

The Role of Rumination in Depressive Disorders and Mixed Anxiety/Depressive Symptoms

Susan Nolen-Hoeksema
University of Michigan

Several studies have shown that people who engage in ruminative responses to depressive symptoms have higher levels of depressive symptoms over time, after accounting for baseline levels of depressive symptoms. The analyses reported here showed that rumination also predicted depressive disorders, including new onsets of depressive episodes. Rumination predicted chronicity of depressive disorders before accounting for the effects of baseline depressive symptoms but not after accounting for the effects of baseline depressive symptoms. Rumination also predicted anxiety symptoms and may be particularly characteristic of people with mixed anxiety/depressive symptoms.

People with a ruminative response style think repetitively and passively about their negative emotions, focusing on their symptoms of distress (“I feel so lousy,” “I just can’t concentrate”) and worrying about the meanings of their distress (“Will I ever get over this?”; Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Nolen-Hoeksema, 1991). Several longitudinal studies have shown that people who engage in more ruminative responses when they are sad, blue, or depressed have higher levels of depressive symptoms over time, even after accounting for their baseline levels of depressive symptoms (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Nolen-Hoeksema, Parker, & Larson, 1994; see also Carver & Scheier, 1990; Ingram, Lumry, Cruet, & Sieber, 1987; Pyszczynski & Greenberg, 1987; Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990).

For example, a study of people who lost a loved one to a terminal illness found that those who reported using more ruminative responses around the time of their loss had higher levels of depressive symptoms over the 18 months after their loss than those who were less ruminative (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Larson, 1999). Similarly, a study of college students’ depressive symptoms after the 1989 San Francisco Area Earthquake showed that those who endorsed more ruminative responses to distress before the earthquake were most likely to show elevated depressive symptoms shortly after the earthquake and 7 weeks after the earthquake, even after accounting for their levels of depressive symptoms before the earthquake (Nolen-Hoeksema & Morrow, 1991).

The predictors of depressive disorders may be different from those of depressive symptoms, however (Gotlib, Lewinsohn, &

Seeley, 1995). Do ruminative responses predict diagnoses of depression as well as milder symptoms of depression? At least two previous studies found that ruminative responses predicted episodes of depression (Just & Alloy, 1997; Roberts, Gilboa, & Gotlib, 1998). Depressive episodes in these studies were indexed by answers to self-report questionnaires rather than by diagnoses given after clinical interviews, however. The first purpose of the analyses presented here was to examine the prospective relationship of ruminative responses to depressive diagnoses derived from structured clinical interviews.

The second purpose of these analyses was to examine whether rumination predicts anxiety symptoms as well as depressive symptoms. Anxiety symptoms are highly comorbid with depressive symptoms (for reviews, see Clark, 1989; Clark & Watson, 1991; Mineka, Watson, & Clark, 1998). Similarly, anxiety disorders and depressive disorders are highly comorbid (Clark, 1989; Kessler et al., 1996; Moras et al., 1996). Thus, simply because depression and anxiety are highly correlated, we might expect rumination, which is correlated with depression, also to be correlated with anxiety.

There may be more substantive reasons to expect rumination to predict anxiety and mixed anxiety/depression as well. Content analyses of ruminators’ ruminations suggest that many of these thoughts reflect an uncertainty over whether important situations will be manageable or controllable (e.g., “What if I can’t pull myself together?” “What did my spouse’s comment mean?”; Lyubomirsky, Tucker, Caldwell, & Berg, 1999). Other studies found that ruminators are more uncertain than nonruminators about the solutions they generate to complex problems (Ward, Lyubomirsky, Sousa, & Nolen-Hoeksema, 1999). Uncertainty may keep ruminators analyzing everything that happens or that others say in a ruminative manner (Nolen-Hoeksema et al., 1999). In turn, several theorists argued that uncertainty over whether one will be able to control one’s environment is key to anxiety (Alloy, Kelly, Mineka, & Clements, 1990; Barlow, 1988; Beck & Emery, 1985; Garber, Miller, & Abramson, 1980).

Yet rumination also appears to contribute to a hopelessness about the future and negative evaluations of the self, which many theorists argue are key to depression (Abramson, Metalsky, & Alloy, 1989; Beck, 1967). Laboratory studies have shown that inducing dysphoric people to ruminate leads them to predict that

This study was supported by Public Health Service Grant MH 51817. I thank Judith Larson for running this study and Christopher Davis for statistical consultation. I thank David Watson for helpful suggestions on early drafts of this article.

Correspondence concerning this article should be addressed to Susan Nolen-Hoeksema, Department of Psychology, University of Michigan, 525 East University Avenue, Ann Arbor, Michigan 48109. Electronic mail may be sent to nolen@umich.edu.

negative outcomes are likely to happen in the future (Lyubomirsky & Nolen-Hoeksema, 1995) and to evaluate themselves and their current situations in a negative, hopeless manner (Lyubomirsky et al., 1998). Thus, ruminators may vacillate between anxiety and depression as their cognitions vacillate between uncertainty and hopelessness (for similar arguments about the cognitions associated with anxiety vs. depression, see Alloy et al., 1990; Garber et al., 1980; Mineka et al., 1998). This suggests that ruminators may be particularly prone to the mixed anxiety/depression syndrome that appears so common.

