
Can't Quite Commit: Rumination and Uncertainty

Andrew Ward

Swarthmore College

Sonja Lyubomirsky

Lorie Sousa

University of California, Riverside

Susan Nolen-Hoeksema

University of Michigan

Why do some individuals persist in self-destructive rumination? Two studies investigated the relation between a ruminative response style and the reluctance to initiate instrumental behavior. In Study 1, ruminators were compared to nonruminators regarding their evaluation of a self-generated plan to revise their university housing system and, in Study 2, concerning their plan to redesign the undergraduate curriculum. In both studies, on relevant composite measures, ruminators expressed less satisfaction and confidence with regard to their plans than did nonruminators. They were also less likely to commit to the plans they generated. The findings suggest that in addition to its documented detrimental effects on thinking and problem solving, self-focused rumination may inhibit instrumental behavior by increasing uncertainty, resulting in further rumination and behavioral paralysis.

Until one is committed, there is hesitancy, the chance to draw back, always ineffectiveness.

—Murray (1951)

When people are distressed (e.g., depressed, anxious, or angry), they can respond to their mood in several ways (Gross, 1998; Lazarus & Folkman, 1984; Nolen-Hoeksema, 1991). They may deny or avoid thinking about how they feel, they may quickly take action to alter their environment and change their mood, they may seek out social support, or they may ruminate. A growing body of research suggests that individuals who respond to depressed mood, anxiety, or anger with self-focused rumination experience greater negative moods, as well as negatively biased thinking, problem-solving deficits, and impaired attention and concentration (Ingram, 1990; Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998;

Lyubomirsky, Kasri, & Zehm, in press; Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Nolen-Hoeksema, 2000; Pyszczynski & Greenberg, 1987; Rusting & Nolen-Hoeksema, 1998). We define a ruminative response as focusing repetitively on the meaning, causes, and consequences of one's mood, asking questions such as "What does it mean that I feel this way?" and "What if I don't snap out of this quickly?" (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Nolen-Hoeksema, 1991; Nolen-Hoeksema, Morrow, & Frederickson, 1993; Nolen-Hoeksema, Parker, & Larson, 1994). Longitudinal, community-based studies have shown that the tendency to engage in a ruminative process when distressed is a stable individual difference characteristic (Nolen-Hoeksema & Davis, 1999). Specifically, whereas many individuals may engage in some rumination when depressed or sad, some people ruminate a great deal; others engage in little or no rumina-

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tion, and these individual differences tend to be stable over time, even as depressed moods wax and wane.

Persistent, repetitive self-focusing need not necessarily lead to negative thinking or negative affect if an individual engages in such a process while in a neutral or positive mood. In a series of laboratory studies, we asked nondysphoric individuals (i.e., those low in depressed, anxious, or angry moods) to ruminate. Specifically, participants were instructed to focus on how they were feeling, how their lives were going, and their expectations for the future. Such an induction did not lead to greater negative thinking or mood in the nondysphoric participants than did asking them to focus on pleasant or neutral thoughts that distract from self-focus (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Rusting & Nolen-Hoeksema, 1998). Indeed, the rumination induction itself is neutral in emotional tone. It does not specifically direct people's attention to negative feelings and thoughts; instead, it directs their thoughts to how they are feeling and their current life circumstances.

But when individuals are already at least somewhat dysphoric (i.e., depressed, anxious, or angry), that mood makes negative thoughts and memories more accessible and likely to be retrieved (e.g., Blaney, 1986; Bower, 1981, 1991; Forgas, 1991; Kuhl, 1981). When individuals then persistently and repetitively focus on how they are feeling and their life circumstances, their attention is likely to be drawn to the network of negative memories and thoughts associated with the mood. For example, the more the individual continues to ask "Why am I depressed?" when in a depressed mood, the more likely it is that he or she will retrieve answers to this question that are negative and will feed the depressed mood even further. Laboratory studies show that people in a depressed mood who have been induced to ruminate show greater recall of negative memories (Lyubomirsky et al., 1998), more negative self-evaluations (Lyubomirsky et al., 1999), more pessimistic and distorted inferences and attributions, and more negative expectations for the future (Lyubomirsky & Nolen-Hoeksema, 1995) than do people in a depressed mood distracted from their ruminations. Moderately depressed people induced to ruminate also show less effective interpersonal problem solving, particularly when complex solutions are required, compared to moderately depressed people distracted from rumination (Lyubomirsky & Nolen-Hoeksema, 1995).

