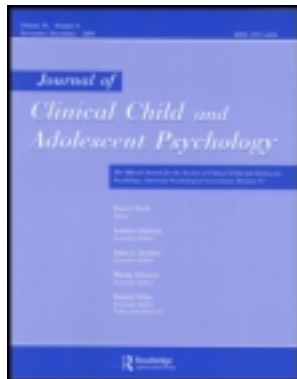


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Meir Flanbaum<sup>a</sup>, Caroline W. Oppenheimer<sup>b</sup>, John R.Z. Abela<sup>c</sup>, Jamie F. Young<sup>a</sup>, Darren Stolow<sup>c</sup> & Benjamin L. Hankin<sup>b</sup>

<sup>a</sup> Graduate School of Applied and Professional Psychology, Rutgers University

<sup>b</sup> Department of Psychology, University of Denver

<sup>c</sup> Department of Psychology, Rutgers University

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# The Effects of Rumination on the Timing of Maternal and Child Negative Affect

Meir Flanbaum

*Graduate School of Applied and Professional Psychology, Rutgers University*

Caroline W. Oppenheimer

*Department of Psychology, University of Denver*

John R.Z. Abela

*Department of Psychology, Rutgers University*

Jamie F. Young

*Graduate School of Applied and Professional Psychology, Rutgers University*

Darren Stolow

*Department of Psychology, Rutgers University*

Benjamin L. Hankin

*Department of Psychology, University of Denver*

The current study examined whether rumination serves as a moderator of the temporal association between maternal and child negative affect. Participants included 88 mothers with a history of major depressive episodes and their 123 children. During an initial assessment, mothers and their children completed measures assessing negative affect and children completed a measure assessing the tendency to ruminate in response to such symptoms. Every 6 weeks for the subsequent year, mothers and their children completed measures assessing negative affect. Consistent with hypotheses, children with a ruminative response style were more likely than other children to report elevations in negative affect when their mothers' level of negative affect increased over time. Neither child gender nor mothers' current clinical depression status moderated the association between child rumination and maternal negative affect.

Children with depressed mothers are significantly more likely to develop depression and general internalizing problems compared to other children (Goodman

& Tully, 2006; Hammen, Burge, Burney, & Adrian, 1990; Weissman, Warner, Wickramaratne, Moreau, & Olfson, 1997). There is also a significant temporal

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Correspondence should be addressed to Caroline W. Oppenheimer, Department of Psychology, University of Denver, 2155 South Race Street, Denver, CO 80208. E-mail: Caroline.Oppenheimer@gmail.com or Hankin, Department of Psychology, University of Denver, 2155 South Race Street, Denver, CO 80208. E-mail: Ben.Hankin@psy.du.edu

association between maternal and child affective symptoms, such that elevations in maternal negative affect are typically linked with elevations in child negative affect (Abela, Skitch, Adams, & Hankin, 2006; Hammen, Burge, & Adrian, 1991). Despite their increased risk, however, not all children of depressed mothers necessarily develop internalizing symptoms. Therefore, it is important to identify vulnerability factors that moderate the association between parent and child negative affect, thereby placing youth at an increased risk for the damaging effects of maternal depression.

### RESPONSE STYLE THEORY

One framework that has been posited to explain the development and maintenance of depression is Nolen-Hoeksema's (1987, 1991) response style theory (RST). RST asserts that the way in which individuals respond to a dysphoric mood influences the onset, severity, and duration of negative affect. Individuals with a ruminative response style focus passively and repetitively on their symptoms of distress, as well as the causes and consequences of these symptoms, without engaging in active problem solving to alleviate their mood or improve their situation. For example, ruminative responses to negative affect include meditating about the causes of their distress; talking with others about negative feelings for an extended period; or isolating themselves to focus on how tired, lethargic, or unmotivated they feel (Nolen-Hoeksema, 1991; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Although everyone occasionally engages in rumination, a ruminative response style refers to a relatively stable, maladaptive pattern of responding to negative affect (Bagby, Rector, Bacchioni, & McBride, 2004; Hankin, 2008a; Just & Alloy, 1997). RST contends that individuals with ruminative response styles are at an increased risk for prolonged periods of negative mood, greater severity of distress symptoms, and clinical episodes of depression (Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1991).