In the analyses reported here, I examined whether people who had more ruminative styles of responding to their distress were more likely than nonruminators (a) to have depressive disorders and (b) to have anxiety symptoms, as well as depressive symptoms. These analyses were conducted in a large, randomly selected, community sample of adults who were interviewed two times over 1 year.

Method

Respondents and Procedures

The respondents were adults living in the greater San Francisco Bay Area. These adults were recruited through random-digit dialing of telephone numbers in San Francisco, San Jose, and Oakland, California. These communities were chosen because of their ethnic diversity. Residential telephone numbers in these communities were chosen randomly and then called. The person answering the phone was asked whether anyone living in the household was between the ages of 25 and 35 years, 45 and 55 years, or 65 and 75 years. These age groups were targeted to ensure that we had sufficient samples of young, middle-aged, and older adults in the study. Only one person per household was recruited into the study. Of the 1,789 people called and identified as meeting the age criteria for the study, 19.3% said they were not interested in participating, 3.3% said they did not have time to participate, and 3.7% said they would participate but then did not return repeated telephone calls to schedule a first interview, resulting in a sample of 1,317 for the first interview.¹ Of these, 1,132 people participated in a second interview 1 year later. Significant differences were found between those who did and did not participate in both interviews on both self-reported and interviewer-rated depressive symptoms; those who dropped out of the study scored higher on both depression measures at the first interview than those who participated in the second interview ($ps < .05$). The analyses reported here include only those people who participated in both interviews. The specific number of respondents available for each analysis varied because of occasional missing data.

Three hundred ninety of the participants were in the 25- to 35-year age group (210 of these were women), 470 were in the 45- to 55-year age group (245 of these were women), and 262 were in the 65- to 75-year age group (144 of these were women). The ethnic distribution of the sample was as follows: 72% European American; 7% African American, 6% Asian American, 9% Hispanic/Latino; 6% mixed or other ethnicity. Eighteen percent of the sample was single, 54% was married or cohabiting, 16% was separated or divorced, 9% was widowed, and 3% was committed but not cohabiting. Nineteen percent of the participants had a high school degree or less education, 27% had some college, 26% had a college degree, 8% had some postgraduate education, and 21% had a graduate or professional degree. The median income of the sample was \$40,000 to 50,000.

All participants were interviewed in person, usually at the participant's home, by an extensively trained clinical interviewer, once at the beginning of the study and then a second time approximately 1 year later. Each interview lasted about 90 min. For each measure, the interviewers read the instructions to the participant (the instructions provided for published measures were adapted slightly to reflect the interview format). If the

answers to the questions required participants to use a Likert scale or to choose from among a group of possible answers, the interviewers presented the participant with a card with the possible answers printed on it and asked the participant to use the card to choose his or her answer.

Measures

Depression. Participants completed the 13-item form of the Beck Depression Inventory (BDI; Beck & Beck, 1972) for a self-report measure of current depressive symptoms. The BDI is one of the most widely used self-report instruments for detecting depressive symptoms. The coefficient α in this study at the first interview was .82 and the test-retest correlation between interviews was .60. Scores on the BDI ranged from 0 to 29 at Time 1 and from 0 to 26 at Time 2.

Interviewers completed the 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960) on each participant immediately after the interview. This scale provides an index of participants' current levels of depression. Information on the presence of specific symptoms came from participants' responses to the BDI and the Structured Clinical Interview for DSM-IV (SCID), which was also administered (see later discussion). Interviewers were also instructed to use participants' nonverbal behaviors and information provided spontaneously by participants during the interview. Interviewers were extensively trained in the use of the HRSD. Scores on the HRSD have been shown to have good reliability and to correlate well with other clinical measures and self-report measures of depressive symptoms (see Shaw, Vallis, & McCabe, 1985). In this study, the test-retest correlation between interviews was .44, and the coefficient alpha for the scale at the first interview was .74. Scores on the HRSD ranged from 0 to 36 at Time 1 and from 0 to 32 at Time 2.

The correlation between HRSD scores and BDI scores was .61 at the first interview and .67 at the second interview. Because the HRSD and BDI were correlated so highly, and they showed the same pattern of results when they were used separately in the analyses reported later, I created one composite measure of depressive symptoms by standardizing scores on each variable (separately at each wave) and then averaging these standardized scores separately for each wave. I refer to these composite measures as Time 1 depressive symptoms and Time 2 depressive symptoms. The range of scores on this composite measure was from -1.15 to 6.85 at Time 1 and from -1.04 to 4.93 at Time 2.

The SCID (First, Spitzer, Gibbon, & Williams, 1997) was administered to determine whether participants met criteria for major depressive disorder. At Time 1, participants were asked about symptoms they experienced in the last month. At Time 2, participants were asked about symptoms they experienced in the year between Time 1 and Time 2. Interviewers were given at least 60 hr of training on the administration of the SCID. Reliability of the diagnoses was assessed by having a clinical psychologist trained on the SCID who did not conduct the interviews listen to a randomly selected 10% of the tapes of the interviews and score the SCID. Agreement between this rater and the original interviewers' diagnoses was 100%.

