THE EFFECTS OF RUMINATION ON THE TIMING OF MATERNAL AND CHILD DEPRESSIVE SYMPTOMS

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ABSTRACT

The goal of the current study was to examine whether child rumination serves as a moderator of the temporal association between maternal and child depressive symptoms. Participants included 88 mothers with a history of major depressive episodes and their 123 children (59 boys and 64 girls). Using a multi-wave longitudinal design, mothers and their children were assessed at baseline and again every six weeks for the subsequent year. During the initial assessment, mothers and their children completed measures assessing depressive symptoms and children completed measures assessing their tendency to ruminate in response to such symptoms. At each follow-up assessment, mothers and their children completed measures assessing depressive symptoms. Consistent with hypotheses, children with a ruminative response style were more likely than other children to experience increases in depressive symptoms following increases in their mothers’ depressive symptoms. Contrary to hypotheses, however, the strength of this association did not vary as a function of child gender.
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CHAPTER I

Introduction

Children with depressed mothers are more than twice as likely than other children to develop depression (Hammen, Burge, Burney, & Adrian, 1990; Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997) and will typically have an earlier onset and longer duration of disorder (Beardslee, Keller, Lavori, Staley, & Sacks, 1993). There is also a significant temporal association between maternal and child depressive symptoms such that elevations in maternal symptoms of depression are typically followed by elevations in child depressive symptoms (Hammen, Burge, & Adrian, 1991). Despite their increased risk, however, not all children of depressed mothers necessarily develop depression. Therefore, it is important to identify vulnerability factors which moderate the association between parent and child depression, thereby placing this population at an increased risk for the damaging effects of maternal depression.

Response style theory

One framework which has been posited to explain the development and maintenance of depression is Nolen-Hoeksema’s (1987, 1991) response style theory. Response style theory posits that the way in which individuals respond to their depressive symptoms, and the possible causes and consequences of those symptoms, influences the onset, severity, and duration of their depressive symptoms. More specifically, response
style theory differentiates between individuals with a ruminative response style and individuals with a distractive response style. Individuals with a ruminative response style focus passively and repetitively on their depressive symptoms, and on the causes and consequences of their distress, without engaging in active problem solving to alleviate their symptoms or improve their situation. For example, ruminative responses to depressed mood include meditating about the causes of depressed mood, talking with others about negative feelings for an extended period of time, or prolonged crying in response to depressed mood. While everyone occasionally engages in rumination, a ruminative response style refers to a stable, maladaptive pattern of responding to distress. In contrast to a ruminative response style, individuals with a distractive response style deliberately direct attention away from their depressive symptoms in a way that is not dangerous, usually through focusing on neutral or pleasurable activities instead. Some examples of distractive responses include getting together with friends to engage in an enjoyable activity or playing a computer game in effort to avoid focusing on negative feelings. Response style theory contends that individuals with ruminative response styles are at an increased risk for developing depression, and will likely have more severe symptoms and longer durations of the disorder. Conversely, individuals with distractive response styles are less likely to develop the disorder, and will likely have milder symptoms lasting for shorter periods of time.

*Empirical support for response style theory in adults*

There is a substantial body of research on response style theory with adults. In relation to rumination, numerous longitudinal studies have shown that adults with a ruminative response style are more likely to develop depressive episodes and to
experience more severe depressive symptoms (Just & Alloy, 1997; Nolen-Hoeksema, 2000; Nolen-Hoeksema & Morrow, 1991). In addition, laboratory studies have shown that women have a greater tendency to engage in rumination than men (e.g., Butler & Nolen-Hoeksema, 1994), lending support to Nolen-Hoeksema’s (1987, 1991) hypothesis that the higher rates of depression among women may be related to their increased tendency to engage in ruminative coping. However, while some naturalistic studies have confirmed this finding (e.g., Nolen-Hoeksema, Morrow, & Fredrickson, 1993), one notable study did not (Nolen-Hoeksema & Morrow, 1991). In contrast to rumination, research related to distraction has not been as promising in supporting Nolen-Hoeksema’s hypothesis that engaging in distractive tendencies is associated with lower levels of depressive symptoms and with being male. While numerous laboratory studies have shown that individuals who engage in distractive tasks will show decreases in depressive affect (Butler & Nolen-Hoeksema, 1994; Katz & Bertelson, 1993; Nolen-Hoeksema & Morrow, 1993), results from naturalistic studies have not consistently found an association between distractive tendencies and depressive symptoms (e.g., Just & Alloy, 1997). Furthermore, though women may be more likely than men to engage in rumination, research has found gender to be unrelated to distractive responses (Butler & Nolen-Hoeksema, 1994; Katz & Bertelson, 1993).

