Rumination as a Common Mechanism Relating Depressive Risk Factors to Depression

Jelena Spasojević and Lauren B. Alloy
Temple University

Rumination was examined as a potential common mechanism linking risk factors with depression. Initially nondepressed individuals (N = 137) were assessed for presence of a ruminative response style and 4 other hypothesized risk factors for depression. They were followed for 2.5 years. Negative cognitive styles, self-criticism, dependency, neediness, and history of past depression were all significantly associated with rumination. Rumination mediated the predictive relationships of all risk factors except dependency with the number of prospective Diagnostic and Statistical Manual of Mental Disorders (3rd ed., rev.; American Psychiatric Association, 1987) major depressive episodes (MDEs; definite and subthreshold) during the follow-up period. In contrast, private self-consciousness did not mediate any relationships between risk factors and subsequent MDEs. Thus, rumination, as a special kind of self-focus, may act as a general proximal mechanism through which other vulnerability factors affect depression.

Although most people become at least mildly depressed from time to time, only about 10% to 25% of women and 5% to 12% of men experience a major depressive episode during their lifetime, according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed., DSM-IV; American Psychiatric Association [APA], 1994). Nolen-Hoeksema’s (1987, 1991) response styles theory of depression may be relevant to this fact because it suggests that individuals who respond to mildly dysphoric or depressive mood by consistently engaging in rumination tend to have more persistent and severe depressive episodes than those who respond to negative affect by distracting themselves from it. Nolen-Hoeksema (1991) defined depressive rumination as “repetitively focusing on the fact that one is depressed; on one’s symptoms of depression; and on the causes, meanings, and consequences of depressive symptoms” (p. 569). Depressive rumination is thus conceptualized as an emotion regulation strategy or a meta-emotional cognitive process (Gross, 1999). Insofar as individual differences exist in the way people regulate their emotions, certain individuals seem to regularly engage in depressive rumination.

We thank Wayne G. Whitehouse for statistical consultation and the following individuals for serving as interviewers for the CVD Project at Temple University: Dena Berrebi, Monica Calkins, Judith Cronholm, Kimberly Eberbach, Teresa Gannon, Nancy Just, Ray Kim, Joanna Lapkin, Alan Lipman, Catherine Panzarella, Matthew Robinson, Pamela Shapiro, Nancy Tashman, and Aaron Torrance.

Correspondence concerning this article should be addressed to Jelena Spasojević, Department of Psychology, Temple University, 1701 North 13th Street, Philadelphia, Pennsylvania 19122-6085. Electronic mail may be sent to jsпасojевић@unix.temple.edu.

1Rumination and ruminative response style are used interchangeably throughout this article. Both terms indicate a stable tendency to ruminate in response to depressive mood.
The role of rumination in prolonging and intensifying depression has been empirically supported in a number of recent laboratory and field studies. For example, in a mood induction study in which responses to induced depressed mood were experimentally manipulated, remediation of depressive affect was smallest in the ruminative-passive group. Also, degree of rumination had a greater impact on the remediation of depressed mood than did level of activity (Morrow & Nolen-Hoeksema, 1990). In a prospective field study of 137 students who survived the 1989 Loma Prieta earthquake, prequake rumination levels significantly predicted depressive symptoms 7 weeks after the earthquake (Nolen-Hoeksema & Morrow, 1991). Initial rumination was also predictive of more persistent depression in a 12-month longitudinal study of recently bereaved men, even after controlling for initial depressive symptomatology (Nolen-Hoeksema, McBride, & Larson, 1997). Further, Nolen-Hoeksema, Morrow, and Fredrickson (1993) found that people tended to be consistent in their responses to depressive mood, measured daily for 30 consecutive days. In addition, participants’ level of rumination predicted duration of depressive symptomatology.

Just and Alloy (1997) extended the response styles theory of depression in a prospective study of initially nondepressed participants and showed that a ruminative response style predicted an increased likelihood of experiencing a depressive episode over 18 months. Additionally, rumination predicted onset of depressive episodes (diagnosed with a diagnostic interview) over a year in a randomly selected community sample of 1,132 participants, even after controlling for initial depressive symptomatology (Nolen-Hoeksema, 2000). In summary, the tendency to engage in ruminative coping in response to depressed mood seems to be a traitlike vulnerability factor for the development of longer, more intense depressive episodes.

Given that the existing empirical evidence provides support for the hypothesis that rumination predicts depression, we now turn to the following question: Who ruminates in response to depressive mood?

Several hypothesized vulnerabilities for depression including gender, perceived social support, number of stressors, concurrent depressive symptomatology, optimism, and neuroticism have all been found to be related to rumination in various empirical studies. Most consistently, women have been found to ruminate more than men (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema, 1987; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema et al., 1993; Nolen-Hoeksema, Parker, & Larson, 1994; Schwartz & Koenig, 1996). Less perceived social support, a larger number of stressors, and more concurrent depressive symptomatology were also all related to more rumination (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema et al., 1994). In two studies, researchers examined the relationship between rumination and personality risk factors for depression. In a study of 253 recently bereaved adults, less optimistic individuals were more likely to have a concurrent ruminative response style ($r = - .36, p < .001$; Nolen-Hoeksema et al., 1994). In a study of 299 college students, with a replication sample of 317, neuroticism was positively related to concurrent rumination ($r = .43, p < .001$; Roberts, Gilboa, & Gotlib, 1998).