Anxiety. The Beck Anxiety Inventory (BAI; Beck & Steer, 1990) was used to obtain self-reports of anxiety symptoms. This measure has 21 items assessing the severity of anxiety symptoms using a 4-point scale ranging from 0 (*not at all*) to 3 (*severely; I could barely stand it*). Beck and Steer (1991) reported strong concurrent validity of the BAI with clinical ratings of anxiety. The coefficient alpha for the BAI in this study was .88, and the test-retest correlation between Time 1 and Time 2 scores was .63. Scores on the BAI ranged from 0 to 52 at Time 1 and from 0 to 41 at Time 2.

¹ Some people hung up the telephone before any information about the age distribution in the household could be gathered. Because we could not determine whether any residents of these households would have been eligible for the study, these immediate refusals to participate are not included in the pool of 1,789 used to calculate response rates.

Interviewers completed a one-item global rating of the anxiety levels of the respondents immediately after the interview on a scale ranging from 0 (*none*) to 4 (*disabling*). Interviewers were instructed to use information reported by the respondents on the BAI, as well as information provided by the respondents' verbal and nonverbal behavior throughout the interview, in making their rating. The correlation between Time 1 and Time 2 scores on the anxiety rating was .32 ($p < .001$).

BAI scores and the interviewers' anxiety ratings of respondents correlated at .42 at Time 1 and .52 at Time 2. I created one composite measure of anxiety symptoms by standardizing scores on each variable (separately at each wave) and then averaging these standardized scores separately for each wave. I shall refer to these composite measures as Time 1 anxiety symptoms and Time 2 anxiety symptoms. The range of scores on this composite measure was from -0.98 to 4.42 at Time 1 and from -1.04 to 3.74 at Time 2.

Ruminative coping. The Response Styles Questionnaire (RSQ; cf. Nolen-Hoeksema & Morrow, 1991) was administered to assess participants' tendencies to ruminate in response to their symptoms of negative emotion. Interviewers read the following instructions to participants:

People think and do many different things when they feel sad, blue, or depressed. I'm going to read a list of possibilities. Turn to the next scale in your book and please tell me if you never, sometimes, often, or always think or do each one when you feel down, sad, or depressed. Please indicate what you generally do, not what you think you should do.

The Ruminative Responses Scale of the RSQ includes 22 items describing responses that are self-focused (e.g., "I think, 'Why do I react this way?'"), symptom focused (e.g., "I think about how hard it is to concentrate"), and focused on the possible consequences and causes of their mood (e.g., "I think, 'I won't be able to do my job if I don't snap out of this'"), which respondents rate on a scale from 1 (*almost never*) to 4 (*almost always*). The coefficient alpha at the first interview was .90, and the test-retest correlation between the two interviews was .67. Scores on this scale ranged from 22 to 76 at Time 1 and from 22 to 75 at Time 2. Previous studies reported acceptable convergent and predictive validity for the Ruminative Responses Scale (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema & Morrow, 1991).

Results

Because gender, age, and income have been shown to correlate with depression, anxiety, and rumination (Nolen-Hoeksema, 1991; Yonkers & Gurguis, 1995), all analyses were run using these variables as covariates. Because results for gender, age, and income in this data set have been reported elsewhere (Nolen-Hoeksema & Kartub, 2000; Nolen-Hoeksema et al., 1999), and to simplify presentation of results, results for these variables were not presented here. All results that are presented are from analyses including gender, age, and income as covariates.

Analyses of Depressive Diagnoses

Repeated measures analysis of variance (ANOVA) indicated that respondents who were diagnosed with a major depressive disorder on the SCID at Time 1 had significantly higher scores on ruminative responses at both Time 1 and Time 2 than respondents who were not diagnosed with major depressive disorder on the SCID (Table 1), $F(1, 1089) = 51.70$, $p < .0001$. Similarly, respondents who were diagnosed with a major depressive disorder on the SCID at Time 2 had significantly higher scores on ruminative responses at both Time 1 and Time 2 than respondents who

Table 1
*Rumination Scores of Respondents With and Without a
Diagnosis of Major Depressive Disorder*

Variable	Respondents with major depression		Respondents without major depression	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Time 1 diagnostic status	<i>(n</i> = 104)		<i>(n</i> = 1,109)	
Rumination, Time 1	48.19	9.40	40.19	10.25
Rumination, Time 2	44.80	10.64	38.26	9.89
Time 2 diagnostic status	<i>(n</i> = 139)		<i>(n</i> = 984)	
Rumination, Time 1	46.59	11.13	40.13	10.08
Rumination, Time 2	45.75	10.85	37.89	9.64

Note. Values represent means + standard deviations. Post hoc analyses showed that all differences in rumination scores between those diagnosed with depression and those not diagnosed with depression were significant.

were not diagnosed with major depressive disorder on the SCID (see Table 1), $F(1, 1089) = 81.36$, $p < .0001$.