*Empirical support for response style theory in children and adolescents*

Response style theory has more recently been studied in children to identify how ruminative and distractive tendencies impact the initial development and course of child and adolescent depression, particularly in relation to the emergence of gender differences. Studies of response style theory with children and adolescents have yielded strong
support for the theory’s vulnerability hypothesis, but only partial support for the gender differences hypothesis. Across age and gender, numerous studies with children and adolescents have found that rumination was a significant predictor of increases in depressive symptoms over time (e.g., Abela, Aydin, & Auerbach, 2007; Abela, Brozina, & Haigh, 2002; Abela, Parkinson, Stolow, & Starrs, 2009; Broderick & Korteland, 2004; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Schwartz & Koenig, 1996). Like research conducted with adults, however, results regarding the role of distraction were more equivocal. While some studies have shown that distraction is predictive of lower levels of depression in children and adolescents (e.g., Abela et al., 2007; Broderick & Korteland, 2004), others have found distraction to be unrelated to levels of depressive symptoms (e.g., Abela et al., 2002; Schwartz & Koenig, 1996). Regarding the relationship between gender and rumination, results of the eight completed studies to date have yielded a near even split. Three out of four studies of children have found no gender differences in levels of rumination (Abela et al., 2007; Abela et al., 2002; Abela, Vanderbilt, & Rochon, 2004). Only Ziegert and Kistner (2002) found a gender difference in rumination among children, perhaps because they utilized a different construct for assessing response style. Yet, all four of the studies conducted with early and middle adolescents found higher levels of rumination among females (Abela et al., 2009; Broderick & Korteland, 2004; Burwell & Shirk, 2007; Schwartz & Koenig, 1996). Based on these results, it is plausible that the increased cognitive vulnerability (i.e., the greater tendency to ruminate) among females during early and middle adolescence is related to the gender difference in the rate of depression which emerges between males and females during this developmental period (Nolen-Hoeksema & Girgus, 1994).
A vulnerability-stress perspective of rumination as a moderator of the timing of parent-child depressed mood

Recent research has suggested that the association between rumination and increases in depressive symptoms is moderated by the occurrence of stressful events. In other words, individuals with high levels of rumination are particularly likely to experience high levels of depressive symptoms following the occurrence of negative events in their lives. It is hypothesized that the occurrence of a stressful event serves as the “occasion setter” which triggers initial depressive symptoms and negative cognitions. It appears that rumination is then likely to lead to further increases in depressive symptoms following negative events (i.e., fighting with parents, getting a bad report card, being bullied). The onset of maternal depressive symptoms likely serves as a significant stressor for youth, thereby making youth who possess certain vulnerabilities, such as a ruminative response style, particularly susceptible to depression.

There are a multitude of reasons why maternal depressive symptoms may serve as a stressor for children and adolescents. A meta-analysis of observational studies linking maternal depression and parenting behavior indicates that maternal depression is associated with increases in negative and hostile exchanges between mothers and their children, maternal disengagement from their children, and decreases in positive mother-child social interactions (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). In addition, maternal depression is associated with increased familial conflict, interpersonal strife, occupational difficulties and financial struggles, and health-related problems (Hammen, 2002). Finally, depressed mothers are more likely to experience marital discord or conflict (Downey & Coyne, 1990). Whether directly or indirectly, each of these
psychosocial stressors negatively impacts the quality of the mother-child relationship and elevates children’s levels of stress.