It appears that some very divergent risk factors for depression, ranging from environmental to personality vulnerabilities, are associated with the likelihood that a person will have a ruminative response style. Conceptually, it is possible that other known vulnerability factors for depression might also be related to rumination. If this hypothesis receives support, it would be plausible to examine rumination as a common proximal mechanism through which other risk factors influence depression.

In the present study, we examined negative cognitive styles, self-criticism, dependency, neediness, and a history of past depression as they relate to rumination. All of these variables have received empirical support as risk factors for depression and they represent three different theoretical approaches to studying depression well: cognitive, interpersonal, and epidemiological. Negative cognitive styles predicted onset of depressive episodes in a 2.5-year prospective study with initially nondepressed individuals (Alloy et al., 1999; Alloy, Abramson, Whitehouse, et al., 2000). These findings, in conjunction with many other studies (for reviews, see Abramson, Alloy, & Metalsky, 1995; Haaga, Dyck, & Ernst, 1991), provide strong support for the role of negative cognitive styles in the development of both depressive symptomatology and clinical depression.

Two personality traits that have been implicated in the development of depression are self-criticism and dependency. Both self-criticism and dependency were shown to be consistently related to depressive symptomatology in cross-sectional studies (e.g., Brown & Silberschatz, 1989; Nietzel & Harris, 1990; Whiffen & Sasseville, 1991). In prospective studies and studies of remitted depressives, there is mixed evidence for both self-criticism and dependency as stable vulnerability factors for depression, with self-criticism receiving greater support (Bagby, Schuller, Parker, &
Levitt, 1994; Franche & Dobson, 1992; Hirschfeld et al., 1989; Klein, Harding, Taylor, & Dickstein, 1988; Priel & Besser, 1999; Rosenfarb, Becker, Khan, & Mintz, 1998; Zuroff, Igereu, & Mongrain, 1990). The inconsistent prospective findings relating dependency to depression could be attributed to crude conceptualization and measurement of dependency. In line with this explanation, two groups of researchers have independently identified two similar subfactors within one of the most commonly used dependency scales, the dependency factor of the Depressive Experiences Questionnaire (DEQ; Blatt, D’Afflitti, & Quinlan, 1976; Blatt, Zohar, Quinlan, Zuroff, & Mongrain, 1995; Rude & Burnham, 1995). One subfactor, termed neediness, seems to tap a maladaptive form of dependency; whereas another, named connectedness, appears to measure the level of healthy interpersonal attachment. Neediness includes items expressing anxious and helpless concerns regarding possible separation, rejection, or interpersonal loss. These are aspects of dependency that should conceptually be related to rumination and depression. Rude and Burnham reported that neediness was cross-sectionally related to depressive symptomatology. We hypothesized that both dependency and neediness would be related to ruminative response style.

Furthermore, a history of past depressive episodes has long been recognized as one of the main risk factors for the development of subsequent depression (e.g., Gonzales, Lewinsohn, & Clarke, 1985; Keller, Shapiro, Lavore, & Wolfe, 1982; Lewinsohn, Zeiss, & Duncan, 1989). In general, the greater the number of past episodes of depression a person has experienced, the more likely he or she is to have a recurrence.

Ruminative response style might prove to be a proximal mechanism that mediates the effects of the reviewed depressive risk factors on the likelihood of subsequent depressive episodes. Direct support for this hypothesis comes from Nolen-Hoeksema et al.’s (1994) aforementioned study, in which the relationships of both gender and perceived social support to depressive symptomatology at 5-month follow-up were mediated by rumination. However, this study prospectively measured depressive symptoms at an arbitrary time point, inquiring only about the level of symptoms at that particular time. Also, only depressive symptoms were assessed rather than clinical episodes, and the average level of depression was mild to moderate. Therefore, the conclusions of the study may apply only to dysphoria, and not to the likelihood of developing a clinically significant depression. Additionally, Roberts et al. (1998) showed that rumination mediated (the mediation was partial in their original sample and complete in their replication sample) the relationship between neuroticism and duration of students’ retrospectively reported “worst lifetime episode of dysphoria.” The most important limitation of this study was the use of a self-report measure to assess current and past episodes of dysphoria. It is questionable whether these findings can be generalized to clinical depression, and whether this kind of “remitted depression” design can elucidate the process by which depressive vulnerability factors contribute to future depression (Just, Abramson, & Alloy, 2001).

Our study is the first to examine the role of ruminative response style as a mediator of the effects of several hypothesized risk factors on the subsequent development of the revised third edition of the DSM (or DSM-III-R; APA, 1987) major depressive episodes (MDEs; definite and subthreshold) in a 2.5-year prospective study with initially nondepressed individuals. Individuals who are vulnerable to developing clinical depression, on the basis of exhibiting various vulnerability factors, are hypothesized to consistently engage in rumination in response to their depressive affect. In turn, the ruminative response is hypothesized to directly influence the development of clinical depression by prolonging and intensifying the depressive affect (Nolen-Hoeksema, 1991). Rumination is thus conceptualized as a common cognitive result of the operation of many risk factors for depression. This tendency to passively focus on one’s own negative emotional state might prove to be an underlying link between the more global vulnerability factors and depression.