Logistic regression analysis was used to assess predictors of change in diagnostic status from Time 1 to Time 2. Ruminative response scores at Time 1 were first entered into the equation and significantly predicted diagnostic status at Time 2, odds ratio = 1.06, Wald = 39.74 ($p < .0001$). Then diagnostic status at Time 1 and severity of depressive symptoms (indexed by scores on the composite depressive symptoms measure) were entered into the equation, and both significantly predicted Time 2 diagnostic status: for Time 1 diagnostic status, odds ratio = 2.67, Wald = 12.86 ($p < .001$); for Time 1 depressive symptoms, odds ratio = 1.37, Wald = 9.21 ($p < .001$). In addition, Time 1 rumination continued to significantly predict Time 2 diagnostic status after Time 1 diagnostic status and depressive symptoms were added to the equation, odds ratio = 1.04, Wald = 10.78, ($p < .001$).

This logistic regression analysis does not distinguish between respondents who were depressed at Time 1 and continued to experience depression between Time 1 and Time 2 (chronic depressives, $n = 39$) and those who were not depressed at Time 1 but did experience depression between Time 1 and Time 2 (new onsets, $n = 100$). I undertook a series of analyses to distinguish between these two groups as well as respondents who were depressed at Time 1 but were not depressed at Time 2 (remitters, $n = 65$) and respondents who were not depressed at Time 1 or Time 2 (never depressed, $n = 919$). Repeated measures ANOVA revealed significant differences across these four groups in ruminative responses scores at Time 1 and Time 2, $F(3, 1087) = 38.12$, $p < .0001$ (Table 2). Post hoc analyses of both Time 1 and Time 2 rumination scores showed that the never-depressed group had significantly lower scores than the other three groups. It is particularly noteworthy that the Time 1 rumination scores of the remitters, whose depression lifted between Time 1 and Time 2, were significantly lower than the scores of those who remained chronically depressed. Also at Time 1, the new-onset group had rumination scores significantly lower than the chronically depressed group. At Time 2, the remitters group had rumination scores that were marginally lower than the chronically depressed group ($p = .07$), and the new-onset group had rumination scores marginally higher than the remitters ($p = .09$).

Table 2
Rumination Scores Across Four Diagnostic Groups

Variable	Never depressed (<i>n</i> = 919)		New onsets (<i>n</i> = 100)		Remitters (<i>n</i> = 65)		Chronically depressed (<i>n</i> = 39)		Significant differences ^a
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Time 1	39.64	9.98	45.22	11.26	47.05	8.84	50.10	10.10	a < b, c, d b, c < d
Time 2	37.46	9.46	45.56	10.67	43.94	10.14	46.23	11.42	a < b, c, d

^a Significant differences at $p < .05$ in post hoc pairwise comparisons. a = never depressed; b = new onsets; c = remitters; d = chronically depressed.

To determine whether ruminative responses at Time 1 were significant predictors of new onsets of depression between Time 1 and Time 2 even after controlling for Time 1 levels of depressive symptoms, a logistic regression analysis was conducted using only respondents who were not depressed at Time 1. Ruminative response scores at Time 1 were first entered into the equation and significantly predicted diagnostic status at Time 2 (Table 3, top). Then Time 1 severity of depressive symptoms (indexed by scores on the composite depressive symptoms measure) were entered into the equation and significantly predicted Time 2 diagnostic status (see Table 3, top). In addition, Time 1 rumination continued to significantly predict Time 2 diagnostic status after Time 1 depressive symptoms were added to the equation.

Multiple regression analysis was used to determine whether Time 1 ruminative responses also predicted the severity of depressive symptoms at Time 2 among people who were not depressed at Time 1 (see Table 3, bottom). Time 1 rumination was a significant predictor of Time 2 depressive symptoms, both before and after Time 1 depressive symptoms were added to the equation (see Table 3, bottom).

To determine whether ruminative responses at Time 1 significantly predicted chronicity of depression between Time 1 and Time 2 after controlling for Time 1 levels of depressive symptoms, a logistic regression analysis was conducted using only respondents who were depressed at Time 1. Ruminative response scores at Time 1 were first entered into the equation and significantly predicted diagnostic status at Time 2 (Table 4, top). Then Time 1 severity of depressive symptoms (indexed by scores on the com-

posite depressive symptoms measure) were entered into the equation and significantly predicted Time 2 diagnostic status (see Table 4, top). Time 1 rumination did not reach conventional levels of significance as a predictor of Time 2 diagnostic status when Time 1 depressive symptoms were added to the equation, odds ratio = 1.04, Wald = 2.55, $p = .11$.

Multiple regression analysis was used to determine whether Time 1 ruminative responses predicted the severity of depressive symptoms at Time 2 among people who were depressed at Time 1. Time 1 rumination was a significant predictor of Time 2 depressive symptoms, both before and after Time 1 depressive symptoms were added to the equation (see Table 4, bottom).

Analyses of Anxiety/Depression Data

Both at Time 1 and Time 2, ruminative responses were significantly correlated with the binary variable, indicating presence or absence of a major depression diagnosis, the composite measure of depressive symptoms, and the composite measure of anxiety symptoms (Table 5).