In turn, several naturalistic studies have shown that a ruminative response style is associated with prolonged negative mood (Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Larson, 1999; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema et al., 1993). For example, a large longitudinal study of more than 1,100 community-based participants showed that those with a

more ruminative response style experienced more protracted periods of depressive symptoms and were more prone to develop major depressive disorder (Nolen-Hoeksema, 2000; Nolen-Hoeksema et al., 1999). Individual difference measures of rumination predict future levels of depression even after taking into account baseline levels. This suggests that although rumination may be closely intertwined with depression, it is a separable construct, with additional predictive power over and above concomitant levels of depression. Rumination also has been found to predict anxiety symptoms (Nolen-Hoeksema, 2000).

So if rumination is associated with more negative moods, negative thinking, and poor problem solving, why do ruminators keep ruminating? One possible reason has been provided by Lyubomirsky and Nolen-Hoeksema (1993), who found that individuals in a depressed mood induced to ruminate believed they were gaining greater insight into their problems than individuals in a depressed mood distracted from their ruminations. The authors argued that this sense of insight might motivate ruminators to continue ruminating. The researchers also found, however, that the "insights" commonly generated by ruminators appeared to be negative and ineffectual (see also Lyubomirsky & Nolen-Hoeksema, 1995).

The fact that ruminators tend to generate less effective solutions to complex interpersonal problems than do nonruminators also may perpetuate rumination. If ruminators ultimately implement the inferior solutions they have generated, these solutions may often fail, giving ruminators more problems and thus more cause to ruminate. Nolen-Hoeksema and colleagues (1999) found that over a year-long period, ruminators reported more increases in stressful events in their lives than did nonruminators, even after the authors controlled for differences between ruminators' and nonruminators' levels of depressed mood. The researchers speculated that ruminators generate stress by enacting poor solutions to their problems.

Finally, ruminators may be less motivated than nonruminators to enact any solution to their problems. In one study, moderately depressed people induced to ruminate showed lower motivation to participate in pleasant, distracting activities than moderately depressed people distracted from their ruminations, despite their recognition that such activities would lift their moods (Lyubomirsky & Nolen-Hoeksema, 1993). The authors argued that because rumination maintains a focus on depressive symptoms, it may lead people to believe that they lack the self-efficacy (Bandura, 1986) and wherewithal to participate in pleasant activities, despite their acknowledgment that they would enjoy them. Supporting and extending this finding, Lyubomirsky

and colleagues (1999) recently asked participants to generate their three biggest problems and then come up with possible solutions to these problems. Moderately depressed participants induced to ruminate came up with solutions to their problems that they believed to be effective but at the same time appeared less likely to actually take action to implement these solutions compared to moderately depressed people distracted from their ruminations. The results of both of these studies suggest that reduced motivation to problem solve, engendered by rumination, may serve as a significant obstacle to effective reduction of depressed mood and the alleviation of personal problems. Consequently, problems in a ruminator's life may remain unaddressed, and rumination could become a perpetual response.

In the studies reported here, we investigated another possible reason why ruminators may persist in ruminating. We hypothesized that ruminators are likely to remain uncertain about the wisdom of an action even after significant deliberation on its merits. This uncertainty keeps ruminators locked in continued rumination and unwilling to take action—action that could potentially terminate a ruminative cycle. In particular, based on a number of relevant findings (e.g., Davis & Nolen-Hoeksema, 2000; Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1995), it seemed likely that ruminators' memories of past failures and gloomy predictions for the future, coupled with a cognitive tendency to perseverate, may all contribute to a reluctance to commit to a particular plan of action.

