. Self-schemas and risk for depression: A prospective study. *Journal of Personality and Social Psychology*. 1985; 49:1147–1159. [PubMed: 4078670]
- Hammen CL, Shih JH, Brennan PA. Intergenerational transmission of depression: Test of an interpersonal stress model in a community sample. *Journal of Consulting and Clinical Psychology*. 2004; 72:511–522. [PubMed: 15279534]
- Hankin BL, Abramson LY. Development of gender differences in depression: An elaborated cognitive vulnerability-transactional stress theory. *Psychological Bulletin*. 2001; 127:773–796. [PubMed: 11726071]
- Hankin BL, Abramson LY. Measuring cognitive vulnerability to depression in adolescence: Reliability, validity, and gender differences. *Journal of Clinical Child and Adolescent Psychology*. 2002; 31:491–504. [PubMed: 12402568]
- Hankin BL, Abramson LY, Miller N, Haefl GJ. Cognitive vulnerability-stress theories of depression: Examining affective specificity in the prediction of depression versus anxiety in 3 prospective studies. *Cognitive Therapy and Research*. 2004; 28:309–345.
- Hankin BL, Abramson LY, Moffitt TE, Silva PA, McGee R, Angell KE. Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology*. 1998; 107:128–140. [PubMed: 9505045]
- Hankin BL, Abramson LY, Siler M. A prospective test of the hopelessness theory of depression in adolescence. *Cognitive Therapy and Research*. 2001; 25:607–632.
- Hankin BL, Lakdawalla Z, Carter IL, Abela JRZ, Adams P. Are neuroticism, cognitive vulnerabilities and self-esteem overlapping or distinct risks for depression? Evidence from exploratory and confirmatory factor analyses. *Journal of Social and Clinical Psychology*. 2007; 26:29–63.
- Hankin BL, Mermelstein R, Roesch L. Sex differences in adolescent depression: Stress exposure and reactivity models. *Child Development*. 2007; 78:279–295. [PubMed: 17328705]
- Hankin BL, Roberts J, Gotlib IH. Elevated self-standards and emotional distress during adolescence: Emotional specificity and gender differences. *Cognitive Therapy and Research*. 1997; 21:663–679.
- Harter S. The perceived competence scale for children. *Child Development*. 1982; 53:87–97.
- Harter S, Whitesell NR, Kowalski P. Individual differences in the effects of educational transitions on young adolescent's perceptions of competence and motivational orientation. *American Educational Research Journal*. 1992; 29:777–807.