Longitudinal regression analyses showed that Time 1 rumination was as strong a predictor of changes in anxiety symptoms as of depressive symptoms. In the first analysis, the dependent variable was the composite measure of anxiety symptoms at Time 2, and the predictor variables were the composite measure of anxiety symptoms at Time 1 and rumination at Time 1 (entered simultaneously). Anxiety symptoms at Time 1 predicted significant variance in anxiety symptoms at Time 2, $\beta = .47$, $t(943) = 16.38$, $p <$

Table 3
Analyses of Respondents Not Depressed at Time 1 (*n* = 1,019)

Variable	Odds ratio at entry	Wald at entry	Final odds ratio	Final Wald
Logistic analyses of Time 2 diagnostic status				
Step 1: Time 1 rumination	1.05	19.58*	1.03	8.17*
Step 2: Time 1 depressive symptoms	1.35	6.68*	1.35	6.68*
Multiple regression analyses of Time 2 depressive symptoms levels				
	Standardized β		Final β	
	at entry			
Step 1: Time 1 rumination	.39*		.16*	
Step 2: Time 1 depressive symptoms	.49*		.49*	

* $p < .05$.

Table 4
Analyses of Respondents Depressed at Time 1 ($n = 104$)

Variable	Odds ratio at entry	Wald at entry	Final odds ratio	Final Wald
Logistic regression analyses of Time 2 diagnostic status				
Step 1: Time 1 rumination	1.06	5.69*	1.04	2.55
Step 2: Time 1 depressive symptoms	1.53	3.93*	1.53	3.93*
Multiple regression analyses of Time 2 depressive symptoms levels				
	Standardized β at entry		Final β	
Step 1: Time 1 rumination	.36*		.24*	
Step 2: Time 1 depressive symptoms	.35*		.35*	

* $p < .05$.

.001, as did rumination at Time 1, $\beta = .22$, $t(943) = 7.10$, $p < .001$.² In the second analysis, the dependent variable was the composite measure of depressive symptoms at Time 2, and the predictor variables were the composite measure of depressive symptoms at Time 1 and rumination at Time 1 (entered simultaneously). Depressive symptoms at Time 1 predicted significant variance in depressive symptoms at Time 2, $\beta = .53$, $t(947) = 18.22$, $p < .001$, as did rumination at Time 1, $\beta = .17$, $t(947) = 5.60$, $p < .001$.³ Note that the standardized β weights for the effects of Time 1 rumination on Time 2 anxiety and depression are quite similar (.22 vs. .17).

To indicate which participants were experiencing a mixed anxiety/depression syndrome compared with depression alone, anxiety alone, or neither anxiety nor depression, an anxiety/depression index was formed separately for each wave of data. Participants who scored below 1 standard deviation on both the combined anxiety and the combined depression measures were labeled the no-symptoms group ($n = 959$ at Time 1 and 897 at Time 2). Participants who scored below 1 standard deviation on the combined anxiety measure but 1 standard deviation or above on the combined depression measure were labeled the depression-only group ($n = 49$ at Time 1 and 51 at Time 2). Participants who scored 1 standard deviation or above on the combined anxiety measure but below 1 standard deviation on the combined depres-

sion measure were labeled the anxiety-only group ($n = 53$ at Time 1 and 68 at Time 2). Participants who scored 1 standard deviation or more above the mean on both the combined anxiety and the combined depression measures were labeled the mixed anxiety/depression group ($n = 62$ at Time 1 and 86 at Time 2).

To determine whether rumination scores would be highest among the mixed anxiety/depression group, the depression-only group, or anxiety-only group, I ran a series of one-way ANOVAs in which group status was the dependent variable and rumination scores were the predictor variable. At Time 1, rumination was a significant predictor of anxiety/depression group status, $F(3, 1088) = 35.06$, $p < .0001$. Post hoc Student-Newman-Keuls tests showed that the mean rumination score of the mixed anxiety/depression group ($M = 51.71$) was significantly higher ($p < .05$) than that of the other three groups (depression-only group $M = 47.32$, anxiety-only group $M = 43.79$, no-symptoms group $M = 39.74$). In addition, the depression-only group mean and the anxiety-only group mean were both significant higher than the no-symptoms group mean but did not differ significantly from each other.

Similarly, Time 2 rumination was a significant predictor of Time 2 anxiety/depression group status, $F(3, 1067) = 92.26$, $p < .0001$. Post hoc comparisons of groups showed the same pattern of differences as at Time 1; the mixed anxiety/depression group had higher mean rumination scores ($M = 51.47$) than the other three groups (depression-only group $M = 47.31$, anxiety-only group $M = 44.06$, no-symptoms group $M = 36.65$). In addition, the depression-only group mean and the anxiety-only group mean were both significantly higher than the no-symptoms group mean but did not differ significantly from each other.