PRESENT STUDIES

The two studies described in this article aimed to examine the relationship between rumination and the likelihood of initiating action intended to solve problems. In Study 1, students identified as "ruminators" and "nonruminators" on the basis of their scores on a measure of ruminative response style were asked to formulate and describe on videotape a plan to revise the housing system at their university. In addition, participants were asked to respond to a series of direct questions regarding the plan they generated and, finally, to engage in a "thought-listing" exercise. We hypothesized that ruminators would exhibit less confidence, satisfaction, and commitment regarding their plans and would report requiring more time to feel comfortable with their plans than would nonruminators. In addition, in accord with past research (Lyubomirsky, Dickerhoof, Kasri, & Zehm, 2000), the "thought samples" of the ruminators were expected to show evidence of "dwelling," that is, relatively more references to their plans than the samples provided by nonruminators (cf. Greenberg & Pyszczynski, 1986).

Study 2 was designed to extend and replicate the findings of Study 1 in a different domain. Ruminators and nonruminators were videotaped as they generated and presented a plan to revise the curriculum at their university. In addition to the measures used in Study 1, we also asked participants in this study to report how satisfied they were with their videotaped presentation in general and, in particular, with their physical appearance and the sound of their voice on the videotape. Relative to nonruminators, ruminators were once again expected to be less satisfied, confident, and committed to their plans, as well as to report requiring more time to formulate those plans. In addition, we hypothesized that this dissatisfaction might extend to other elements of the situation, with ruminators more likely than nonruminators to report unhappiness with their videotaped appearance and voice quality.

In both studies, we chose to select participants based on their current status as a ruminator or nonruminator rather than use a rumination induction in the laboratory. Although this represented a departure from most previous rumination studies, the adoption of such a selection procedure here seemed appropriate in light of our hypotheses. In particular, we believed that one reason ruminators may be reluctant to commit to decisive action is because they have endured a history of negative outcomes (Nolen-Hoeksema et al., 1999)—a history that could not be created in a one-time laboratory induction.

The selection procedure also altered the manner in which we investigated potential mood effects in our participants. In past studies, the aversive effects of induced rumination have been exhibited by participants who were already experiencing dysphoria. However, recent research has shown that rumination actually predicts the onset of a wider range of negative emotions, including symptoms of both depression and anxiety (Nolen-Hoeksema, 2000). In addition, as noted above, past studies have relied on a rumination induction rather than examining the consequences of individuals' natural tendency to ruminate. By contrast, in the present studies, we sought to examine a relatively stable personality characteristic that was predicted to exert an impact any time a person encounters an emotionally arousing event with the potential to produce negative affect in that individual. Of importance, because of the close association between rumination and negative mood, we sought to investigate that impact, which was hypothesized to include heightened uncertainty and an unwillingness to commit to decisive action, independent of any similar effect potentially attributable to depressed or anxious mood, either of which could potentially be associated with feelings of uncertainty (cf. Beck, Rush, Shaw, & Emery, 1979).

In sum, the studies reported here represented, in many ways, a fundamentally different approach than that taken in past rumination studies. We sought to examine a characteristic that we believe typically accompanies habitual rumination (i.e., being plagued by uncertainty) rather than simply induce rumination in the context of dysphoria and examine the resulting consequences for mood. We therefore constructed samples based on whether individuals reported a chronic tendency to engage in rumination and we examined the implications of that tendency for their capacity to react to a potentially aversive situation. It should be acknowledged, however, that even if rumination is shown to predict uncertainty and hesitation independent of any similar mood effect, that by no means rules out a link between rumination and dysphoria. Indeed, as suggested above, it may be the case that one route from rumination to prolonged (or even initial) depression involves uncertainty and/or a reluctance to engage in mood-enhancing behavior.