- Herman-Stahl M, Petersen AC. Depressive symptoms during adolescence: Direct and stress-buffering effects of coping, control beliefs, and family relationships. *Journal of Applied Developmental Psychology*. 1999; 20:45–62.
- Hilsman R, Garber J. A test of the cognitive diathesis–stress model of depression in children: Academic stressors, attributional style, perceived competence, and control. *Journal of Personality and Social Psychology*. 1995; 69:370–380. [PubMed: 7643310]
- Hirsch BJ, Rapkin BD. The transition to junior high school: A longitudinal study of self-esteem, psychological symptomatology, school life, and social support. *Child Development*. 1987; 58:1235–1243. [PubMed: 3665642]
- Hollingshead, AB. Unpublished manuscript. Yale University; New Haven, CT: 1975. Four factor index of social status.
- Hosmer, DW., Lemeshow, S. *Applied logistic regression*. 2. New York: Wiley; 2000.
- Jaser SS, Langrock AM, Keller G, Merchant MJ, Benson MA, Reeslund K, et al. Coping with the stress of parental depression: II. Adolescent and parent reports of coping and adjustment. *Journal of Clinical Child and Adolescent Psychology*. 2005; 34:193–205. [PubMed: 15677293]
- Joiner TE Jr, Metalsky GI, Lew A, Klocek J. Testing the causal mediation component of Beck's theory of depression: Evidence for specific mediation. *Cognitive Therapy and Research*. 1999; 23:401–412.
- Joiner TE Jr, Rudd M. Toward a categorization of depression-related psychological constructs. *Cognitive Therapy and Research*. 1996; 20:51–68.
- Joiner TE Jr, Wagner KD. Attribution style and depression in children and adolescents: A meta-analytic review. *Clinical Psychology Review*. 1995; 5:777–798.
- Kandel DB, Davies M. Epidemiology of depressive mood in adolescents. *Archives of General Psychiatry*. 1982; 39:1205–1212. [PubMed: 7125850]
- Kashani JH, Carlson GA, Beck NC, Hooper EW, Corcoran CM, McAllister JA, et al. Depression, depressive symptoms, and depressed mood among a community sample of adolescents. *American Journal of Psychiatry*. 1987; 144:931–934. [PubMed: 3605407]
- Kaufman J, Birmaher B, Brent D, Rao U, Flynn C, Moreci P, et al. Schedule for Affective Disorders and Schizophrenia for School-Age Children–Present and Lifetime version (K-SADS-PL): Initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1997; 36:980–988. [PubMed: 9204677]
- Kazdin AE, French NH, Unis AS, Esveltd-Dawson K. Assessment of childhood depression: Correspondence of child and parent ratings. *Journal of the American Academy of Child Psychiatry*. 1983; 22:157–164. [PubMed: 6841836]
- Kazdin AE, French NH, Unis AS, Esveltd-Dawson K, Sherick RB. Hopelessness, depression, and suicidal intent among psychiatrically disturbed inpatient children. *Journal of Consulting and Clinical Psychology*. 1983; 54:241–245.
- Kazdin AE, Rodgers A, Colbus D. The Hopelessness Scale for children: Psychometric characteristics and concurrent validity. *Journal of Consulting and Clinical Psychology*. 1986; 54:241–245. [PubMed: 3700812]
- Kessler RC, McGonagle KA, Swartz M, Blazer DG, Nelson CB. Sex and depression in the National Comorbidity Survey I: Lifetime prevalence, chronicity, and recurrence. *Journal of Affective Disorders*. 1993; 29:85–96. [PubMed: 8300981]
- Klein DN, Clark DC, Dansky L, Margolis ET. Dysthymia in the offspring of parents with primary unipolar affective disorder. *Journal of Abnormal Psychology*. 1988; 97:265–274. [PubMed: 3192817]
- Kovacs M. Rating scales to assess depression in school children. *Acta Paedopsychiatrica*. 1981; 46:305–315. [PubMed: 7025571]
- Kwon SM, Oei TP. The roles of two levels of cognitions in the development, maintenance, and treatment of depression. *Clinical Psychology Review*. 1994; 14:331–358.
- Langrock AM, Compas BE, Keller G, Merchant MJ, Copeland ME. Coping with the stress of parental depression: Parents' reports of children's coping, emotional, and behavioral problems. *Journal of Clinical Child and Adolescent Psychology*. 2002; 31:312–324. [PubMed: 12149969]