Table 5
Correlations Among Rumination, Depressive Diagnoses and Symptoms, and Anxiety Symptoms

Variable	1	2	3	4	5	6	7	8
1. Rum T1	—							
2. Diag 1	.22*	—						
3. Dep T1	.48*	.44*	—					
4. Anx T1	.38*	.29*	.68*	—				
5. Rum T2	.62*	.19*	.44*	.34*	—			
6. Diag 2	.21*	.24*	.24*	.21*	.25*	—		
7. Dep T2	.40*	.32*	.61*	.50*	.55*	.40*	—	
8. Anx T2	.40*	.22*	.52*	.55*	.46*	.33*	.77*	—

Note. These analyses used only respondents with data available on all variables, $n = 943$. T1 = Time 1; T2 = Time 2; Rum = rumination; Diag = diagnosis of major depression; 0 = no; 1 = yes; Dep = depressive symptoms; Anx = anxiety symptoms.

* $p < .001$.

² A separate analysis showed that Time 1 rumination continued to predict Time 2 anxiety symptoms, controlling for both Time 1 anxiety symptoms and Time 1 depressive symptoms (standardized β for rumination = .16, $t(942) = 5.05$, $p < .0001$).

³ A separate analysis showed that Time 1 rumination continued to predict Time 2 depressive symptoms, controlling for both Time 1 depressive symptoms and Time 1 anxiety symptoms (standardized β for rumination = .16, $t(946) = 5.26$, $p < .0001$). The cross-sectional and longitudinal relationships between rumination and depressive symptoms in this sample were previously reported in Nolen-Hoeksema et al. (1999).

Finally, a longitudinal analysis was conducted to determine whether Time 2 anxiety/depression group status could be predicted by Time 1 rumination, covarying Time 1 scores on anxiety and depressive symptoms. Results showed significant differences across groups in Time 1 rumination, $F(3, 940) = 6.83, p < .001$. The pattern of results indicated that the no-symptoms group had lower mean rumination scores ($M = 19.19$) than the other three groups (mixed anxiety/depression group $M = 50.57$, depression-only group $M = 47.96$, anxiety-only group $M = 45.15$). In addition, the mixed anxiety/depression group had higher rumination scores than the anxiety-only group but did not differ from the depression-only group.

Discussion

The analyses presented here extend the literature on rumination to show that these responses to distress predict major depressive disorders, including new onsets of major depressive episodes, and to some extent the chronicity of major depressive episodes. The analyses further show that rumination predicts symptoms of anxiety as well as it predicts symptoms of depression and that a ruminative response style may be particularly characteristic of people with mixed anxiety/depressive symptoms.

Rumination and Major Depressive Episodes

Why would ruminative responses contribute to new episodes of major depression? Laboratory studies have shown that when people ruminate in the context of a dysphoric mood, they recall more negative memories from the past, interpret their current situation more negatively, and are more pessimistic about their future (Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Pyszczynski, Holt, & Greenberg, 1987). In contrast, when people in a dysphoric mood are distracted from their ruminations for a short period, their memories, interpretations of current events, and predictions about the future are much less negatively toned. In addition, when dysphoric people who are ruminating attempt to problem solve, the quality of the solutions they generate is lower than those they generate if they are not ruminating (Lyubomirsky & Nolen-Hoeksema, 1995). Finally, ruminators report that their friends and family members are not adequately supportive of them, perhaps because the ruminators continue to ruminate about their distress long after friends and family members think they should stop (Nolen-Hoeksema & Davis, 1999). Thus, rumination may prolong and enhance the negative thinking associated with depressed mood, interfere with good problem solving, and cause friction with friends and family. These processes, in turn, may lead the depressed mood to become more severe over time. Eventually, that depressed mood may evolve into a major depressive episode.

This study provided mixed evidence for the power of rumination to predict chronicity of major depressive episodes. Multiple regression analyses of data from people depressed at Time 1 showed that Time 1 rumination did predict the severity of their depressive symptoms at Time 2, after accounting for levels of depressive symptoms at Time 1. In addition, among those depressed at Time 1, Time 1 ruminative responses differentiated between chronic depressives (who reported experiencing depression in the year between Time 1 and Time 2) and remitters (who reported they did not continue to experience depression in that year) before

baseline levels of depressive symptoms were taken into account. Once baseline depression levels were entered into the regression equation, however, the effects of rumination on Time 2 diagnostic status did not reach conventional levels of significance.

Conditions for testing the effects of rumination on chronicity of depressive episodes were not ideal in this study. First, the relatively low number of chronic depressives (39) and remitters (65) provided modest statistical power to test hypotheses about chronicity. Second, the method of assessing depressive diagnoses at Time 2 did not allow for distinctions between people who continued to be depressed long after Time 1 and those whose Time 1 episodes remitted but then recurred sometime during the year. Third, the diagnostic status variable at Time 2 was binary rather than being a more fine-grained index of duration of depressive episodes. Finally, no information was available on whether the respondents depressed at Time 1 received treatment, which could have overcome the effects of rumination on the chronicity of their depression. Future studies are needed to determine whether ruminative responses do predict the chronicity of major depressive episodes or whether their primary utility is in predicting when episodes of dysphoria will develop into episodes of major depression.