The goal of the current study was to examine whether rumination serves as a moderator of the temporal relationship between maternal and child depressive symptoms. More specifically, the study investigated whether children and adolescents with a ruminative response style were at an increased risk for developing depressive symptoms following the occurrence of a stressful event, i.e., an increase in their mothers’ depressive symptoms. To provide a powerful examination of our hypotheses, we utilized a sample of mothers with a history of major depressive disorder and their children. Since the history of a depressive episode is the best predictor of a future depressive episode (Angst, 1992; Belsher & Costello, 1988), the use of such a sample helped to maximize the likelihood that mothers would experience increases in depressive symptoms during the course of the study. In addition, since children of depressed mothers are significantly more likely to themselves experience depressive episodes (Hammen et al., 1990; Weissman et al., 1997), the use of such a sample increased the likelihood that children would experience increases in depressive symptoms over the course of the study. In addition to the use of a high-risk paradigm, a multi-wave longitudinal design, whereby maternal and child depressive levels were assessed at multiple time points over the course of the study, was employed. This approach allowed for an idiographic, as opposed to nomothetic, approach to testing our hypotheses. In other words, mothers and their children were considered to be exhibiting high levels of depressive symptoms when they reported a level of depressive symptoms that was high in comparison to their own average level of depressive symptoms. Given that increases in stress on an individual level, rather than an
absolute level, will trigger increases in depressive symptoms, operationalizing high levels of maternal and child depressive symptoms from an idiographic perspective is likely to provide a powerful examination of our hypotheses. Specifically, we hypothesized that children with a ruminative response style would report greater increases in depressive symptoms following increases in their mothers’ depressive symptoms compared to children without such a style.

In addition, given that numerous studies have shown that maternal depression has a greater negative impact on daughters than on sons (Davies & Windle, 1997; Duggal, Carlson, Sroufe, & Egeland, 2001; Fergusson, Horwood, & Lynkskey, 1995; Hops, 1992), we also examined whether children’s gender served as a significant moderator of this association.
CHAPTER II

Methods

Study participants included mothers who met criteria for a current or past major depressive episode and had at least one child age 6-14 years old. Participants were recruited through advertisements placed in local newspapers and posters placed throughout the Montreal metropolitan area. Two hundred-fifty individuals responded to the ads. To determine study eligibility, trained diagnosticians administered the affective disorders module of the Structured Clinical Interview for the Diagnostic and Statistical Manual (SCID-I; First, Gibbon, Spitzer, & Williams, 1995) over the telephone to the mothers.

The final sample included 88 mothers and their 123 children (59 boys and 64 girls) ages 6-14 ($M = 9.93$ years; $SD = 2.37$). Thirty-four sibling pairs were included in the sample. The sample was 86.4% Caucasian, 3.4% Asian, 3.4% Hispanic, 2.3% African-American, 1.1% Native American, and 3.4% of other descent. While all the participants were fluent in English, their primary spoken languages were English (68.2%), French (11.4%), Spanish (3.4%), and other languages (17.0%). Of the parents, 15.9% were single, 43.2% were married, 10.2% were separated, and 26.1% were divorced. The median family income ranged from $30,000 to $45,000. The highest level of education completed by parents was an elementary school diploma for 8.0%, a high
school diploma for 15.9%, a community college diploma for 39.7%, a bachelor’s degree for 20.5%, and a graduate degree for 15.9%. At the time of the initial assessment, 45.5% of the mothers (n = 40) were experiencing a current major depressive episode and 54.5% of the mothers (n = 48) were in full remission.

Procedure

Following approval from the Institutional Review Board, the study procedure consisted of two phases: an initial laboratory-based assessment and a series of eight telephone follow-up assessments evenly dispersed over the ensuing year. During the first phase of the study, two research assistants met with the mother-child dyads in the laboratory. First, mothers and their children completed consent and assent forms, as well as a demographics questionnaire. Mothers and their children were also reminded that participation in the study was voluntary and that either or both could withdraw at any point. All participants elected to participate. Next, mothers and their children met separately with the research assistants. Children were verbally administered the Child Depression Inventory (CDI; Kovacs, 1981) and the ruminative subscale of the Children’s Response Style Questionnaire (CRSQ; Abela, Rochon, & Vanderbilt, 2000), and mothers completed the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

The second phase of the study consisted of follow-up assessments conducted every six weeks for the duration of one year. During the eight follow-up assessments, children were verbally administered the CDI and mothers were verbally administered the BDI to assess depressive symptoms. Seven mothers and their eight children did not complete phase two of the study because they were unavailable for contact or withdrew.
The average number of follow-up assessments completed by the participants was 4.77 ($SD = 2.21$). The number of completed follow-up assessments was not associated with maternal depressive symptoms ($r = .07, ns$), child depressive symptoms ($r = -.04, ns$), child age ($r = -.11, ns$), child rumination ($r = .05, ns$), child gender ($t(84) = 1.35, ns$), maternal diagnostic status (i.e., current or past episode; $t(81) = 0.29, ns$), and maternal marital status ($t(86) = 1.91, ns$) at baseline. Higher levels of parental education were associated with completion of a greater number of follow-up assessments ($r = .26, p < .05$).