STUDY 1

Method

PARTICIPANTS

Seventy University of Michigan students participated. These students were chosen based on their scores on the short form of the Ruminative Responses Scale (RRS) (Nolen-Hoeksema & Morrow, 1991), a subscale of the Response Style Questionnaire (RSQ). The RSQ assesses individuals' ruminative, distracting, problem-solving, and sensation-seeking tendencies in response to negative moods. The short RRS includes 10 items that describe behaviors indicative of a "ruminative" response style (e.g., "think about how hard it is to concentrate" and "think about how passive and unmotivated you feel") and has previously demonstrated high internal consistency (Cronbach's $\alpha = .87$; Nolen-Hoeksema, 2000). Indeed, in a recent investigation (Nolen-Hoeksema & Davis, 1999), a longer version of the RRS exhibited high levels of internal consistency over a 2-year period (i.e., Cronbach's $\alpha > .89$), despite the fact that participants had experienced a traumatic death of a loved one during the course of the study. In addition, the long RRS has demonstrated acceptable convergent and predictive validity (Butler & Nolen-Hoeksema, 1994; Just & Alloy, 1997; Nolen-Hoeksema & Morrow, 1991) as well as discriminant validity with respect to such constructs as neuroticism and extraversion (Bagby & Parker, 2000). Time limitations in this investigation necessitated the use of the short RRS (hereafter referred to simply as the RRS) rather than its longer counterpart, but the two have been shown to be highly correlated, $r = .90$ (Nolen-Hoeksema, 2000), and a recent investigation (Ward,

Monterosso, & Schwartz, 2001) revealed that scores on the short RRS were highly correlated with a measure of depression (Beck & Beck, 1972; $r = .47$, $n = 53$) but not with a measure of neuroticism (John, Donahue, & Kentle, 1991; $r = .23$).

Two weeks prior to the beginning of the study, participants were asked during a "prescreening" administration of the RRS to rate how frequently they engaged in each of the relevant behaviors on 4-point Likert-type scales (1 = *almost never*, 2 = *sometimes*, 3 = *often*, and 4 = *almost always*). We used the top 10% of scores to identify 35 ruminators ($M = 3.18$, $SD = 0.41$; 19 women, 16 men) and the bottom 10% to identify 35 nonruminators ($M = 1.09$, $SD = 0.11$; 19 women, 16 men).

MATERIALS AND PROCEDURE

Each student participated individually. An elaborate cover story was employed to minimize possible demand characteristics. Students were told they would be participating in "two" studies: the first aimed at soliciting feedback from undergraduates on the current housing situation and the second assessing their "free associations." Participants' informal comments during oral debriefing indicated that the cover story was successful in allaying suspicion of the true hypotheses. After their arrival to the laboratory, students were greeted by a male experimenter and asked to sign a consent form detailing their rights as participants and explaining that they would be videotaped. The experimenter then introduced the cover story, informing students that they would be asked to propose a new system for on-campus housing, which they would subsequently present to a member of a research team studying the issue. The experimenter then told the participants that they would be videotaped because the research team was interested in hearing students' responses "in their own voice." Finally, the experimenter added that the research team "may use the plan you propose as a basis for making recommendations to the university" and then administered the mood measure.

Mood. The Multiple Adjective Affect Checklist (MAACL) (Zuckerman & Lubin, 1965) was used to assess the mood of participants. The MAACL consists of 132 adjectives (e.g., discouraged, irritated, secure, amiable) and instructs respondents to check the adjectives that are most descriptive of their current mood. In light of recent research linking rumination to both depression and anxiety (Nolen-Hoeksema, 2000) composite scores for two subscales—depressed mood and anxiety—were computed by summing the number of relevant adjectives checked.¹ Analysis revealed a high correlation between the two scales ($r = .75$). Therefore, the subscales were averaged to form a single mood score for each participant (although where appropriate, separate

analyses for each of the two subscales are reported below).