Rumination and Anxiety

Rumination predicts anxiety in addition to depression. Rumination may reflect attempts to understand and gain some control over troubling circumstances in one's life (Carver & Scheier, 1990; Martin & Tesser, 1996; Nolen-Hoeksema et al., 1999). Ruminators appear to ask themselves questions such as "What do my feelings mean?," "Why are things happening this way?," "What am I going to do?" (Lyubomirsky et al., 1999). Although such questions are reasonable and may be useful in many circumstances, people who are frequent ruminators may have difficulty settling on satisfying answers to these questions either because of circumstances in their lives or because they desire an excessive level of certainty before settling on an answer to such questions (Ward et al., 1999). Thus, they continue asking these questions and remaining vigilant to their environment, and their own feelings, for answers to the questions. This vigilance and uncertainty may then contribute to anxiety symptoms.

The more they ruminate, however, the more ruminators may become depressed. As noted, rumination in the context of negative affect contributes to hopelessness about the future, negative evaluations of the present, and negative memories of the past (Lyubomirsky et al., 1998). These cognitions may then contribute to depression, either a persistent depression or depressive symptoms that revert to anxiety symptoms when ruminators have some glimmer of hope that they may be able to wrest some control over their circumstances (see also Alloy et al., 1990).

Limitations

The effect sizes for the impact of rumination on diagnoses of depression in the longitudinal analyses were small. Thus, conclusions about the role of rumination in depressive disorders must remain tentative until future research can be conducted.

The fact that the respondents who attrited from the study between Time 1 and Time 2 were more depressed at Time 1 may

have affected the results. I ran all the Time 1 analyses using all available Time 1 respondents and found nearly identical results to the Time 1 results reported here. The loss of the more depressed respondents probably reduced the statistical power of the predictive analyses because it reduced the variance in depression at Time 2.

The analyses of anxiety symptoms, and the anxiety/depression groups, relied heavily on self-reports of respondents. It would have been very useful to have clinical diagnoses of anxiety disorders as well as diagnoses of depression for these analyses. Firm conclusions about the relationship between rumination and anxiety must await studies that have more extensive information about respondents' levels of anxiety and diagnoses of anxiety disorders.

Conclusions

Rumination appears to predict depressive disorders in addition to subclinical depressive symptoms. The evidence that rumination predicts new onsets of depressive episodes was stronger and more consistent than the evidence that rumination predicts chronicity of depressive episodes. An important goal for future studies is to examine the effects of rumination on chronicity of depressive episodes using larger samples and more comprehensive measures of chronicity.

Rumination also predicts anxiety symptoms and mixed anxiety/depression as well as depression alone. Rumination may be one of the reasons for the common comorbidity of anxiety and depression. The specific content of ruminative thoughts at any given moment may influence whether an individual is anxious or depressed, but the ruminative process may keep the individual in either an anxious or depressed mood much of the time.