Measures

The Structured Clinical Interview for the DSM–IV (SCID–I; First, et al., 1995). The SCID–I is a clinician-administered, semi-structured clinical interview to assess current and lifetime diagnoses of psychological disorders as defined by the Diagnostic and Statistical Manual (4th ed.; American Psychiatric Association, 2000). The SCID–I contains modules for affective, anxiety, and externalizing disorders; the current study employed the affective disorders module and the psychotic screen. The SCID–I has been shown to be a reliable tool for the diagnosis of depressive disorders (Zanarini et al., 2000) and has been utilized as an assessment instrument in numerous clinical studies.

In order to ensure accurate diagnoses, study diagnosticians received extensive training on the administration of the SCID–I and the assignment of psychological diagnoses. The training included approximately 40 hours of didactic training, listening to and coding audiotaped interviews, conducting practice interviews, and passing regular exams on the interview administration and DSM–IV diagnostic criteria with an 85% or higher. In addition, throughout the study, the principal investigator provided regular
group supervision to discuss diagnostic decisions and reviewed interviewers’ notes and tapes to confirm the presence or absence of diagnoses. The inter-rater agreement between the principal investigator and diagnosticians was 97%, and where discrepancies remained following a consensus meeting, participants were excluded from the study.

*Beck Depression Inventory (BDI; Beck et al., 1961).* The BDI is a 21-item self-report questionnaire that assess the presence and severity of depressive symptoms within the past two weeks. For each item, adults are presented with a group of four statements and instructed to select the response that best describes how they have been feeling. Sample questions include “I do not feel sad,” “I feel sad,” “I feel sad all the time and I can’t snap out of it,” or “I am so sad or unhappy that I can’t stand it.” Scores for each item range from 0 to 3, and total scores range from 0 to 63, with higher scores indicating more severe depressive symptoms. The BDI has been shown to be a reliable (Cronbach’s alpha = .93) and valid measure of depressive symptoms (Beck, Steer, & Garbin, 1988; Beck et al., 1961), and has been utilized in a number of clinical studies.

*Children’s Depression Inventory (CDI; Kovacs, 1981).* The CDI is a 27-item self-report questionnaire that assess the presence and severity of depressive symptoms in children within the past two weeks. For each item, children are presented with a group of three statements and instructed to select the response that best describes them. An example group includes “I am sad once in a while,” “I am sad many times,” or “I am sad all the time.” Scores for each item range from 0 to 2, and total scores range from 0 to 54, with higher scores indicating more severe depressive symptoms. The CDI’s psychometric properties include excellent internal consistency (Cronbach’s alpha = .86; Nelson & Politano, 1990), adequate test-retest reliability, and the ability to distinguish between
depressed and non-depressed children (Saylor, Finch, Spirito, & Bennett, 1984). The CDI has been utilized for a number of child and adolescent studies related to depression.

*Children’s Response Style Questionnaire (CRSQ; Abela et al., 2000).* The CRSQ is adapted from Nolen-Hoeksema and Morrow’s (1991) RSQ to better assess response styles among children and adolescents. The CRSQ is a 25-item self-report questionnaire which presents the respondent with a series of reactions to depressive symptoms which map onto three subscales: Ruminative Response Subscale, Distractive Response Subscale, and Problem-Solving Response Subscale. For the current study, only the Ruminative Response Subscale, consisting of 13 items, was administered. Similar to the RSQ, children are presented with a particular response to depressed mood (e.g., “think about how alone you feel”) and asked to indicate the extent to which they react in that way using a four-point Likert Scale, ranging from 0 (*almost never*) to 3 (*almost always*). Scores on the Ruminative Subscale range from 0 to 39, with higher scores indicating a greater propensity to ruminate. Past research indicates that the CRSQ has moderate levels of internal consistency (Cronbach’s Alpha = .74 in 3rd graders and .75 in 6th graders) and positively correlates with children’s depressive symptoms (Abela et al., 2004).
CHAPTER III