It is important to distinguish rumination from other similar self-awareness constructs. Nolen-Hoeksema (1991) argued that a ruminative response style differs from a general tendency to self-focus, insofar as rumination represents a special kind of self-focus; namely, passively focusing on one’s emotions when one is already in a depressed mood. Private self-consciousness is a construct that taps into the general awareness of one’s inner feelings, thoughts, and physical sensations (Fenigstein, Scheier, & Buss, 1975). As such, the self-consciousness construct is a

2 The other identified subfactor was labeled the connectedness subfactor. It includes items that tap valuing of relationships and sensitivity to the effects of one’s actions on others. The connectedness subfactor was not significantly correlated with depressive symptomatology (Rude & Burnham, 1995).
good candidate to contrast with ruminative response style. Nolen-Hoeksema et al. (1994) reported a moderate significant relationship between private self-consciousness and rumination \((r = .21, p < .05)\), arguing for the distinctiveness of the rumination construct. However, convincing support for the unique value of ruminative response style can be obtained only by testing concepts like private self-consciousness alongside rumination, and comparing their predictive power. In the current study, to more conclusively elucidate the postulated specific role rumination plays as a mediator relating the risk factors to depression, we performed all of the same analyses with private self-consciousness as with rumination.

We hypothesized that negative cognitive styles, self-criticism, dependency, neediness, and a history of past depression would all be positively and significantly related to ruminative response style. We also hypothesized that ruminative response style would mediate the relationships between these risk factors and the number of subsequent MDEs over the 2.5-year prospective period. Finally, we predicted that private self-consciousness would not mediate any of the relationships between the risk factors and the number of prospective MDEs.

Method

Participants

One hundred and thirty-seven participants in this study were a subset of those selected for inclusion at the Temple University site of the Temple-Wisconsin Cognitive Vulnerability to Depression (CVD) Project (Alloy & Abramson, 1999). The CVD Project longitudinally followed initially nondepressed first year students who were at high versus low cognitive risk for depression to test the etiological hypotheses of the cognitive vulnerability-stress models of depression (Abramson, Metalsky, & Alloy, 1989; Beck, 1967). The CVD Project participants were selected by screening a large sample of Temple University and University of Wisconsin students (about 5,500) with the Cognitive Style Questionnaire (CSQ; Abramson, Metalsky, & Alloy, 2000) and the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). Individuals who scored in the highest (most negative) and in the lowest (most positive) quartile on both the CSQ and the DAS were designated at high and low cognitive risk for depression, respectively. In the second phase of the screening process, a modified Schedule for Affective Disorders and Schizophrenia—Lifetime (Mod-SADS–L; Endicott & Spitzer, 1978) interview was administered to a randomly selected subsample of the high-risk and low-risk individuals. On the basis of several exclusion criteria (current DSM–III–R or Research Diagnostic Criteria [RDC; Spitzer, Endicott, & Robins, 1978] diagnosis of any episodic mood disorder or any other current Axis I psychiatric disorder, current serious medical illness, and past bipolar-spectrum disorder), Alloy and Abramson (1999) selected a final CVD Project sample. The selection process, as well as demographic characteristics and representativeness of CVD Project participants, is described in detail elsewhere (Alloy & Abramson, 1999; Alloy, Abramson, Hogan, et al., 2000).

The CVD Project participants at Temple University who completed the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991) at the initial CVD Project Time 1 assessment (only participants at Temple University completed the RSQ) and who remained in the study through the 2.5-year prospective follow-up were included in the current study. Of 137 participants in this study, 88 were women and 49 were men; 67 were high risk and 70 were low risk. The demographic and clinical characteristics of our subsample are presented in Table 1. The mean age of the participants was 19 years (range = 16 to 29 years). The subsample of participants included in the present study was similar to the total CVD Project

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>86</td>
<td>62.8</td>
</tr>
<tr>
<td>African American</td>
<td>35</td>
<td>25.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>6</td>
<td>4.4</td>
</tr>
<tr>
<td>Asian</td>
<td>6</td>
<td>4.4</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>2.9</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>64.2</td>
</tr>
<tr>
<td>Risk status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High risk</td>
<td>67</td>
<td>48.9</td>
</tr>
<tr>
<td>Low risk</td>
<td>70</td>
<td>51.1</td>
</tr>
<tr>
<td>No. of prospective MDEs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>112</td>
<td>81.8</td>
</tr>
<tr>
<td>1</td>
<td>17</td>
<td>12.4</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>.7</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>.7</td>
</tr>
</tbody>
</table>
sample in terms of gender, ethnicity, age, and cognitive risk status. High-risk and low-risk participants in our subsample did not differ on any of the demographic characteristics.

**Measures**

**Negative cognitive styles and cognitive risk status.** The CSQ (Abramson et al., 2000) and the DAS (Weissman & Beck, 1978) were both used to assess participants’ negative cognitive styles. They were also used jointly to select high- and low-risk participants for the CVD Project (see Alloy & Abramson, 1999).

The CSQ is a revised version of the Attributional Style Questionnaire (ASQ; Seligman, Abramson, Semmel, & von Baeyer, 1979), which assesses individuals’ tendency to make internal, stable, and global attributions. The ASQ was modified in two major ways to create the CSQ. First, the number of hypothetical events for which respondents provided their attributions was increased to include 12 positive and 12 negative events (each with 6 interpersonal and 6 achievement of each). Second, inferences about consequences and self-worth implications of the events were also assessed in addition to attributions. A composite score was computed by summing scores on four inference dimensions (stability, globality, consequences, and self-worth implications) generated in response to the negative events. Findings from the CVD Project indicate that the CSQ composite for negative events had good internal consistency (α = .88), 1-year retest reliability (r = .80), and predictive validity for depressive episodes (Alloy, Abramson, Murray, Whitehouse, & Hogan, 1997; Alloy, Abramson, Hogan, et al., 2000; Alloy, Abramson, Whitehouse, et al., 2000; Alloy et al., 1999).