References

- Abramson, L. Y., Metalsky, G. L., & Alloy, L. B. (1989). Hopelessness depression: A theory based subtype of depression. *Psychological Review*, *96*, 358–372.
- Alloy, L., Kelly, K., Mineka, S., & Clements, C. (1990). Comorbidity in anxiety and depressive disorders: A helplessness/hopelessness perspective. In J. D. Maser & C. R. Cloninger (Eds.), *Comorbidity of mood and anxiety disorders* (pp. 3–12). Washington, DC: American Psychiatric Association Press.
- Barlow, D. H. (1988). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. New York: Guilford Press.
- Beck, A. T. (1967). *Depression: Clinical, experimental and theoretical aspects*. New York: Harper & Row.
- Beck, A. T., & Beck, R. W. (1972). Screening depressed patients in family practice: A rapid technique. *Postgraduate Medicine*, *52*, 81–85.
- Beck, A. T., & Emery, G. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York: Basic Books.
- Beck, A. T., & Steer, R. A. (1990). *Manual for the revised Beck Anxiety Inventory*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., & Steer, R. A. (1991). Relationship between the Beck Anxiety Inventory and the Hamilton Anxiety Rating Scale with anxious outpatients. *Journal of the Anxiety Disorders*, *5*, 213–223.
- Butler, L. D., & Nolen-Hoeksema, S. (1994). Gender differences in response to depressed mood in a college sample. *Sex Roles*, *30*, 331–346.
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, *97*, 19–35.
- Clark, L. A. (1989). The anxiety and depressive disorders: Descriptive psychopathology and differential diagnosis. In P. C. Kendall & D. Watson (Eds.), *Anxiety and depression: Distinctive and overlapping features* (pp. 83–129). San Diego, CA: Academic Press.
- Clark, L. A., & Watson, D. (1991). Theoretical and empirical issues in differentiating depression from anxiety. In J. Becker & A. Kleinman (Eds.), *Psychosocial aspects of depression* (pp. 39–65). Hillsdale, NJ: Erlbaum.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1997). *Structured Clinical Interview for DSM-IV Axis I Disorders—Non-patient edition (version 2.0)*. New York: New York State Psychiatric Institute, Biometrics Research Department.
- Garber, J., Miller, S. M., & Abramson, L. Y. (1980). On the distinction between anxiety states and depression: Perceived control, certainty, and probability of goal attainment. In J. Garber & M. E. P. Seligman (Eds.), *Human helplessness: Theory and applications* (pp. 131–172). New York: Academic Press.
- Gottlib, I. H., Lewinsohn, P. M., Seeley, J. R. (1995). Symptoms versus a diagnosis of depression: Differences in psychosocial functioning. *Journal of Consulting and Clinical Psychology*, *63*, 90–100.
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery, & Psychiatry*, *23*, 56–61.
- Ingram, R. E., Lumry, A. E., Cruet, D., & Sieber, W. (1987). Attentional processes in depressive disorders. *Cognitive Therapy and Research*, *11*, 351–360.
- Just, N., & Alloy, L. B. (1997). The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology*, *106*, 221–229.
- Kessler, R. C., Nelson, C. B., McGonagle, K. A., Liu, J., Swartz, M., & Blazer, D. G. (1996). Comorbidity of DSM-III-R major depressive disorder in the general population: Results from the U.S. National Comorbidity Survey. *British Journal of Psychiatry*, *168*(Suppl. 30), 17–30.
- Lyubomirsky, S., Caldwell, N. D., & Nolen-Hoeksema, S. (1998). Effects of ruminative and distracting responses to depressed mood on retrieval of autobiographical memories. *Journal of Personality and Social Psychology*, *75*, 166–177.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1993). Self-perpetuating properties of dysphoric rumination. *Journal of Personality and Social Psychology*, *65*, 339–349.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1995). Effects of self-focused rumination on negative thinking and interpersonal problem solving. *Journal of Personality and Social Psychology*, *69*, 176–190.
- Lyubomirsky, S., Tucker, K., Caldwell, N. D., & Berg, K. (1999). Why ruminators are poor problem solvers: Clues from the phenomenology of dysphoric rumination. *Journal of Personality and Social Psychology*, *77*, 1041–1060.
- Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer (Ed.), *Ruminative thoughts* (pp. 1–47). Hillsdale, NJ: Erlbaum.
- Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, *49*, 377–412.
- Moras, K., Clark, L. A., Katon, W., Roy-Byrne, R., Watson, D., & Barlow, D. (1996). Mixed anxiety-depression. In T. A. Widiger, A. J. Frances, H. A. Pincus, R. Ross, M. B. First, & W. W. Davis (Eds.), *DSM-IV sourcebook* (pp. 623–643). Washington, DC: American Psychiatric Association Press.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*, 569–582.
- Nolen-Hoeksema, S., & Davis, C. G. (1999). "Thanks for sharing that": Ruminators and their social support networks. *Journal of Personality and Social Psychology*, *77*, 801–814.
- Nolen-Hoeksema, S., & Kartub, C. (2000). *Age differences in the correlates of depressive symptoms*. Manuscript submitted for publication.

- Nolen-Hoeksema, S., & Larson, J. (1999). *Coping with loss*. Hillsdale, NJ: Erlbaum.
- Nolen-Hoeksema, S., Larson, J., & Grayson, C. (1999). Explaining the gender difference in depressive symptoms. *Journal of Personality and Social Psychology*, 77, 1061–1072.
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, 61, 115–121.
- Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, 102, 20–28.
- Nolen-Hoeksema, S., Parker, L. E., & Larson, J. (1994). Ruminative coping with depressed mood following loss. *Journal of Personality & Social Psychology*, 67, 92–104.
- Pyszczynski, T., & Greenberg, J. (1987). Self-regulatory perseveration and the depressive focusing style: A self-awareness theory of reactive depression. *Psychological Bulletin*, 102, 122–138.
- Pyszczynski, T., Holt, K., & Greenberg, J. (1987). Depression, self-focused attention, and expectancies for future positive and negative events for self and others. *Journal of Personality and Social Psychology*, 52, 994–1001.
- Roberts, J. E., Gilboa, E., & Gotlib, I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: Gender, neuroticism, and episode duration. *Cognitive Therapy and Research*, 22, 401–423.
- Shaw, B. F., Vallis, T. M., & McCabe, S. B. (1985). The assessment of the severity and symptom patterns in depression. In E. E. Beckham & W. R. Leber (Eds.), *Handbook of depression: Treatment, assessment, and research* (pp. 372–407). Homewood, IL: Dorsey Press.
- Ward, A., Lyubomirsky, S., Sousa, L., & Nolen-Hoeksema, S. (1999). *Can't quite commit: Ruminators and uncertainty*. Unpublished manuscript, Swarthmore College.
- Wood, J. V., Saltzberg, J. A., Neale, J. M., Stone, A. A., & Rachmiel, T. B. (1990). Self-focused attention, coping responses, and distressed mood in everyday life. *Journal of Personality and Social Psychology*, 58, 1027–1036.
- Yonkers, K., & Gurguis, G. (1995). Gender differences in the prevalence and expression of anxiety disorders. In M. V. Seeman (Ed.), *Gender and psychopathology* (pp. 113–130). Washington, DC: American Psychiatric Association Press.

Received May 14, 1999

Revision received January 24, 2000

Accepted February 11, 2000 ■