Results

Descriptive Statistics

Means, standard deviations, and Pearson correlations for all Time 1 measures (BDI, CDI, CRSQ), child age, and child gender are reported in Table 1. Of particular relevance, higher levels of child depressive symptoms were significantly associated with higher levels of child rumination and higher levels of maternal depressive symptoms. Child gender was not associated with any variables.

Means and standard deviations for maternal (BDI) and child (CDI) depressive symptoms across the eight follow-up assessments are presented in Table 2.

Vulnerability-Stress Hypothesis

To test our hypothesis that children who possess high levels of rumination would report greater increases in depressive symptoms following increases in their mothers’ depressive symptoms than children who possess low levels of rumination, we utilized multilevel modeling. Analyses were carried out using the SAS (version 8.1) MIXED procedure and maximum likelihood estimation. Our dependent variable was within-subject fluctuations in child depressive symptoms during the follow-up interval (FU_CDI). Our primary predictors of FU_CDI were child rumination (C_RUMINATION) and fluctuations in maternal depressive symptoms during the
follow-up interval (FU_BDI). As C_RUMINATION was a between-subject predictor, CRSQ scores were standardized prior to analyses. As FU_BDI was a within-subject predictor, BDI scores were centered at each mother’s mean prior to analyses, such that FU_BDI reflected upwards or downwards fluctuations in mothers’ depressive symptoms compared to her mean level of depressive symptoms. Preliminary analyses were conducted to examine whether child gender served as a significant moderator of any of the reported associations. As child gender was not a significant moderator, results were examined in the sample as a whole.

When utilizing hierarchical linear models, it is important to identify appropriate mean and covariance structures. The use of an appropriate covariance structure is essential in order to obtain valid inferences for the parameters of the mean structure. Overparametrization of the covariance structure can lead to inefficient estimation and poor assessment of errors, while too much restriction of the covariance structure can lead to invalid inferences when the assumed structure does not hold (Altham, 1984). In other words, when analyzing results, overparametrization may lead to false negatives, while too much restriction of the covariance structure can lead to false positives.

We were interested in examining the effects of maternal depressive symptoms, child rumination, and child gender on child depressive symptoms. In line with Diggle, Liang, and Zeger’s (1994) recommendation that one use a “saturated” model for the mean structure while searching for an appropriate covariance structure, our mean structure included FU_BDI, C_RUMINATION, CHILD GENDER, and all possible interactions. Two additional effects were also included in the model. First, in order to control for individual differences in baseline levels of child depressive symptoms, children’s Time 1
CDI scores were included in the model. Second, as each child reports a different level of depressive symptoms when his or her mother is experiencing her own average level depressive symptoms, a random effect for intercept (RE INTERCEPT) was included. Third, since fluctuations in maternal depressive symptoms are a within-subject predictor whose effect is expected to vary from child to child, a random effect for slope (RE SLOPE) is included.

Commonly used covariance structures when multiple responses are obtained from the same individual over time (and consequently, when within subject residuals over time are likely to be correlated) include compound symmetry, first-order autoregressive (AR), heterogeneous autoregressive (ARH), and banded Toeplitz. In order to select one of these covariance structures for our analyses, we fitted models utilizing each structure and chose the ‘best’ fit based on Akaike information criteria (AIC and AICC) and Schwartz Bayesian criterion (BIC). In all cases, the best fit was heterogeneous autoregressive structure (ARH[1]). Such a covariance structure indicates two general patterns in CDI scores during the follow-up interval. First, as the interval between any two follow-up assessments increases, the degree of inter-correlation between children’s CDI scores at two time points decreases (i.e., current depression is more strongly associated with more recent depression than with less recent depression). Second, the variance in CDI scores across administrations is not constant (i.e., variance in CDI scores is greater at some follow-up assessments than others) (Littell, Pendergast, & Natarajan, 2000).