### EMPIRICAL SUPPORT FOR RST

There is a substantial body of research on RST 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 and anxiety symptoms (see Aldao, Nolen-Hoeksema, & Schweizer, 2010, and Thomsen, 2006, for reviews). Research investigating RST has also been extended to youth. Studies of RST with children and adolescents

have yielded strong support for the theory's vulnerability hypothesis. Across age and gender, numerous studies with children and adolescents have found that rumination was a significant predictor of increases in negative affect over time (e.g., Abela, Aydin, & Auerbach, 2007; Abela, Brozina, & Haigh, 2002; Abela, Parkinson, Stolorow, & Starrs, 2009; Broderick & Korteland, 2004; Hankin, 2008a; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007; Roelofs et al., 2009; Schwartz & Koenig, 1996) as well as new onsets of clinical depression (Abela & Hankin, *in press*).

In addition, Nolen-Hoeksema (1987, 1991) hypothesized that the higher rates of depression among women may be related to their increased tendency to engage in ruminative coping. Consistent with this feature of RST, laboratory studies of adults have shown that women have a greater tendency to engage in rumination than men (e.g., Butler & Nolen-Hoeksema, 1994). However, naturalistic studies of adults have been mixed regarding sex differences in rumination with some studies finding sex differences (e.g., Nolen-Hoeksema, Morrow, & Fredrickson, 1993) and others not finding such differences (Nolen-Hoeksema & Morrow, 1991). Similarly, research studies with youth samples investigating the relationship between gender and rumination have been equivocal. Eight studies have found higher levels of rumination among girls compared to boys (Abela et al., 2009; Broderick & Korteland, 2004; Burwell & Shirk, 2007; Driscoll, Lopez, & Kistner, 2009; Hankin, 2008a, 2009; Schwartz & Koenig, 1996; Ziegert & Kistner, 2002), whereas three studies have found no gender differences in rumination (Abela et al., 2007; Abela et al., 2002; Abela, Vanderbilt, & Rochon, 2004).

### A VULNERABILITY-STRESS PERSPECTIVE OF RUMINATION AS A MODERATOR OF THE TIMING OF PARENT-CHILD NEGATIVE AFFECT

Recent research has suggested that the association between rumination and increases in negative affect is moderated by the occurrence of stressful events (Kraaij et al., 2003; Robinson & Alloy, 2003; Skitch & Abela, 2008). In other words, individuals with high levels of rumination are particularly likely to experience high levels of negative affect following the occurrence of negative events in their lives. It is hypothesized that the occurrence of a stressful event serves as the "occasion setter" that triggers initial negative affect and negative cognitions (Abramson, Metalsky, & Alloy, 1989). It appears that rumination is then likely to lead to further increases in negative affect following negative events (i.e., fighting with parents, getting a bad report

card, being bullied). There is a growing body of research that conceptualizes maternal depression or elevations in maternal negative affect (Abela et al., 2006; Gibb, Uhrlass, Grassia, Benas, & McGeary, 2009; Hammen, 2009), or the child's own elevations in negative affect (Hankin, 2008a), as triggers that can activate ruminative thinking, consistent with a vulnerability-stress model. Accordingly, youth who possess certain cognitive vulnerabilities, such as a ruminative response style, and experience increases in their own or maternal negative affect may be particularly susceptible to increases in negative affect.

There are a multitude of reasons why maternal depression or general negative affect may serve as a stressor for children and adolescents. A meta-analysis of observational studies indicates that maternal depression is associated with increases in 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 and dysphoria is associated with increased familial and marital conflict, occupational difficulties and financial struggles, and health-related problems (Cummings, Keller, & Davies, 2005; Downey & Coyne, 1990; Hammen, 2002). Whether directly or indirectly, each of these psychosocial stressors likely negatively influences 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 negative affect. More specifically, the study investigated whether children and adolescents with a ruminative response style were at an increased risk for exhibiting negative affect when experiencing a stressful event (i.e., an increase in their mothers' negative affect). To provide a powerful examination of our hypotheses, we utilized a sample of mothers with a history of major depressive disorder and their children. Because a 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 negative affect during the course of the study. In addition, because children of depressed mothers are significantly more likely to experience internalizing problems themselves (Goodman, 2007; Weissman et al., 1997), the use of such a sample increased the likelihood that children would experience increases in negative affect over the course of the study. In addition to the use of a high-risk paradigm, we used a multiwave longitudinal design, whereby levels of maternal and child negative affect were assessed at multiple time points over the course of the study. 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 negative affect when they reported a level of negative affect that was high in comparison to their own average level of negative affect. Given that increases in stress on an individual level, rather than an absolute level, will trigger increases in negative affect (Abela et al., 2006; Hankin, Jenness, Abela, & Smolen, in press), operationalizing high levels of maternal and child negative affect 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 negative affect when their mothers' levels of negative affect increased compared to children without such a style. In addition, given that numerous studies have shown that maternal depression and negative affect 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 explored whether children's gender served as a significant moderator of this association.