The DAS is a 40-item self-report inventory designed to measure maladaptive attitudes including concern with evaluation, perfectionistic performance standards, pessimism, expectations of control, and causal attributions. The DAS has demonstrated good internal consistency, retest reliability, and validity in student and patient samples (e.g., Dobson & Breiter, 1983; Hamilton & Abramson, 1983; Weissman & Beck, 1978). A 64-item version of the DAS, used in this study, has shown good internal consistency (α = .90), 1-year retest reliability (r = .78), and predictive validity for depressive episodes (Alloy et al., 1997, 1999; Alloy, Abramson, Hogan, et al., 2000; Alloy, Abramson, Whitehouse, et al., 2000).

**Ruminative response style (rumination).** The RSQ (Nolen-Hoeksema & Morrow, 1991) was used to assess how participants tend to respond to their depressive mood. Using 4-point Likert scales on the RSQ, we asked participants to indicate what they “generally do when feeling down, sad, or depressed.” The Ruminative Responses subscale of the RSQ consists of 21 items assessing responses to depressed mood that are self-focused (e.g., “Think about all your shortcomings, failings, faults, mistakes”), symptom focused (e.g., “Think about how hard it is to concentrate”), or focused on possible causes and consequences of the depressive mood (e.g., “Think I won’t be able to do my job/work because I feel so badly”). Previous research has established that the Ruminative Responses subscale of the RSQ has good internal consistency (α = .89; Nolen-Hoeksema & Morrow, 1991), 5-month retest reliability (r = .80; Nolen-Hoeksema et al., 1994), and validity for predicting depression (e.g., Just & Alloy, 1997; Nolen-Hoeksema & Morrow, 1991). In the present sample, internal consistency of the Ruminative Responses subscale was similar to the previously reported values (α = .92).

**Private self-consciousness.** The Self-Consciousness Scale (SCS; Fenigstein, Scheier, & Buss, 1975) is designed to measure the dispositional tendency to focus attention on the self. The Private Self-Consciousness (PrSC) subscale of the SCS was used to assess chronic attention toward one’s inner feelings, thoughts, and physical sensations. The PrSC subscale consists of 10 statements such as “I reflect about myself a lot,” “I am always trying to figure myself out,” and “I’m generally attentive to my inner feelings,” each rated on a 5-point Likert scale. The subscale has shown adequate internal consistency (α = .89 in our sample) and retest reliability (r = .79; Fenigstein et al., 1975).

**Self-criticism, dependency, and neediness.** The Depressive Experiences Questionnaire (Blatt et al., 1976) was used to measure three hypothesized depressogenic personality styles: self-criticism, dependency, and neediness. The DEQ consists of 66 statements such as “If I fail to live up to expectations, I feel unworthy,” “I often blame myself for things I have done or said to someone” (self-criticism), and “I become frightened when I feel alone” and “I often think about the danger of losing someone who is close to me” (dependency). Each of the items was rated on a 7-point Likert scale. Both self-criticism and dependency factors of the DEQ have demonstrated good internal consistency (α > .75), 12-month retest reliability (r = .79 for both scales), and construct validity (Blatt et al., 1976; Blatt & Zuroff, 1992; Zuroff et al., 1990; Zuroff, Moskowitz, Wielgus, Powers, &
Franko, 1983), as well as concurrent validity with various measures of depressive symptomatology (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982; Brown & Silberschatz, 1989; Whiffen & Sasseville, 1991). The neediness subfactor, identified as a mal-adaptive part of the dependency factor, includes items such as “Without support from others who are close to me, I would be helpless” and “I urgently need things that only other people can provide.” We calculated the neediness subfactor on the basis of Rude and Burnham’s (1995) results. The Neediness scale had high internal consistency (α = .82) and 1-year retest reliability (r = .69) in our sample.

History of past MDEs. The Mod-SADS-L (Endicott & Spitzer, 1978) interview was used to assess the number of past MDEs (definite and subthreshold). The SADS-L was expanded for the CVD Project to allow for DSM-III-R as well as RDC diagnoses. In addition, the Mod-SADS-L grouped together all of the questions relevant to each diagnosis and presented pertinent items for assessment of past episodes of a given disorder immediately following the items for a current episode of that disorder. In the current study, history of past MDEs was coded as a continuous variable, indicating the number of MDEs each participant experienced prior to the beginning of the study. Diagnostic interviewer training for the Mod-SADS-L is described in Alloy, Abramson, Hogan, et al. (2000). The interrater reliability for MDEs on the Mod-SADS-L in the CVD Project was κ > .90. The Mod-SADS-L was also used to select the final sample of nondisordered participants for the CVD Project (see Alloy & Abramson, 1999).

The criteria for subthreshold MDEs were the same as the DSM-III-R criteria for definite MDEs, with the following two modifications: (a) 1 week (instead of a 2-week) duration was required and (b) 75% persistence (instead of 90% persistence) of depressed mood on each depressed day was required. On the basis of the evidence for continuity between clinical and subclinical depression (Flett, Vredenburg, & Krames, 1997; Lewinsohn, Solomon, Seeley, & Zeiss, 2000; Ruscio & Ruscio, 2000), we included subthreshold MDEs in our analyses together with definite MDEs, thus maximizing the statistical power. Remission criteria included 2 months of not meeting criteria for MDE, with no more than minimal (i.e., two) symptoms and a Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) score of less than 10 (Frank et al., 1991).