- Larson R, Ham M. Stress and “storm and stress” in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*. 1993; 29:130–140.
- Leadbeater BJ, Kuperminc GP, Hertzog C, Blatt SJ. A multivariate model of gender differences in adolescents’ internalizing and externalizing disorders. *Developmental Psychology*. 1999; 35:1268–1282. [PubMed: 10493653]
- Leahy, RL., Shirk, SR. Social cognition and the development of the self. In: Leahy, RL., editor. *The development of the self*. New York: Academic Press; 1985. p. 123–150.
- Lewinsohn PM, Joiner TE Jr, Rohde P. Evaluation of cognitive diathesis–stress models in predicting major depressive disorder in adolescents. *Journal of Abnormal Psychology*. 2001; 110:203–215. [PubMed: 11368074]
- Mazur E, Wolchik SA, Virdin L, Sandler IN, West SG. Cognitive moderators of children’s adjustment to stressful divorce events: The role of negative cognitive errors and positive illusions. *Child Development*. 1999; 70:231–245. [PubMed: 10191525]
- McClelland GH, Judd CM. Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin*. 1993; 114:376–390. [PubMed: 8416037]
- Metalsky GI, Halberstadt LJ, Abramson LY. Vulnerability to depressive mood reactions: Toward a more powerful test of the diathesis–stress and causal mediation components of the reformulated theory of depression. *Journal of Personality and Social Psychology*. 1987; 52:386–393. [PubMed: 3559897]
- Metalsky GI, Joiner TE Jr. Vulnerability to depressive symptomatology: A prospective test of the diathesis–stress and causal mediation components of the hopelessness theory of depression. *Journal of Personality and Social Psychology*. 1992; 63:667–675. [PubMed: 1447690]
- Metalsky GI, Joiner TE Jr. The hopelessness depression symptom questionnaire. *Cognitive Therapy and Research*. 1997; 21:359–384.
- Metalsky GI, Joiner TE Jr, Hardin TS, Abramson LY. Depressive reactions to failure in a naturalistic setting: A test of the hopelessness and self-esteem theories of depression. *Journal of Abnormal Psychology*. 1993; 102:101–109. [PubMed: 8436686]
- Monroe SM, Simons AD. Diathesis–stress theories in the context of life stress research: Implications for the depressive disorders. *Psychological Bulletin*. 1991; 110:406–425. [PubMed: 1758917]
- Nolen-Hoeksema S, Girgus JS. The emergence of gender differences in depression during adolescence. *Psychological Bulletin*. 1994; 115:424–443. [PubMed: 8016286]
- Nolen-Hoeksema S, Girgus JS, Seligman MEP. Learned helplessness in children: A longitudinal study of depression, achievement, and attributional style. *Journal of Personality and Social Psychology*. 1986; 51:435–442. [PubMed: 3746624]
- Nolen-Hoeksema S, Girgus JS, Seligman MEP. Sex differences in depression and explanatory style in children. *Journal of Youth and Adolescence*. 1991; 20:233–245. [PubMed: 24265008]
- Nolen-Hoeksema S, Girgus JS, Seligman MEP. Predictors and consequences of childhood depressive symptoms: A five-year longitudinal study. *Journal of Abnormal Psychology*. 1992; 101:405–422. [PubMed: 1500598]
- Nolen-Hoeksema S, Morrow J, Fredrickson BL. Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*. 1993; 102:20–28. [PubMed: 8436695]
- Nunnally, JC., Bernstein, IH. *Psychometric theory*. New York: McGraw-Hill; 1994.
- Olkin I, Finn JD. *Correlations redux*. *Psychological Bulletin*. 1995; 118:155–164.
- Panak WF, Garber J. Role of aggression, rejection, and attributions in the prediction of depression in children. *Development and Psychopathology*. 1992; 4:145–165.
- Persons JB, Miranda J. Cognitive theories of vulnerability to depression: Reconciling negative evidence. *Cognitive Therapy and Research*. 1992; 16:485–502.
- Pilowsky DJ, Wickramaratne PJ, Rush AJ, Hughes CW, Garber J, Malloy E, et al. Children of currently depressed mothers: A STAR_D ancillary study. *Journal of Clinical Psychiatry*. 2006; 67:126–136. [PubMed: 16426099]
- Poznanski E, Mokros HB, Grossman J, Freeman LN. Diagnostic criteria in childhood depression. *American Journal of Psychiatry*. 1985; 142:1168–1173. [PubMed: 4037128]