## METHODS

### Participants

Study participants included mothers who met criteria for a current or past major depressive episode and had at least one child age 6 to 14 years old. The final sample included 88 mothers and their 123 children (59 boys, 64 girls) ages 6 to 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. Although all 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, 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 study procedure consisted of two remaining 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, 1992) and the Ruminative subscale of the Children's Response Style Questionnaire (CRSQ-Ruminative; 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 6 weeks for the duration of 1 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 2 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 negative affect ( $r = .07$ ,  $ns$ ), child negative affect ( $r = -.04$ ,  $ns$ ), 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),  $t(81) = 0.29$ ,  $ns$ ; or 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 SCID-I (First et al., 1995).* The SCID-I is a clinician-administered, semistructured clinical interview to assess current and lifetime diagnoses of psychological disorders as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. [DSM-IV];

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.

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 hr 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 interrater agreement between the principal investigator and diagnosticians was 97%, and where discrepancies remained following a consensus meeting, participants were excluded from the study.

*BDI (Beck et al., 1961).* The BDI is a 21-item self-report questionnaire that assess the presence and severity of negative affect within the past 2 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 items include, "I do not feel sad," "I feel sad," "I feel sad all the time and I can't snap out of it," and "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 negative affect (Beck, Steer, & Garbin, 1988; Beck et al., 1961), and has been utilized in a number of clinical studies. Alphas in this sample ranged from .89 to .93 across administrations, indicating high internal consistency.

*CDI (Kovacs, 1992).* The CDI is a 27-item self-report questionnaire that assess the presence and severity of negative affect in children within the past 2 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 negative affect. The CDI's psychometric properties include excellent

internal consistency (Cronbach's  $\alpha = .86$ ; Nelson & Politano, 1990), adequate test-retest reliability (Saylor, Finch, Spirito, & Bennett, 1984), and good convergent validity (Klein, Dougherty, & Olino, 2005). Alphas in this sample ranged from .79 to .87 across administrations indicating adequate internal consistency.

*CRSQ-Ruminative* (Abela et al., 2000). The CRSQ-Ruminative is adapted from Nolen-Hoeksema and Morrow's (1991) RSQ to better assess response styles among children and adolescents. The full CRSQ is a 25-item self-report questionnaire that presents the respondent with a series of reactions to depressive symptoms that 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 4-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-Ruminative has moderate levels of internal consistency (Cronbach's  $\alpha = .74$  in third graders and .75 in sixth graders), exhibits good test-retest stability (Hankin, 2008b), and positively correlates with children's depressive symptoms (Abela et al., 2004). Coefficient alpha in this study was .82

## RESULTS

### Examining Nonindependence in Data

Given that 34 pairs of siblings participated in this study, we conducted preliminary analyses to examine whether nonindependence in our data affected any findings. To do so, we first conducted all analyses including only (a) the 55 children who did not have a sibling participating in the study and (b) the first child from each sibling

pair to complete the assessment ( $n = 34$ ). Next, we conducted all analyses including only (a) the 55 children who did not have a sibling participating in the study and (b) the second child from each sibling pair to complete the assessment ( $n = 34$ ). Last, we conducted all analyses including all 123 children. The direction and magnitude of effects were similar in all three sets of analyses, suggesting that the inclusion of siblings in this study did not have a significant impact on the pattern of findings obtained. Thus, we used the entire sample of children ( $n = 123$ ) in the analyses presented.

### Descriptive Statistics

Means and standard deviations for all primary variables overall, and separated by maternal depression status at the outset of the study, are presented in Table 1. Independent  $t$  tests revealed that mothers with a current major depressive disorder at the start of the study had significantly higher BDI scores than mothers with a remitted, past major depressive disorder only. There were no differences in child negative affect (CDI) or rumination scores (CRSQ-Ruminative) between children of currently depressed mothers and children of mothers with a history of depression.