Number of prospective MDEs. A modified SADS—Change (Mod-SADS-C; Spitzer & Endicott, 1978) interview was used to assess DSM-III-R (definite and subthreshold) MDEs across the 2.5-year prospective follow-up. In its original version, the SADS-C is used to make current and past diagnoses based on RDC (Spitzer, Endicott, & Robins, 1978) criteria. The Mod-SADS-C also included DSM-III-R diagnoses and was expanded in the same way as the Mod-SADS-L for the CVD Project. The MDE definite and subthreshold criteria and remission criteria were the same as for the history of past MDEs assessed by SADS-L. The Mod-SADS-C was administered approximately every 6 weeks by interviewers who were unaware of participants’ ruminative scores, cognitive risk status, and scores on all of the other risk factor measures. Diagnostic interrater reliability for MDEs throughout the follow-up phase was κ > .90. Details regarding interviewer training may be found in Alloy and Abramson (1999).

Depressive symptomatology The BDI (Beck et al., 1979) was used to assess participants’ level of depressive symptoms at the time they completed the RSQ. Numerous studies have established the validity and reliability of the BDI (Beck, Steer, & Garbin, 1988).

Procedure

Participants completed the CSQ and the DAS during the first phase of the CVD Project selection process and the SADS-L during the second phase of the selection process. Participants in the final sample completed the RSQ, DEQ, SCS, and BDI at an initial Time 1 assessment, after which they were assessed with the SADS-C approximately every 6 weeks for 2.5 years. When participants were unable to come to the laboratory, assessments were conducted by phone (SADS-C) and mail (questionnaires). Participants were reimbursed for their time (see Alloy & Abramson, 1999, for more details about the procedures and payment schedules).

Results

To test the hypothesis that the depressive risk factors (negative cognitive styles, self-criticism, dependency, neediness, and history of past depression) would be significantly related to rumination, we regressed rumination onto each of the risk factors independently. Intercorrelations among rumination and the risk factors are provided in Table 2. In addition, we tested whether significant relationships between risk factors and rumination would be maintained after
Table 2
Correlations Among Ruminations, Private Self-Consciousness, and the Five Risk Factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. RUM</td>
<td></td>
<td></td>
<td></td>
<td>.20*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. PrSC</td>
<td></td>
<td></td>
<td>.42***</td>
<td></td>
<td>.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CSQ</td>
<td></td>
<td></td>
<td></td>
<td>.28**</td>
<td></td>
<td>.85***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. DAS</td>
<td></td>
<td></td>
<td>.52***</td>
<td></td>
<td>.23**</td>
<td></td>
<td>.62***</td>
<td></td>
</tr>
<tr>
<td>5. Self-CR</td>
<td></td>
<td></td>
<td>.44***</td>
<td></td>
<td>.16</td>
<td></td>
<td>.45***</td>
<td></td>
</tr>
<tr>
<td>6. Dep</td>
<td></td>
<td></td>
<td>.52*</td>
<td></td>
<td>.09</td>
<td></td>
<td>.59***</td>
<td></td>
</tr>
<tr>
<td>7. Need</td>
<td></td>
<td></td>
<td>.34***</td>
<td></td>
<td>.08</td>
<td></td>
<td>.36***</td>
<td></td>
</tr>
<tr>
<td>8. No. of past MDEs</td>
<td>.35***</td>
<td>.08</td>
<td></td>
<td>.36***</td>
<td>.17</td>
<td></td>
<td>.23**</td>
<td></td>
</tr>
</tbody>
</table>

*Note. RUM = rumination; PrSC = private self-consciousness; CSQ = negative cognitive styles measured by the Cognitive Style Questionnaire (CSQ); DAS = negative cognitive styles measured by the Dysfunctional Attitudes Scale (DAS); Self-CR = self-criticism; Dep = dependency; Need = neediness; MDE = major depressive episode.

*p < .05  **p < .01  ***p < .001.

controlling for cognitive risk status and concurrent depressive symptomatology. This conservative test was performed to account for the fact that the CVD Project sample was selected on the basis of cognitive risk status and to control for possible response bias related to current depressive symptoms.

A preliminary set of hierarchical regression analyses was performed to test for possible moderation effects of gender. Each analysis consisted of regressing rumination onto a risk factor and gender in the first step and entering the interaction (between the risk factor and gender) term into the regression equation subsequently in the second step. A significant interaction term indicated the presence of a moderation effect. Insofar as moderating effects of gender were nonsignificant in all preliminary analyses, we proceeded to perform the regression analyses designed to test our first hypothesis by collapsing participants across gender.

Negative cognitive styles, as measured by both CSQ and DAS, were significantly related to rumination, \( t(127) = 5.25, p < .001, \beta = .42 \) and \( t(127) = 4.70, p < .001, \beta = .39 \), respectively. Controlling for depressive symptomatology, all relationships remained significant, \( t(125) = 4.95, p < .001, \beta = .38 \) and \( t(125) = 4.58, p < .001, \beta = .35 \), respectively. Thus, individuals with more maladaptive cognitive styles tended to ruminate to a greater extent.