- Roberts JE, Monroe SM. Vulnerable self-esteem and depressive symptoms: Prospective findings comparing three alternative conceptualizations. *Journal of Personality and Social Psychology*. 1992; 62:804–812. [PubMed: 1593420]
- Roberts JE, Monroe SM. A multidimensional model of self-esteem in depression. *Clinical Psychology Review*. 1994; 14:161–181.
- Roberts, JE., Monroe, SM. Vulnerable self-esteem and social processes in depression: Toward an interpersonal model of self-esteem regulation. In: Joiner, T., Coyne, J., editors. *The interactional nature of depression: Advances in interpersonal approaches*. Washington, DC: American Psychological Association; 1999. p. 149-187.
- Robertson JF, Simons RL. Family factors, self-esteem, and adolescent depression. *Journal of Marriage and the Family*. 1989; 51:125–138.
- Robins CJ, Hinkley K. Social-cognitive processing and depressive symptoms in children: A comparison of measures. *Journal of Abnormal Child Psychology*. 1989; 17:29–36. [PubMed: 2926021]
- Robinson NS, Garber J, Hilsman R. Cognitions and stress: Direct and moderating effects on depressive versus externalizing symptoms during the junior high school transition. *Journal of Abnormal Psychology*. 1995; 104:453–463. [PubMed: 7673569]
- Rohde P, Lewinsohn PM, Tilson M, Seeley JR. Dimensionality of coping and its relation to depression. *Journal of Personality and Social Psychology*. 1990; 58:499–511. [PubMed: 2324939]
- Rosenberg, M. *Conceiving the self*. New York: Basic Books; 1979.
- Rudolph KD. Gender differences in emotional responses to interpersonal stress during adolescence. *Journal of Adolescent Health*. 2002; 30:3–13.
- Saylor CF, Finch AJ, Baskin CH, Furey W, Kelly MM. Construct validity for measures of childhood depression: Application of multitrait-multimethod methodology. *Journal of Consulting and Clinical Psychology*. 1984; 52:977–985. [PubMed: 6520290]
- Saylor CF, Finch AJ, Spirito A, Bennett B. The Children's Depression Inventory: A systematic evaluation of psychometric properties. *Journal of Consulting and Clinical Psychology*. 1984; 52:955–967. [PubMed: 6520288]
- Scher CD, Ingram RE, Segal ZV. Cognitive reactivity and vulnerability: Empirical evaluation of construct activation and cognitive diatheses in unipolar depression. *Clinical Psychology Review*. 2005; 25:487–510. [PubMed: 15914266]
- Schroder KEE. Coping competence as predictor and moderator of depression among chronic disease patients. *Journal of Behavioral Medicine*. 2004; 27:123–145. [PubMed: 15171103]
- Schulenberg JE, Asp CE, Petersen AC. School from the young adolescent's perspective: A descriptive report. *Journal of Early Adolescence*. 1984; 4:107–130.
- Seidman E, Allen LR, Aber JL, Mitchell C, Feinman J. The impact of school transitions in early adolescence on the self-system and perceived social context of poor urban youth. *Child Development*. 1994; 65:507–522. [PubMed: 8013237]
- Seligman MEP, Peterson C, Kaslow NJ, Tenenbaum RL, Alloy LB, Abramson LY. Attributional style and depressive symptoms among children. *Journal of Abnormal Psychology*. 1984; 93:235–241. [PubMed: 6725758]
- Simmons RG, Burgeson R, Carlton-Ford S, Blyth DA. The impact of cumulative change in early adolescence. *Child Development*. 1987; 58:1220–1234. [PubMed: 3665641]
- Spitzer, RL., Williams, JBW., Gibbon, M., First, MB. *User's guide for the Structured Clinical Interview for DSM-III-R*. Washington, DC: American Psychiatric Press; 1990.
- Stone AA, Shiffman S. Ecological momentary assessment (EMA) in behavioral medicine. *Annals of Behavioral Medicine*. 1994; 16:199–202.
- Szanto K, Reynolds C, Conwell Y, Begley A, Houck P. High levels of hopelessness persist in geriatric patients with remitted depression and a history of attempted suicide. *Journal of the American Geriatrics Society*. 1998; 46:1401–1406. [PubMed: 9809762]
- Teasdale JD. Negative thinking in depression: Cause, effect, or reciprocal relationship? *Advances in Behavior and Research Therapy*. 1983; 5:3–25.
- Teasdale JD. Cognitive vulnerability to persistent depression. *Cognition and Emotion*. 1988; 2:247–274.