Pearson correlations for Time 1 measures (BDI, CDI, CRSQ-Ruminative) and child gender are reported in Table 2. Of particular relevance, higher levels of child negative affect were significantly associated with higher levels of child rumination and higher levels of maternal negative affect. Child gender was not associated with any variables. Means and standard deviations for maternal (BDI) and child (CDI) negative affect across the eight follow-up assessments are presented in Table 3.

### Overview of Data Analytic Approach

To test our hypothesis that children who possess high levels of rumination would report greater increases in negative affect when exposed to increases in their mothers' negative affect than children who possess low levels of rumination, we utilized multilevel modeling.

TABLE 1  
Means (and Standard Deviations) for Baseline Measures for Overall Sample, Children of Mothers with Current Major Depressive Disorder, and Children of Mothers with Past Major Depressive Disorder

Variable	Overall	Current Maternal MDD	Past Maternal MDD	$t$
BDI	19.16 (12.25)	26.09 (10.61)	13.33 (9.70)	6.03***
CDI	10.49 (6.94)	10.91 (7.22)	9.80 (6.03)	.82
CRSQ-Ruminative	15.69 (7.82)	15.61 (7.45)	14.39 (7.91)	.78

Note: MDD = major depressive disorder; BDI = Beck Depression Inventory; CDI = Children's Depression Inventory; CRSQ-Ruminative = Children's Response Style Questionnaire-Ruminative subscale.

\*\*\* Correlation is significant,  $p < .001$ .

TABLE 2  
Correlations Among Baseline Measures

	1	2	3	4
1. BDI	—			
2. CDI	.26**	—		
3. CRSQ–Ruminative	.13	.34**	—	
4. Child gender	.09	–.06	.09	—

Note: BDI = Beck Depression Inventory; CDI = Children's Depression Inventory; CRSQ–Ruminative = Children's Response Style Questionnaire.

\*\*Correlation is significant at  $p < .01$ .

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 negative affect during the follow-up interval (CDI). Our primary predictors of CDI were child rumination (CRSQ–Ruminative) and fluctuations in maternal negative affect during the follow-up interval (BDI). As BDI was a within-subject predictor, BDI scores were centered at each mother's mean prior to analyses, such that BDI reflected upwards or downwards fluctuations in mother's negative affect compared to her mean level of negative affect.

When utilizing hierarchical linear models, it is important to identify appropriate mean and covariance structures. We were interested in examining the effects of maternal negative affect, child rumination, and child gender on child negative affect. 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 BDI, CRSQ–Ruminative, child gender, and all possible interactions. As each child reports a different level of negative affect when his or her mother is experiencing her own average level of negative affect, a random effect for intercept (RE INTERCEPT) was included. Second, because fluctuations in maternal negative affect are a within-subject predictor the effect of which is expected to vary from child to child, a random effect for slope (RE SLOPE)

TABLE 3  
Means and Standard Deviations of Maternal and Child Negative Affect Levels Across the Eight Follow-Up Assessments

	1	2	3	4	5	6	7	8
BDI								
<i>M</i>	18.47	16.18	18.23	14.65	14.73	15.80	18.16	16.76
<i>SD</i>	11.49	10.16	9.43	9.61	10.84	10.33	11.01	9.37
CDI								
<i>M</i>	8.34	8.69	8.05	7.74	7.85	7.59	7.74	8.07
<i>SD</i>	6.00	7.09	5.49	5.99	6.24	5.90	6.25	6.32

Note: BDI = Beck Depression Inventory; CDI = Children's Depression Inventory.

is included. To select the proper covariance structure for our analyses, we fitted models utilizing different structures (Littell, Pendergast, & Natarajan, 2000) 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]).

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 ( $r = .14$ ,  $p < .056$ ) approached significance and was thus retained in the model.

### Vulnerability-Stress Hypothesis

The three-way interaction, Gender  $\times$  Child Rumination  $\times$  Maternal Negative Affect, predicting child negative affect was nonsignificant,  $F(1, 778) = .64$ ,  $p = .93$ . This indicates no moderation by gender. It is important to note, and consistent with our primary hypothesis, that the interaction between child rumination and maternal negative affect was a significant predictor of child negative affect during follow-up ( $b = 0.006$ ,  $SE = 0.002$ ),  $F(1, 778) = 7.49$ ,  $p < .01$ . To examine the form of the Child Rumination  $\times$  Maternal Negative Affect interaction (CRSQ–Ruminative  $\times$  BDI), the model summarized in Table 4 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 negative affect in comparison to their average level of depressive symptoms (plus or minus 1.5  $\times$  mean within-subject *SD*). The results are presented in Figure 1. As both maternal negative affect (BDI) and child negative affect (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 1 point higher on the BDI.