Self-criticism was significantly related to rumination, \( t(129) = 7.02, p < .001, \beta = .53 \), suggesting that more self-critical participants were more likely to ruminate. Dependency was also significantly related to rumination, \( t(129) = 5.67, p < .001, \beta = .45 \), indicating that more dependent individuals were also more likely to be ruminators. Both self-criticism and dependency remained significantly related to rumination after controlling for cognitive risk status and depressive symptomatology were controlled simultaneously, \( t(127) = 4.05, p < .001, \beta = .39 \) and \( t(127) = 3.72, p < .001, \beta = .32 \), respectively. Neediness was also significantly related to rumination, \( t(131) = 6.96, p < .001, \beta = .52 \); this relationship remained significant after controlling for cognitive risk status and depressive symptomatology simultaneously, \( t(129) = 4.17, p < .001, \beta = .37 \).

A history of past MDEs was significantly related to rumination, \( t(133) = 4.20, p < .001, \beta = .34 \), indicating that people with a greater history of depression (more past episodes) were more likely to ruminate than people with fewer past episodes. Controlling for cognitive risk status and depressive symptomatology simultaneously, the relationship between history of MDEs and rumination remained significant, \( t(131) = 2.67, p < .01, \beta = .21 \).

To evaluate our second hypothesis, we conducted mediational analyses separately for each of the risk factors. As recommended by Baron and Kenny (1986), and incorporating pertinent modifications by Kenny, Kashy, and Bolger (1998), each mediational analysis estimated three regression equations. First, rumination was regressed onto a risk factor. Second, number of prospective MDEs was regressed onto the risk factor. Third, number of MDEs was regressed onto the risk factor, controlling for rumination. The summary of the second and third steps of the analyses is presented in Table 3. Mediation is established if a risk factor is significantly related to rumination (the

\(^3\) As cognitive risk status is based on both the CSQ and the DAS scores, we did not control for cognitive risk status in these two regression analyses.
Table 3  
Summary of Hierarchical Regression Analyses Predicting the No. of Prospective MDEs

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>β</th>
<th>t</th>
<th>Total R²</th>
<th>ΔR²</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>CSQ</td>
<td>.28</td>
<td>3.33***</td>
<td>.080</td>
<td>.080</td>
<td>127</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.35</td>
<td>3.96***</td>
<td>.182</td>
<td>.102</td>
<td>126</td>
</tr>
<tr>
<td>With ruminations</td>
<td>CSQ</td>
<td>.14</td>
<td>1.52</td>
<td></td>
<td></td>
<td>126</td>
</tr>
<tr>
<td>Analysis 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>DAS</td>
<td>.19</td>
<td>2.19*</td>
<td>.036</td>
<td>.036</td>
<td>127</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.39</td>
<td>4.48***</td>
<td>.169</td>
<td>.133</td>
<td>126</td>
</tr>
<tr>
<td>With ruminations</td>
<td>DAS</td>
<td>.04</td>
<td>.43</td>
<td></td>
<td></td>
<td>126</td>
</tr>
<tr>
<td>Analysis 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Self-criticism</td>
<td>.27</td>
<td>3.23**</td>
<td>.075</td>
<td>.075</td>
<td>129</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.27</td>
<td>2.81**</td>
<td>.129</td>
<td>.054</td>
<td>128</td>
</tr>
<tr>
<td>With ruminations</td>
<td>Self-criticism</td>
<td>.13</td>
<td>1.34</td>
<td></td>
<td></td>
<td>128</td>
</tr>
<tr>
<td>Analysis 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Dependency</td>
<td>.13</td>
<td>1.52</td>
<td>.018</td>
<td>.018</td>
<td>129</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.35</td>
<td>3.79***</td>
<td>.117</td>
<td>.099</td>
<td>128</td>
</tr>
<tr>
<td>With ruminations</td>
<td>Dependency</td>
<td>.03</td>
<td>-.27</td>
<td></td>
<td></td>
<td>128</td>
</tr>
<tr>
<td>Analysis 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Neediness</td>
<td>.31</td>
<td>3.68***</td>
<td>.094</td>
<td>.094</td>
<td>131</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.35</td>
<td>3.78***</td>
<td>.183</td>
<td>.089</td>
<td>130</td>
</tr>
<tr>
<td>With ruminations</td>
<td>Neediness</td>
<td>.12</td>
<td>1.34</td>
<td></td>
<td></td>
<td>130</td>
</tr>
<tr>
<td>Analysis 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>No. of past MDEs</td>
<td>.28</td>
<td>3.39**</td>
<td>.080</td>
<td>.080</td>
<td>133</td>
</tr>
<tr>
<td>Step 2</td>
<td>Ruminations</td>
<td>.27</td>
<td>3.12**</td>
<td>.143</td>
<td>.063</td>
<td>132</td>
</tr>
<tr>
<td>With ruminations</td>
<td>No. of past MDEs</td>
<td>.19</td>
<td>2.22*</td>
<td></td>
<td></td>
<td>132</td>
</tr>
</tbody>
</table>

Note. CSQ = negative cognitive styles measured by the Cognitive Style Questionnaire (CSQ); DAS = negative cognitive styles measured by the Dysfunctional Attitudes Scale (DAS); MDE = major depressive episode.