After choosing the appropriate covariance structure, we next examined the random-effects and fixed-effects components of our model. With respect to random effects, RE_INTERCEPT ($p > .0001$) was significant and thus retained in the model.
However, RE_SLOPE ($p > .14$) was not significant and thus deleted from the model. With respect to covariance structure, the ARH[1] parameter ($r = 0.14$, $p < .056$) approached significance and was thus retained in the model.

With respect to fixed-effects, the final results are presented in Table 3. As hypothesized, the interaction between child rumination and maternal depression was a significant predictor of child depressive symptoms during follow-up ($b = 0.07$, SE = 0.03, $F(1, 447) = 8.02$, $p < .01$). In order to examine the form of the C_RUMINATION x FU_BDI (child rumination by maternal depression) interaction, the model summarized in Table 3 was used to calculate the predicted CDI scores for children exhibiting either high or low levels of rumination (plus or minus 1.5 $SD$) whose mothers were experiencing either high or low levels of depressive symptoms in comparison to their average level of depressive symptoms (plus or minus 1.5 $\times$ mean within-subject $SD$). The results of are presented in Figure 1. As both maternal depressive symptoms (FU_BDI) and child depressive symptoms (FU_CDI) are within-subject variables, slopes are interpreted as the increase in a child’s CDI score that would be expected given that his or her mother scored one point higher score on the BDI.

Analyses were conducted for each C_RUMINATION condition examining whether the slope of the relationship between maternal depressive symptoms and child depressive symptoms significantly differed from zero. Analyses indicated that children with a more ruminative response style reported higher levels of depressive symptoms when their mothers were experiencing higher levels of depressive symptoms, compared to when their mothers were experiencing lower levels of depressive symptoms ($t(447) = 4.20$, $p < .001$). However, among children who exhibited lower levels of rumination at
baseline, children’s depressive symptoms were not significantly associated with within-subject fluctuations in maternal depressive symptoms \( (t(447) = -0.62, p < .54, ns) \). Planned comparisons of the slopes of the relationship between maternal and child depressive symptoms revealed that the slope was significantly greater in children exhibiting high levels of rumination (slope = 0.19) than in children exhibiting low levels of rumination (slope = -0.03; \( t(447) = 2.83, p < .01 \)).
CHAPTER IV

Discussion

The results of the current study provide partial support for hypotheses. Consistent with prior research (e.g., Hammen, et al., 1991), a temporal association was observed between mother and child depressive symptoms. In addition, consistent with our primary hypothesis, children’s levels of rumination served as a significant moderator of this temporal association. More specifically, children with a more ruminative response style reported greater increases in their levels of depressive symptoms following increases in their mothers’ levels of depressive symptoms. Contrary to hypotheses, however, the strength of this association did not vary as a function of child gender. Several findings warrant additional attention.

First, the results of the current study suggest that there is a significant temporal association between maternal and child depressive symptoms. In other words, elevations in maternal depressive symptoms were associated with elevations in their children’s depressive symptoms. At the same time, the specific factors that account for this association remain unclear. It is plausible that children’s depressive symptoms occurred in reaction to their mothers’ depressive symptoms. For instance, Hammen (2002) speculates that younger children may become distressed by their parents’ low energy or apathy, while older children may become concerned about parents’ expressions of
worthlessness, hopelessness, or suicide ideation. Alternatively, children and their mothers’ depressive symptoms may be simultaneous responses to external stressors encountered by mothers, such as economic hardships (Conger, Conger, Mathews, & Elder, 1999; Hammen, 2002) or marital conflicts (Downey & Coyne, 1990). In order to more precisely understand the relationship between maternal and child depression, additional research is needed examining children’s actual perceptions and symptomatic reactions toward their parents’ depressive symptoms (Hammen, 2002).

Second, the results of the current study provide support for rumination as a moderator of the temporal association between maternal and child depressive symptoms. Consistent with Nolen-Hoeksema’s (1987; 1991) response style theory, children with a ruminative response style experienced greater elevations in depressive symptoms following the occurrence of stressful events, which in this study were elevations in maternal depressive symptoms. Furthermore, in the absence of elevations in maternal depressive symptoms, children with a ruminative response style were not more likely than children without such a style to experience elevations in their depressive symptoms. Such a finding highlights the interaction between vulnerability and stress when understanding the development and course of depressive symptoms (Ingram & Luxton, 2005).