Filler questionnaire and video presentation. Participants then indicated whether they lived on or off campus and then responded to a series of “filler” questions designed to bolster our cover story. For example, they listed and evaluated the problems and benefits of the current housing system and were asked to express preferences for alternative types of systems. Next, participants were given the opportunity to propose a new housing system by delivering an oral presentation while being videotaped. Participants were essentially given no time to “rehearse” the presentation of their housing proposal; the presentations themselves lasted approximately 5 min and did not differ in length by rumination status.

Plan Evaluation Questionnaire. After participants finished their presentation, the experimenter turned off the video camera and presented students with the Plan Evaluation Questionnaire, instructing them that the measure would help prepare them for the second presentation of their housing proposal (i.e., the one to the “research team member”). The items on the questionnaire served as our primary dependent measures. Participants answered a total of five questions using 7-point Likert-type scales: (a) “How satisfied are you with the plan for on-campus housing that you came up with?” (1 = *not satisfied at all*, 7 = *extremely satisfied*); (b) “How confident are you that the plan you came up with would work?” (1 = *not confident at all*, 7 = *extremely confident*); (c) “How willing are you to commit to the plan you came up with?” (1 = *not willing at all*, 7 = *extremely willing*); (d) “How much time would you need to spend researching your plan before you were confident that it would work?” (1 = *no time at all*, 7 = *a great deal of time*); and (e) “How certain would you have to feel about your plan before it became the universitywide housing plan for all students?” (1 = *not certain at all*, 7 = *extremely certain*). A principal components analysis of the five items on the Plan Evaluation Questionnaire revealed that all but the last question loaded highly (with coefficients greater than .35) on the first principal component (eigenvalue for all 5 = 2.24), which accounted for 45% of the variance. Accordingly, an overall “plan evaluation” composite was computed from the average of participants’ ratings of satisfaction, confidence, time needed to research the plan (reverse-coded), and level of commitment (Cronbach’s $\alpha = .80$).

Interview and post-interview measures. Next, a confederate, blind to the rumination status of participants and portrayed as the member of the research team, entered the laboratory and interviewed each participant while the participant was again videotaped. The sex of the confederate always matched that of the participant. During their interaction with the confederate, students were

once again asked to describe their plans. Then the confederate asked them a series of questions regarding their satisfaction with, and confidence in, their plans, that is, “Why do you think this is a good plan?” “How confident are you this plan is an improvement over the existing system?” and “So you think this is the most workable plan?”

The videotaped portions of each participant’s housing proposal and subsequent interaction with the confederate were presented to two independent judges who were unaware of the hypotheses or rumination status of the participants. These judges were instructed simply to note and record any statements made by participants regarding additional time required for further consideration of the proposal, which they accomplished with 100% agreement. The confederate then thanked the participant, stated that his or her suggestions would be taken into consideration, and departed. At this point, participants were informed that the “first” study was complete and the “second” study would begin. Students were then asked to provide a “thought sample” by writing down everything that came to mind. The experimenter exited the room and, after 8 min had passed, reentered. After completing the final measure, participants were thoroughly debriefed. The entire study lasted approximately 1 hr.

Results

MOOD

Our composite measure revealed that ruminators reported greater negative mood than did nonruminators, $t(66) = 2.45$, $p < .05$.² In particular, ruminators reported higher rates of depression, $t(67) = 1.95$, $p < .06$, and anxiety, $t(62) = 2.76$, $p < .01$, as compared to nonruminators. This difference in reported mood is not surprising in light of previous research that has found an association between self-focused rumination and negative or dysphoric mood (Lyubomirsky et al., 1998, 1999, in press; Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Nolen-Hoeksema, 1991, 2000; Nolen-Hoeksema & Morrow, 1991, 1993a; Nolen-Hoeksema et al., 1994) and given the fact that the situation faced by our participants (i.e., having to devise and defend a housing plan with essentially no preparation) was intended to simulate a moderately stressful (and potentially negative) challenge, particularly to chronic ruminators. As discussed above, we considered it prudent to conduct an initial analysis of our primary dependent measure (i.e., the plan evaluation composite) with mood serving as a covariate. This analysis revealed a nonsignificant role for mood in this variable, $F(1, 61) = .04$, *ns* (an effect paralleled in analyses conducted separately for each of the two MAACL subscales, all F s < 1). In addition, we conducted post hoc analysis, in which we performed a median split on mood scores and then entered them