*p < .05. **p < .01. ***p < .001.

potential mediator) in the first equation and to number of MDEs in the second equation and if rumination is related to number of MDEs in the third equation. All of the analyses were repeated after controlling for cognitive risk status, thus providing a conservative test of our hypothesis. The findings from the first step of the mediational model for all of the risk factors were already presented previously. We now turn to the second and the third steps, including only those risk factors that showed significant relationships with rumination in the first step.

Negative cognitive styles, as measured by both CSQ and DAS, were significantly related to number of prospective MDEs, t(127) = 3.33, p < .01, β = .28 and t(127) = 2.19, p < .05, β = .19, respectively. After rumination was entered into the respective equations, it was a significant predictor of number of prospective MDEs, t(126) = 3.96, p < .001, β = .35 and t(126) = 4.48, p < .001, β = .39, respectively, whereas both CSQ and DAS were reduced to nonsignificant, t(126) = 1.52, p = .13, β = .14 and t(126) = 0.43, p = .67, β = .04, respectively. This indicates that the relationship between negative cognitive styles and number of prospective MDEs was mediated by rumination.

The relationship between self-criticism and number of prospective MDEs was significant, t(129) = 3.23, p < .01, β = .27. When rumination was entered into the equation, it was significant, t(128) = 2.81, p < .01, β = .27; however, the relationship between self-criticism and number of prospective MDEs lost significance, t(128) = 1.34, p = .18, β = .13, suggesting that this relationship was mediated by rumination. The results were maintained when cognitive risk status was controlled. Dependency was not significantly related to number of prospective MDEs, therefore precluding further test of the mediational model. However, neediness was significantly related to num-
number of prospective MDEs, $t(131) = 3.68, p < .001, \beta = .31$. After rumination was entered into the equation, it was significant, $t(130) = 3.78, p < .001, \beta = .35$, whereas neediness was no longer significant, $t(130) = 1.34, p = .18, \beta = .12$. Therefore, rumination mediated the relationship between neediness and number of prospective MDEs.

History of past MDEs was significantly related to number of prospective MDEs, $t(133) = 3.39, p < .01, \beta = .28$. After rumination was entered into the equation, it was significant, $t(132) = 3.12, p < .01, \beta = .27$, whereas history of past MDEs was reduced in significance, $t(132) = 2.22, p < .05, \beta = .19$. Thus, the relationship between history of past MDEs and number of prospective MDEs was partially mediated by rumination. The findings were maintained after controlling for cognitive risk status.

To test our third hypothesis, that private self-consciousness would not mediate the relationships between the risk factors and the number of prospective MDEs, we repeated the three-step mediational analysis with each risk factor separately, using private self-consciousness as the potential mediator instead of rumination. Intercorrelations among private self-consciousness and the risk factors are presented in Table 2. Negative cognitive styles, as measured by the CSQ, were not significantly related to PrSC, whereas negative cognitive styles, as measured by the DAS, were significantly related to PrSC, $t(121) = 3.47, p < .01, \beta = .30$. Negative cognitive styles, as measured by the DAS, were also significantly related to the number of prospective MDEs, $t(121) = 2.12, p < .05, \beta = .19$. When PrSC was entered into the equation, it was nonsignificant, $t(120) = 1.04, p = .30, \beta = .10$, suggesting that the relationship between negative cognitive styles and number of prospective MDEs was not mediated by PrSC.

Self-criticism was significantly related to both PrSC, $t(125) = 2.35, p < .05, \beta = .21$, and number of prospective MDEs, $t(125) = 3.35, p < .01, \beta = .29$. After PrSC was entered into the second equation, it was nonsignificant, $t(124) = 0.89, p = .37, \beta = .08$, whereas self-criticism maintained significance, $t(124) = 3.09, p < .01, \beta = .27$. Dependency was not significantly related to PrSC. Thus, PrSC mediated neither the relationship between self-criticism and number of prospective MDEs nor the relationship between dependency and number of prospective MDEs. History of past MDEs was not significantly related to PrSC, indicating that PrSC did not mediate the relationship between history of past MDEs and number of prospective MDEs.

Discussion

The results of the current study provided support for our three hypotheses. All of the examined depressive risk factors—namely, negative cognitive styles, self-criticism, dependency, neediness, and history of past depressive episodes—were related to a ruminative response style. Even the most conservative test of the first hypothesis showed that self-criticism, dependency, and history of past MDEs were related to ruminative response style, after controlling simultaneously for cognitive risk status and concurrent depressive symptomatology, and that negative cognitive styles were associated with rumination, after controlling for concurrent depressive symptoms. In summary, our findings suggest that individuals who report higher levels of negative cognitive styles, self-criticism, dependency, neediness, and a history of past MDEs tend to ruminate more in response to depressive mood.

Given that the risk factors of current interest were related to rumination, we examined whether rumination mediated the relationships between these risk factors and the number of prospective MDEs. Ruminative response style indeed mediated the relationship between the four hypothesized risk factors, negative cognitive styles, self-criticism, neediness, and history of past MDEs and the number of prospective MDEs, continuing to do so even when private self-consciousness was controlled for (see footnote 4). Dependency was not related to the number of prospective MDEs in this sample.