TABLE 4  
Child Rumination and Maternal Negative Affect as Predictors of Within-Subject Fluctuations in Child Negative Affect Across Follow-Up

	<i>b</i>	<i>SE</i>	<i>df</i>	<i>F</i>
Maternal Negative Affect	0.09	0.02	778	24.71**
Child Rumination	0.09	0.07	110	1.63
Child Rumination $\times$ Maternal Negative Affect	0.006	0.002	778	7.49**

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

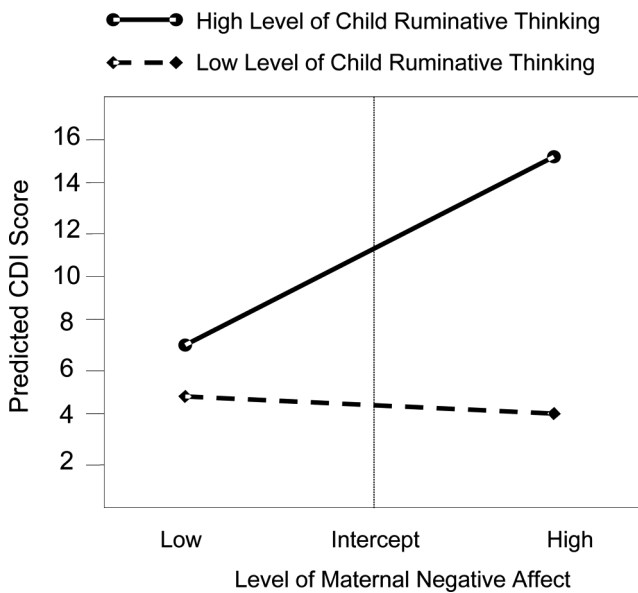


FIGURE 1 Predicted slope of the relationship between mother and child negative affect among children exhibiting low and high levels of rumination. *Note:* CDI=Children's Depression Inventory.

Follow-up analyses were conducted for each CRSQ–Ruminative condition examining whether the slope of the relationship between maternal negative affect and child negative affect significantly differed from zero. Children with a more ruminative response style reported higher levels of negative affect when their mothers were experiencing higher levels of negative affect, compared to when their mothers were experiencing lower levels of negative affect,  $t(447) = 4.20$ ,  $p < .001$ . However, among children who exhibited lower levels of rumination at baseline, children's negative affect levels were not significantly associated with within-subject fluctuations in mothers' negative affect,  $t(447) = -0.62$ ,  $p < .54$ , *ns*. Planned comparisons of the slopes of the relationship between maternal and child negative affect 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),  $t(447) = 2.83$ ,  $p < .01$ .

It should also be noted that a main effect of maternal negative affect on child negative affect was found, providing evidence for the temporal covariation in mother and child negative affect (see Table 4),  $b = 0.09$ ,  $SE = 0.02$ ,  $F(1, 778) = 24.71$ ,  $p < .01$ . Additional analyses were conducted to examine whether current maternal clinical depression status moderated the Child Rumination  $\times$  Maternal BDI interaction. It is possible that rumination interacts with elevations in maternal negative affect only among children whose mothers were currently clinically depressed. However, results showed that the three-way interaction, Current Maternal Clinical Depression (SCID-I)  $\times$  Child

Rumination  $\times$  Maternal BDI, was not significant,  $F(1, 531) = 1.85$ ,  $p = .17$ .

Further exploratory analyses were conducted to explore whether there existed bidirectional effects such that maternal negative affect prospectively predicted increases in child negative affect and/or child negative affect prospectively predicted increases in maternal negative affect. A crossed-lagged effects structural equation model using AMOS 16.0 (Arbuckle, 2007) was used to test potential bidirectional effects. This model included cross-lagged paths from BDI to CDI, and CDI to BDI, across follow-ups after controlling for concurrent associations and construct stability. This model provided an adequate fit to the data,  $\chi^2(2) = 3.51$ ,  $p = .17$ , comparative fit index = .99, root mean square error of approximation = .06. However, none of the cross-lagged paths (i.e., BDI at Time T  $\rightarrow$  CDI at Time T + 1 or CDI at Time T  $\rightarrow$  BDI at Time T + 1) were significant. This shows that associations between maternal and child negative affect are contemporaneous.