into our primary analysis (i.e., an ANOVA on scores on the Plan Evaluation Questionnaire), with rumination status serving as a covariate. This analysis revealed a nonsignificant role for mood, $F(1, 61) = 0.05$, *ns*. Thus, our subsequent analyses were conducted without mood as a factor.

PLAN EVALUATION QUESTIONNAIRE

In support of our primary hypothesis, ruminators scored lower on the plan evaluation composite than did nonruminators ($M_s = 4.43$ vs. 4.63), $F(1, 62) = 4.08$, $p < .05$. That is, ruminators reported requiring more time and being relatively less satisfied, confident, and committed to their plans to revise the housing system than did nonruminators. However, this main effect was qualified by a Rumination Status \times Housing Status interaction, $F(1, 62) = 4.18$, $p < .05$. That is, the difference between ruminators and nonruminators was observed for off-campus students ($M_s = 3.89$ and 4.54 , respectively) but not for on-campus students ($M_s = 4.68$ and 4.65 , respectively). Of interest, women also scored significantly lower than men on the plan evaluation composite ($M_s = 4.42$ vs. 4.66), $F(1, 62) = 4.87$, $p < .05$, although sex of participant did not interact with either rumination or housing status in our results.

VIDEO SEGMENTS

A chi-square test of independence was performed on the judges' ratings of additional time requirements (i.e., whether the participant had mentioned needing more time to formulate the housing plan) as a function of rumination status. Whereas 10 ruminators (28.57%) explicitly mentioned needing more time to formulate a better housing proposal, only 1 nonruminator (1.43%) did so, $\chi^2(1, N = 70) = 8.74$, $p < .01$. Furthermore, a log-linear model including an interaction between rumination status and housing status was significant, $G^2(4) = 48.69$, $p < .0001$, indicating a lack of fit to the observed data. The results of this analysis suggest that this variable did not show a Rumination Status \times Housing Status interaction.

THOUGHT SAMPLE

A single rater coded the thought samples provided during the second half of the study for any explicit mention of the first half, that is, evidence that participants were dwelling on their housing proposal and/or its videotaped presentation. As predicted, ruminators were more likely to mention the housing study in their 8-min free associations than were nonruminators, $\chi^2(1, N = 70) = 9.69$, $p < .01$. Furthermore, the results of a log-linear analysis indicated no interaction between rumination status and housing status, $G^2(4) = 10.19$, $p < .04$.

Discussion

The findings of this study generally supported our predictions. Overall, compared to nonruminators, ruminators reported lower ratings on our "plan evaluation" composite, indicating they were less satisfied, confident, and committed to their plans, and they reported requiring more time to research them. Of importance, however, an interaction between rumination status and housing status indicated that these differences between ruminators and nonruminators were observed only for off-campus students, with on-campus ruminators reporting plan evaluation scores that were indistinguishable from those of on-campus nonruminators. As a group, ruminators also exhibited evidence of prolonged dwelling on their plans, relative to nonruminators.