In conclusion, the prospective associations between all of the examined vulnerability factors and the number of subsequent MDEs were mediated by ruminative response style. These findings, in conjunction with the results of Roberts et al. (1998) showing that rumination mediated the relationship between neuroticism and dysphoria, provide strong support for the role of rumination as a common proximal mechanism relating depressive risk factors to depression. Insofar as all of the risk factors that predicted clinical depression over the 2.5-year follow-up did so through rumi-

---

4 To provide an even more conservative test of our main mediational hypothesis, we re-conducted all of our regression analyses with rumination as a mediator, controlling for private self-consciousness. All of our findings were maintained, suggesting that even the "purified" rumination mediated the relationships between risk factors and number of prospective MDEs.
nation, we propose that the tendency to ruminate in response to depressive mood elucidates a process by which diverse vulnerabilities lead to depression. Rumination may represent a cognitive expression of more global personality characteristics that influence the development of depressive episodes. As such, a ruminative response style may link various higher order depressive risk factors and at least partly explain how each of them predicts clinical depression.

We also addressed whether there was anything unique about rumination and whether any form of self-focus would emerge as a common proximal mechanism relating the risk factors to depression. Given that heightened self-focus appears to be implicated in a broad range of psychopathology (Ingram, 1990), it is important to distinguish ruminative response style from other concepts that also tap self-directed attention. We examined one such self-focus concept, private self-consciousness, as a possible alternative mediator of the effects of the risk factors. Private self-consciousness did not mediate any of the relationships between the risk factors and the number of subsequent MDEs, suggesting that the role of rumination is not explained primarily by its overlap with general self-focus. Trapnell and Campbell’s (1999) results indicated that rumination (conceptualized as a broader, more generic term and not referring to ruminative response style per se) may actually represent one of two unrelated, motivationally distinct dispositions within the PrSC scale. Furthermore, they suggested that rumination, which was related to neuroticism, may account for the association between PrSC and psychological distress. The other disposition within PrSC, reflection, which was related to openness to experience, may explain why PrSC is related to more accurate and extensive self-knowledge (see also Musson & Alloy, 1988). Therefore, ruminative response style may indeed represent a unique emotion-focusing and neurotic self-attentional style.

The deleterious effects of rumination can be attributed to several factors. Findings from experimental studies, in which dysphoric and nondysphoric college students engaged in either rumination or distraction, suggest that rumination leads to more negative, biased interpretations of events (Lyubomirsky & Nolen-Hoeksema, 1995); facilitates recall of negative autobiographical memories and events (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998); impedes problem solving (Lyubomirsky & Nolen-Hoeksema, 1995); and reduces willingness to participate in pleasant activities (Lyubomirsky & Nolen-Hoeksema, 1993). Thus, it seems that by keeping the depressogenic schemata active and by hindering more active and adaptive coping strategies, rumination leads to more depression. More depression, in turn, triggers more rumination, continuing this emotion-cognition vicious circle. A potential area for future research would be to examine the recursive and “intellectualizing” nature of rumination, which may impede meaningful emotional processing (Segerstrom, Tsao, Al- den, & Craske, 2000).

In spite of the ineffectiveness and even dire consequences of persistently using rumination to attempt to regulate one’s depressive moods, some individuals repeatedly engage in it. High trait ruminators in Davis and Nolen-Hoeksema’s (2000) study committed more perseverative errors than nonruminators on the Wisconsin Card Sorting Test, suggesting an inflexible cognitive style. This perseverative style may maintain rumination in the face of negative feedback. Also, certain developmental influences may be especially important for shaping ruminative response style. The results of a recent study indicated that people who report having psychologically overcontrolling parents (both mothers and fathers) tend to engage in rumination in response to depressed mood (Spasojević & Alloy, 2000). We also found that history of reported childhood emotional abuse and, for women, history of reported childhood sexual abuse was related to ruminative response style. Our findings support NolenHoeksema’s (1998) proposal that children who fail to learn active coping strategies and those who feel little control over their environment might be especially prone to becoming ruminators.

Our study has several limitations. The CVD Project sample was fully comprised of college students, and only participants who scored in the highest and the lowest quartile on the CSQ and the DAS were selected to participate in the prospective part of the project. Further research should examine the mediational role of rumination with a more representative sample. It is also important to stress that although the statistical methods used in this study can suggest that ruminative response style mediates the relationships between other risk factors and depression, only truly experimental analysis can establish the mediation with more certainty. Finally, the current findings are based on only one, albeit well-validated, self-report measure of ruminative response style—the Ruminative Responses subscale of the RSQ. Our hypotheses could be reexamined by using some of the other methods recently proposed to measure rumination such as think-out-loud procedures (Lyubomirsky et al., 1998) or physiological measures of sustained processing of
emotional information (e.g., sustained pupil dilation and sustained amygdala activity as measured by functional magnetic resonance imaging; Siegle, 2000). Convergent validity among these different measures of rumination is, however, yet to be established.

Our results suggest an important clinical implication. Insofar as many known vulnerability factors may affect clinical depression through rumination, preventive and therapeutic efforts should focus on rumination directly. Cognitive behavior therapies explicitly teach skills for engaging in benign distracting activities to control depressed mood (cf. Beck et al., 1979). These skills have a potential to weaken one’s tendency toward repeatedly engaging in passive depressive rumination. It is hoped that by diminishing ruminative response style and replacing it with more active and adaptive strategies for coping with depressed mood, the detrimental effects of the other risk factors will, at least, be reduced and, at most, eliminated. Future research should examine these possibilities directly.

References


Brown, J., & Silberschatz, G. (1989). Dependency, self-
Nolen-Hoeksema, S. (1998). Ruminative coping with de-


Received July 24, 2000
Revision received January 2, 2001
Accepted January 16, 2001