## DISCUSSION

The results of the current study provide support for the primary hypotheses. A contemporaneous temporal association was observed between mothers' and children's levels of negative affect over time. In addition, children's levels of rumination moderated this temporal association. More specifically, children with a more ruminative response style reported greater increases in their levels of negative affect when their mothers exhibited higher levels of negative affect over time. The strength of this association did not vary as a function of child gender or mothers' current clinical depression status. The lack of significant moderation by child gender or maternal current depression suggests that the association between child and maternal negative affect and its moderation by child rumination applies equally to boys and girls as well as across mothers' depression history (i.e., both current and remitted).

The finding that elevations in maternal negative affect were associated with elevations in their children's negative affect is consistent with research showing that maternal internalizing problems are linked with child depressive and anxiety symptoms and provides further evidence for the intergenerational transmission of internalizing disorders (Goodman & Gotlib, 2002; Hammen, Burge, & Adrian, 1991). However, it should be emphasized that these effects were "temporally proximal" (e.g., Time 1 maternal negative affect was associated with Time 1 child negative affect) rather than "temporally distal" (cross-lagged over a period of 6 weeks; Keisner, Dishion, Poulin, & Pastore, 2009). In other words, maternal mood appears to have an effect on



child mood contemporaneously, and this association appears to be stable over time. Because possible causal relations between maternal and child negative affect are likely to be synchronous, and not detectable with cross-lag analyses, it may be difficult to disentangle the direction of effects. It is possible that both the mothers' and children's mood may be simultaneously contributing to one another's negative affect. Youth may be immediately distressed or concerned about mothers' behaviors associated with negative affect, such as low energy, apathy, or expressions of worthlessness, (Hammen, 2002). Mothers, on the other hand, may also be distressed or concerned about their child's internalizing symptoms. Alternatively, children and their mothers' negative affect may be simultaneous responses to external stressors, such as economic hardships (Conger, Conger, Matthews, & Elder, 1999; Hammen, 2002) or marital conflicts (Downey & Coyne, 1990). To more precisely understand the relationship between maternal and child internalizing problems, additional research is needed to examine children's and mother's actual immediate perceptions and symptomatic reactions toward their family members' internalizing symptoms (Hammen, 2002).

Consistent with Nolen-Hoeksema's (1987, 1991) RST, findings showed that children with a ruminative response style experienced greater elevations in negative affect when encountering stressful events, which in this study were conceptualized as elevations in maternal negative affect. Furthermore, in the absence of elevations in maternal negative affect, children with a ruminative response style were not more likely than children without such a style to experience elevations in their negative affect. These results extend previous findings showing that adolescents with a ruminative response style report increases in depressive symptoms after experiencing elevations in their own negative affect (Hankin, 2008a). Taken together, such findings highlight that high ruminating youth are more likely to exhibit elevations in negative mood when they have some negative affect that triggers their ruminative response style.

Although results of the current study indicate that child rumination is a moderator of the association between maternal and child negative affect, they do not explain *why* children with a ruminative response style experience greater elevations in negative affect when their mother's level of negative affect increases. Nolen-Hoeksema (1991) suggested three possible mechanisms by which a ruminative response style may contribute to elevations in negative affect. 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 negative affect. Second, individuals who engage in

rumination do not engage in behaviors that provide positive reinforcement and a sense of control, which may contribute to a sense of learned helplessness and further exacerbate negative affect. Third, ruminative thinking may interfere with problem solving by directing attention toward 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 negative affect engaged in negative thinking patterns that interfered with their ability to engage in positively reinforcing behaviors, maintain a sense of control, and/or engage in active problem solving—a response that may have contributed to their heightened levels of negative affect. Future research should examine the specific mechanisms that account for the temporal association between maternal and child negative affect 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 negative affect when experiencing increases in maternal negative affect did not vary as a function of child gender or mothers' current clinical depression. 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, 1983) and having greater conflicts with their mothers (Hill, Holmbeck, Marlow, Green, & Lynch, 1985; Steinberg, 1987, 1988). Although the extant literature suggests that the factors that place daughters at greater risk for elevations in negative affect when exposed to elevations in maternal negative affect first emerge during adolescence, our study incorporates youth from a wider age range. This may explain why the impact of maternal negative affect did not affect daughters more than sons in our sample. Alternatively, although maternal negative affect is a stressor that generally affects daughters more than sons, perhaps youth of both genders who possess ruminative response styles are equally likely to experience elevations in negative affect when experiencing elevations in their mothers' negative affect. Such an alternative posits that there is a unique component to rumination that increases children's susceptibility to internalizing disorders, regardless of their gender. In addition, results suggest that maternal clinical depression status does not moderate findings. In other words, even when mothers do not meet diagnostic threshold for clinical depression, exposure to any elevations in mothers' negative affect increases the likelihood that youth will experience internalizing problems, especially among those with a ruminative response style.