We suspect that the differences found in the pattern of results between off-campus students and on-campus students may have been a function of our participants' particular housing situation and the domain that we chose to present as a problem to them. In particular, most participants' responses revealed that they found the task self-relevant and compelling (perhaps not surprising given that at the time of the study The University of Michigan faced a chronic housing shortage, with housing generally guaranteed to its more than 25,000 undergraduates for only the first 2 years of their education). However, off-campus students may have found the task of revamping the housing system especially challenging and fraught with uncertainty because they were almost certainly not as likely to have kept abreast of the existing rules and guidelines regarding dormitory selection and habitation (indeed, several participants spontaneously mentioned this fact). This putative heightened uncertainty did not, however, lead off-campus nonruminators to manifest the same lack of commitment and confidence exhibited by ruminators. Of course, any speculation regarding the difference between on- and off-campus participants is necessarily post hoc and thus should be interpreted with caution. The difference does, however, highlight the contextual nature of the predicted effects of rumination, effects that manifest themselves in some domains and not others. We return to the related issue of simple versus complex problem domains in the General Discussion.

The results of this study also suggested that, in general, women were less confident and committed to their proposed plans than were men. Although such a result might accord with earlier findings (e.g., Lenney, Browning, & Mitchell, 1980) that women report lower confidence ratings than men in situations where evaluation standards are ambiguous (although, unlike the present investigation, past studies have often focused on self-confidence), it is equally likely that the observed difference may reflect some idiosyncratic feature of this

study, including the presence of a male experimenter (cf. Sleeper & Nigro, 1987; see also Lenney, 1977). In any event, this finding merited further attention in a second study.

In Study 2, we also attempted to examine participants' responses to a domain that, although imbued with uncertainty, would affect students more uniformly than the housing task of Study 1. We therefore asked students to render an opinion regarding changes to the undergraduate curriculum—something in which we felt most students would likely hold a significant stake. Because this second study was also intended as a replication and extension of Study 1, we employed a similar protocol but added questions regarding participants' willingness to allow their videotape to be viewed by a "Student Life Committee" as well as items probing any dissatisfaction they might have felt about their videotaped presentations. We hypothesized that as further indicators of uncertainty and lack of confidence and consistent with the self-focused nature of rumination (cf. Lyubomirsky & Nolen-Hoeksema, 1995), ruminators would be more reluctant than nonruminators to have their videotapes shown to the committee and would be more dissatisfied with their presentation—both in terms of its content and with regard to their own appearance on the videotape. Finally, we asked judges to engage in more elaborate coding of the videotapes than had been accomplished in the first study.

STUDY 2

Method

PARTICIPANTS

Sixty-nine students (39 from University of California, Riverside, and 30 from Swarthmore College) participated in this study in exchange for course credit. As in Study 1, they were selected on the basis of their scores on the 10-item RRS during a prescreening administered a few weeks prior to the study session. For this study, students with scores of 3.0 and above (on a 4-point scale) were recruited for the ruminator group and students with scores of 2.0 and below were recruited for the nonruminator group—a selection procedure that produced a sample generally comparable in rumination status levels to that used in Study 1 (with the exception that participants with a wider range of "nonruminative" levels took part in this study). Thirty-four ruminators (24 women, 10 men) and 35 nonruminators (20 women, 15 men) participated. Mean RRS scores were 3.29 ($SD = 0.29$) for ruminators and 1.69 ($SD = 0.21$) for nonruminators.

MATERIALS AND PROCEDURE

A female experimenter informed participants that the university was interested in improving the under-

graduate curriculum and, accordingly, the "Student Life Committee" was soliciting students' suggestions regarding the school's course offerings. Participants' comments on a debriefing questionnaire and during oral debriefing indicated that the cover story was successful, that is, no participant guessed the true purpose of the investigation. As in Study 1, after filling out a consent form and learning what would be required of them (by means of the cover story), participants completed a mood measure.

Mood. In this study, participants completed the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988), with 10 adjectives measuring the presence of positive affect and 10 measuring negative affect, on 5-point Likert-type scales (1 = *very slightly or not at all*, 5 = *extremely*). Each set of 10 items was combined to provide a single index of positive affect and negative affect, respectively. Such an approach seemed especially appropriate in light of (a) the high correlations found between depressed and anxious affect in Study 1 and (b) research that has questioned the validity of measures of discrete negative emotions as opposed to those that assess a general negativity factor (Watson & Clark, 1997).