While results of the current study indicate that child rumination is a moderator of the association between maternal and child depressive symptoms, they do not explain why children with a ruminative response style experience greater elevations in depressive symptoms following elevations in their mothers depressive symptoms. Nolen-Hoeksema (1991) suggests three possible mechanisms by which a ruminative response style may
contribute to elevations in depressive symptoms. First, individuals who ruminate in response to depressed mood or stressful events may be more likely to experience negative cognitions, which in turn contribute to elevations in depressive symptoms. Second, individuals who engage in rumination do not engage in behaviors that provide positive reinforcement and a sense of control, which may contribute to sense of learned helplessness and further exacerbate depressive symptoms. Third, ruminative thinking may interfere with problem solving by directing attention towards negative cognitions and away from the initiation of instrumental behaviors. Consistent with these mechanisms, it is possible that children who ruminated following elevations in their mother’s depressive symptoms engaged in negative thinking patterns which interfered with their ability to engage in positively reinforcing behaviors, maintain a sense of control, and/or engage in active problem solving. In turn, these children remained distressed for a prolonged period of time, which contributed to their heightened level of depressive symptoms. Future research should examine the specific mechanisms which account for the temporal association between maternal and child depressive symptoms among children with a ruminative response style.

Finally, the results of the current study indicated that the strength of the association between rumination and increases in child depressive symptoms following increases in parental depressive symptoms did not vary as a function of child gender. Previous research examining vulnerability to depression in offspring of depressed mothers has generally found that maternal depression has a greater impact on daughters than sons (e.g., Hops, 1992). This gender difference may be a result of adolescent daughters spending more time with their mothers than adolescent sons (Montemayor,
and their having greater conflicts with their mothers than do sons (Hill, Holmbeck, Marlow, Green, & Lynch, 1985; Steinberg, 1987, 1988). Furthermore, adolescent girls’ greater proximity to their mothers makes them more vulnerable to the effects of parental psychopathology, strained family relationships, and familial stressors, and subsequently, more vulnerable to developing depressive symptoms (Sheeber, Davis, & Hops, 2002).

While the extant literature suggests that the factors which place daughters at greater risk for elevations in depressive symptoms following elevations in maternal depressive symptoms first emerge during adolescence, our study incorporates youth from a wider age range, which may explain why the impact of parental depression did not affect daughters more than sons in our sample. Alternatively, while maternal depression is a stressor that generally impacts daughters more than sons, perhaps youth of both genders who possess ruminative response styles are equally likely to experience elevations in depressive symptoms following elevations in their mothers’ depressive symptoms. Such an alternative posits that there is a unique component to rumination which increases children’s susceptibility to depression, regardless of their gender.

Several limitations of the current study should be noted. First, levels of depressive symptoms were assessed by self-report measures. Although the CDI and BDI are widely utilized measures and considered to be reliable and valid for the assessment of depressive symptoms, it is difficult to make conclusions about clinically significant depression based on self-report questionnaires. Future studies should utilize semi-structured diagnostic interviews to see if the current findings extend to the onset of depressive episodes. Second, the study utilized a high-risk paradigm. Although such a design is advantageous in that it increases the likelihood of capturing elevations in depressive symptoms in both
parents and children, the results of the study cannot be generalized to other populations. Third, the majority of the participants were Caucasian and came from middle-class families, limiting the generalizability of the findings to other cultural, ethnic, and socio-economic groups. Future research with more diverse populations is therefore needed. Fourth, although the current study examined whether child rumination moderates the relation between elevations in children’s depressive symptoms and elevations in maternal depressive symptoms, future research is needed to examine the mechanisms and processes that mediate this relationship. Potential mechanisms underlying the association between maternal and child depressive symptoms among children with ruminative response styles may include the content of children’s negative cognitions, an inability to engage in positively reinforcing behaviors, and/or a lack of active problem solving skills (Nolen-Hoeksema, 1980). Additionally, possible mediators may include parental withdrawal and irritability (Cohn & Campbell, 1992), dysfunctional parenting practices (Fendrich, Warner, & Weissman, 1990), and marital conflict (Beach, Smith, & Fincham, 1994), each of which may trigger children’s ruminative tendencies. Last, the current study only examined the relationship between child rumination, maternal depressive symptoms, and child depressive symptoms. Thus, we were unable to identify whether the interaction of this cognitive vulnerability factor with maternal depressive symptoms is specific to child depressive symptoms rather than broadly applicable to other disorders.