Several limitations of the current study should be noted. First, levels of negative affect were assessed by self-report measures. Furthermore, the scores on the CDI indicated that levels of negative affect were below the cutoff (raw score of 20; Kovacs, 1992) used to suggest the presence of clinical levels of depression. Average scores on the BDI were in the mild (raw score = 14–19) to moderate clinical range (raw score = 20–28; BDI; Beck et al., 1961). Therefore, it is difficult to make conclusions about clinically significant depression based on these measures, although it is clear that the sample of mothers were moderately distressed based on BDI score and the proportion of currently clinically depressed mothers. Along these lines, we do not know how many mothers had a change in their clinical depression status during the study (either experienced a recurrent episode or had a current episode resolve), because maternal clinical depression status was assessed only at baseline. Future studies should utilize semistructured diagnostic interviews to see if the current findings extend to changes in clinical levels of depression over time. On the other hand, the study utilized a high-risk paradigm, which increases the likelihood of capturing elevations in negative affect in both mothers and children but further limits the generalizability 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 socioeconomic groups. Future research with more diverse populations is therefore needed. Fourth, future research should explore different time prospective follow-up intervals. Although these findings suggest synchronous associations between maternal and child negative affect, it is possible that longitudinal cross-lag effects could be observed over periods shorter than 6 weeks (e.g., use of daily diary methods). Last, the current study examined only the relationship between child rumination, maternal negative affect, and child negative affect. Thus, we were unable to identify whether the interaction of this cognitive vulnerability factor with maternal negative affect is specific to child internalizing problems rather than broadly applicable to other forms of psychopathology. For example, prior research shows that rumination predicts general internalizing symptoms (Hankin, 2008a) and eating disorder symptoms (Holm-Denoma & Hankin, 2010; Nolen-Hoeksema et al., 2007) but not substance use (Nolen-Hoeksema et al., 2007) or externalizing problems (Hankin, 2008a).

#### Implications for Research, Policy, and Practice

Findings from this study suggest that increases in maternal negative affect are associated with elevations in child negative affect over time. This implies that

targeting maternal depressive symptoms would be effective in the prevention and treatment of child internalizing problems (e.g., Garber et al., 2009). These results also highlight the importance of designing preventative interventions and treatments targeting ruminative thinking, particularly for children of depressed mothers. Mindfulness-based cognitive behavioral therapy (Segal, Williams, & Teasdale, 2002) may be particularly efficacious in reducing ruminative thinking in response to negative affect.

Future research may benefit from studies exploring mechanisms and processes that may underlie the associations over time between maternal and child negative affect among children with ruminative response styles. However, because effects of maternal negative affect on child negative affect appear to be temporally proximal, it may be challenging to investigate mechanisms that underlie effects occurring within the moment or short periods. Studies that employ more precise methodology designed to capture more subtle and immediate effects, such as shorter follow-ups, daily diary methods, or observational methods, may also be better able to elucidate underlying processes. Potential mechanisms 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, 1991). In addition, 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.

Along these lines, it will also be important for future research to investigate how a history of maternal depression can contribute to a ruminative response style in youth. A growing body of research suggests that maternal depression and depression-related behaviors (e.g., negative inferential feedback) may influence the development of cognitive vulnerabilities, including rumination (Alloy et al., 2004; Cox, Mezulis, & Hyde, 2010). Studies on the developmental origins of rumination may elucidate pathways leading to child internalizing problems (e.g., Hankin et al., 2009). For example, a history of maternal depression may initiate a developmental pathway in which depression in mothers contributes to increases in child rumination, which in turn interacts with fluctuations in maternal dysphoric mood to predict increases in child internalizing symptoms. Ongoing research to identify vulnerability factors that may affect the severity of internalizing symptoms within high-risk families will advance our scientific understanding of the development and course of internalizing disorders and guide clinicians in the development of more effective prevention and treatment programs.

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