- Thompson M, Kaslow NJ, Weiss B, Nolen-Hoeksema S. Children's Attributional Style Questionnaire-Revised: Psychometric examination. *Psychological Assessment*. 1998; 10:166–170.
- Turner JE, Cole DA. Developmental differences in cognitive diatheses in child depression. *Journal of Abnormal Child Psychology*. 1994; 22:15–32. [PubMed: 8163773]
- Velez CN, Johnson J, Cohen P. A longitudinal analysis of selected risk factors of childhood psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1989; 28:861–864. [PubMed: 2808256]
- Wagner BM, Compas BE. Gender, instrumentality, and expressivity: Moderators of the relation between stress and psychological symptoms during adolescence. *American Journal of Community Psychology*. 1990; 18:383–406. [PubMed: 2264556]
- Weissman, MM. Psychopathology in the children of depressed parents: Direct interview studies. In: Dunner, DL, Gershon, ES., Barrett, JE., editors. *Relatives at risk for mental disorders*. New York: Raven; 1988. p. 143-159.
- Wigfield A, Eccles JS, MacIver D, Reuman DA, Midgley C. Transitions during early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology*. 1991; 27:552–565.
- Williamson DE, Birmaher B, Frank E, Anderson BP, Matty MK, Kupfer DJ. Nature of life events and difficulties in depressed adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1998; 37:1047–1057.
- Windle M. A longitudinal study of stress buffering for adolescent problem behaviors. *Developmental Psychology*. 1992; 28:522–530.
- Young M, Fogg L, Sheftner W, Fawcett J, Akiskal H, Maser J. Stable trait components of hopelessness: Baseline and sensitivity to depression. *Journal of Abnormal Psychology*. 1996; 105:155–165. [PubMed: 8722997]

Figure 1. Interaction plot for weakest link diatheses, gender, and stress predicting 7th grade (Time 2) depressive symptoms (Dep-Sxs), controlling for depressive symptoms in 6th grade (Time 1), for males and females.

Figure 2. Interaction plot for keystone diatheses, gender, and stress predicting 7th grade (Time 2) hopelessness depression symptoms (CDI-H), controlling for hopelessness depression symptoms in 6th grade (Time 1), for males and females.

Table 1

Means, Standard Deviations, and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Risk	0.77	0.42	--	.01	-.12	-.06	-.11	-.01	-.03	.45***	.03	.11	.21*	.14
2. T1 CASQ	0.27	0.13	.13	--	-.30**	.24**	.59***	.54***	-.65***	.05	.42***	.43***	.08	.18*
3. T1 SPPC	3.37	0.58	-.27***	-.31**	--	-.30**	.31***	-.71***	.56***	-.16	-.50***	-.59***	-.49***	-.60***
4. T1 CHS	2.29	1.97	.14	.16	-.42***	--	.61***	.66***	-.59***	.05	.37***	.22*	.26**	.24*
5. T1 Additive	0.00	0.48	.01	.65***	.17	.56***	--	.29**	-.42***	-.05	.17	.00	-.12	-.16
6. T1 Weakest	0.00	0.97	.20*	.61***	-.69***	.63***	.44***	--	-.54***	.19*	.53***	.53***	.31**	.38***
7. T1 Keystone	0.00	0.71	-.20*	-.62***	.62***	-.61***	-.47***	-.55***	--	.03	-.51***	-.47***	-.32***	-.42***
8. T1-T2 Stress	26.52	14.98	.43***	-.04	-.17	.17	-.02	.06	-.13	--	.26**	.18*	.40***	.27**
9. T1 Dep-Sxs	-0.01	0.82	.24*	.36***	-.60***	.35***	.11	.60***	-.43***	.20*	--	.77***	.40***	.39***
10. T1 CDI-H	2.92	2.73	.23*	.40***	-.61***	.42***	.18	.64***	-.48***	.03	.80***	--	.38***	.46***
11. T2 Dep-Sxs	0.00	0.88	.33**	.25*	-.41***	.41***	.21*	.50***	-.30**	.26*	.48***	.47***	--	.85***
12. T2 CDI-H	2.49	2.40	.21*	.37***	-.37***	.46***	.36***	.54***	-.41***	.20	.50***	.55***	.83***	--

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

Note: Correlations below diagonal = Boys; Correlations above diagonal = Girls; T1 = Time 1 (6th grade); T2 = Time 2 (7th grade); CASQ = Children's Attributional Style Questionnaire; SPPC = Self-perception Profile for Children; CHS = Children's Hopelessness Scale; Weak = Weakest Link; Dep-Sxs = Depression Symptoms Composite; CDI-H = Children's Depression Inventory - Hopelessness Depression Items

Table 2

Rates of Major Depressive Disorder as a Function of Gender and Risk Status

	Total		Gender				Risk Status			
			Male		Female		High		Low	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Time 1										
Major Depression	1	2.2	0	0	1	2.2	1	2.2	0	0
Above CDI clinical cutoff	24	9.8	13	5.3	11	4.5	21	8.6	3	1.2
Above CDRS-R clinical cutoff	7	2.9	2	0.8	5	2.1	6	2.5	1	0.4
Time 2										
Major Depression	12	5.2	2	0.9	10	4.3	12	5.2	0	0
Above CDI clinical cutoff	10	4.7	4	1.9	6	2.8	9	4.2	1	0.5
Above CDRS-R clinical cutoff	12	5.7	3	1.4	9	4.3	12	5.7	0	0

Note: Major Depression diagnosis determined by KSADS; Clinical cutoff score for CDI = 13; Clinical cutoff score for CDRS-R = 22.