In summary, the results of the current study suggest that children and adolescents with a ruminative response style are at greater risk than other youth for experiencing increases in their own depressive symptoms following increases in their mothers’ depressive symptoms. These results highlight the importance of designing preventative
interventions and treatments targeting ruminative thinking, particularly for children of depressed mothers. Ongoing research to identify vulnerability factors which may affect the severity of depression within high-risk families will advance our scientific understanding of the development and course of the disorder, and guide clinicians in the development of prevention and treatment programs.
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Table 1
Means, Standard Deviations, and Intercorrelations between Children’s Age and Phase 1 Measures

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<th>1</th>
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<th>4</th>
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<tbody>
<tr>
<td>1. BDI</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. CDI</td>
<td>.26**</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CRSQ</td>
<td>.09</td>
<td>.32**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4. CHILD AGE</td>
<td>-.03</td>
<td>.04</td>
<td>-.16</td>
<td>-</td>
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</table>

*M*  
SD  
19.16  
10.49  
15.69  
9.94

12.25  
6.94  
7.82  
2.38

*Notes:* CDI = Children’s Depression Inventory, BDI = Beck Depression Inventory, CRSQ = Children’s Response Style Questionnaire  
** Correlation is significant at the 0.01 level
Table 2
Means and Standard Deviations of Maternal and Child Depressive Symptoms Across the Eight Follow-Up Assessments

<table>
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<th>5</th>
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<td><strong>BDI</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>M</em></td>
<td>18.47</td>
<td>16.18</td>
<td>18.23</td>
<td>14.65</td>
<td>14.73</td>
<td>15.80</td>
<td>18.16</td>
<td>16.76</td>
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<tr>
<td><em>SD</em></td>
<td>11.49</td>
<td>10.16</td>
<td>9.43</td>
<td>9.61</td>
<td>10.84</td>
<td>10.33</td>
<td>11.01</td>
<td>9.37</td>
</tr>
<tr>
<td><strong>CDI</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>M</em></td>
<td>8.34</td>
<td>8.69</td>
<td>8.05</td>
<td>7.74</td>
<td>7.85</td>
<td>7.59</td>
<td>7.74</td>
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</tr>
<tr>
<td><em>SD</em></td>
<td>6.00</td>
<td>7.09</td>
<td>5.49</td>
<td>5.99</td>
<td>6.24</td>
<td>5.90</td>
<td>6.25</td>
<td>6.32</td>
</tr>
</tbody>
</table>

*Notes:* BDI = Beck Depression Inventory, CDI = Children’s Depression Inventory
Table 3  
Child Rumination and Maternal Depression as Predictors of Within-Subject Fluctuations in Child Depressive Symptoms at Follow-Up

<table>
<thead>
<tr>
<th></th>
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<th>SE</th>
<th>Df</th>
<th>F</th>
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<tr>
<td>Time 1 CDI</td>
<td>3.24</td>
<td>0.39</td>
<td>110</td>
<td>67.99***</td>
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<tr>
<td>Maternal Depression</td>
<td>0.09</td>
<td>0.02</td>
<td>447</td>
<td>10.51**</td>
</tr>
<tr>
<td>Child Rumination</td>
<td>0.72</td>
<td>0.40</td>
<td>110</td>
<td>3.29</td>
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<tr>
<td>Child Rumination x</td>
<td>0.07</td>
<td>0.03</td>
<td>447</td>
<td>8.02**</td>
</tr>
</tbody>
</table>

Note: Time 1 CDI = Time 1 Child Depression Inventory scores; Maternal Depression = Within-subject fluctuations in maternal Beck Depression Inventory scores at follow-up (FU_BDI); Child Rumination = Between-subject fluctuations in rumination subscale of Children’s Response Style Questionnaire scores during the follow-up interval (C_RUMINATION).
* p ≤ 0.05. ** p ≤ 0.01. *** p ≤ .001
Figure 1. Predicted slope of the relationship between mother and child depressive symptoms among children exhibiting low and high levels of rumination.