Table 3

Individual cognitive diatheses predicting depressive symptoms composite and hopelessness depression symptoms in 7th grade

Cognitive Diathesis	Hopelessness (CHS)		Attributions (CASQ)		Self-worth (SPPC)	
	Dep Sxs	CDI-H	Dep Sxs	CDI-H	Dep Sxs	CDI-H
T2 Dependent Variable						
Block 1 (R ²)	.29***	.32***	.26***	.29***	.31***	.33***
T1 Depressive Symptoms (β)	.31***	.42***	.37***	.44***	.20**	.30***
Risk	.10	.01	.10	.00	.08	.01
Sex (β)	.08	.01	.07	.01	.06	-.01
Stress Level (β)	.21**	.17*	.21**	.19**	.21**	.16*
Cognitions (β)	.19**	.20**	.00	.09	-.29***	-.28***
Block 2 (R ²)	.04**	.01	.03	.01	.04*	.02
Stress × Cognitions (β)	.17**	.10	-.10	.02	-.08	-.06
Sex × Cognitions (β)	-.01	-.04	-.05	-.08	-.11	-.14*
Sex × Stress (β)	.09	.02	.10	.02	.11	.01
Block 3 (R ²)	.02*	.02*	.01	.01*	.00	.01
Stress × Cognitions × Sex (β)	-.15*	-.15*	-.10	-.12*	-.07	.08

* $p < .05$;

**

$p < .01$;

$p < .001$;

Note: T1 = Time 1 (6th grade); CASQ = Children's Attributional Style Questionnaire; CHS = Children's Hopelessness Scale; Dep-Sxs = Depression Symptoms Composite; CDI-H = Children's Depression Inventory – Hopelessness Depression Items; SPPC = Self-perception Profile for Children

Composite cognitive diatheses predicting depressive symptoms composite and hopelessness depression symptoms in 7th grade

Table 4

Composite Cognitive Diatheses	Additive(CHS, CASQ, SPPC)		Weakest Link(CHS, CASQ, SPPC)		Keystone(CHS, CASQ, SPPC)	
	Dep Sxs	CDI-H	Dep Sxs	CDI-H	Dep Sxs	CDI-H
T2 Dependent Variable						
Block 1 (R ²)	.26***	.29***	.28***	.32***	.28***	.33***
T1 Depressive Symptoms (β)	.37***	.47***	.26**	.34***	.29***	.36***
Risk	.10	.00	.10	.02	.08	-.01
Sex (β)	.07	.02	.09	.02	.07	.01
Stress Level (β)	.21**	.19**	.21**	.17*	.23***	.20**
Cognitions (β)	-.01	.07	.20**	.22**	-.16*	-.25***
Block 2 (R ²)	.03*	.05**	.01	.01	.03*	.01
Stress × Cognitions (β)	.02	.09	.03	.09	.07	-.06
Sex × Cognitions (β)	-.15	-.22***	-.03	-.05	-.10	-.06
Sex × Stress (β)	.10	.01	.12	.03	.13*	.05
Block 3 (R ²)	.05***	.03**	.02*	.03**	.01	.03**
Stress × Cognitions × Sex (β)	-.24***	-.16**	-.20*	-.26**	.12	.18**

* $p < .05$;

**

$p < .01$;

$p < .001$;

Note: T1 = Time 1 (6th grade); CASQ = Children's Attributional Style Questionnaire; CHS = Children's Hopelessness Scale; Dep-Sxs = Depression Symptoms Composite; CDI-H = Children's Depression Inventory – Hopelessness Depression Items; SPPC = Self-perception Profile for Children