Filler questionnaire and video presentation. After completing the mood measure, participants responded to a series of filler questions about the problems and benefits of the current university curriculum. Next, participants were given the opportunity to formulate a plan to revise the existing curriculum. They did so for approximately 5 min while being videotaped. These video presentations were coded by two independent raters who were blind to the participants' rumination status and the hypotheses of the study. The codings included (a) students' confidence with regard to their plans, (b) personal confidence (for both, 1 = *not at all confident*, 7 = *extremely confident*), (c) overall positivity (1 = *not at all positive*, 7 = *very positive*) and negativity (1 = *not at all negative*, 7 = *very negative*), (d) number of references to needing more time to formulate or research their proposal, and (e) the length of their presentations (recorded in seconds). Intraclass correlation coefficients revealed that interrater reliability was good to excellent, ranging from .85 to .94 ($M = .90$).

Plan Evaluation Questionnaire. As in Study 1, participants then completed the Plan Evaluation Questionnaire, which contained our primary dependent variables. Once again, it assessed satisfaction, confidence, commitment, extra time needed, and certainty with regard to participants' plans. A principal components analysis conducted on responses to the Plan Evaluation Questionnaire revealed that three of the items loaded highly (with coefficients greater than .55) on the first principal component (eigenvalue = 2.13), which accounted for 53% of the variance. Accordingly, a "plan

evaluation" composite was calculated using participants' ratings of satisfaction, confidence, and commitment to their plans (Cronbach's $\alpha = .79$).

Interview and post-interview measures. Next, participants were interviewed by a female confederate (blind to participants' rumination status) posing as a representative of the "Student Life Committee," who asked questions identical to those in Study 1, except that they were phrased in reference to revising the curriculum rather than the housing system. At the conclusion of the interview, participants completed a questionnaire assessing their willingness to make the videotape available for viewing by members of the "Student Life Committee" (1 = *not willing at all*, 7 = *extremely willing*). In addition, they were asked to indicate the extent to which each of the following reasons might make them unwilling to make their videotapes available to the committee: (a) "I would be unhappy with my physical appearance on the videotape" and (b) "I would be unhappy with the sound of my voice on the videotape." Each of these two items was rated on a 7-point Likert-type scale (1 = *not true at all*, 7 = *extremely true*). Finally, participants were asked to list any other reasons (other than those already suggested) as to why they would not want the committee to view their videotape and to rate how satisfied they were with their video presentations overall (1 = *not at all satisfied*, 7 = *extremely satisfied*).

As in Study 1, at this point all participants completed an 8-min thought sample. In addition to coding whether participants mentioned their presentation in their thought samples (1 = *not at all*, 2 = *a little*, 3 = *a lot*), two independent judges, unaware of participants' rumination status and the study's hypotheses, coded the thought samples for overall positivity (1 = *not at all positive*, 7 = *very positive*) and overall negativity (1 = *not at all negative*, 7 = *very negative*). Intraclass correlation coefficients showed that interrater reliability was acceptable, ranging from .75 to .87 ($M = .81$). The entire study lasted approximately 1 hr.

Results and Discussion

Unlike Study 1, no significant differences were found on any of our primary dependent variables with respect to sex of student. In addition, neither sex nor participants' institution (public university vs. liberal arts college) interacted with rumination status in any of our results; therefore, all analyses were conducted by collapsing across these two variables.

MOOD

Ruminators, as compared to nonruminators, reported less positive affect ($M_s = 2.29$ vs. 2.72), $t(64) = 2.80$, $p < .007$, and consistent with the results of Study 1, more negative affect ($M_s = 1.77$ vs. 1.46), $t(56) = 2.44$, $p < .02$, at

the beginning of the study. Again, these findings support those of previous research that has found an association between self-focused rumination and negative or dysphoric mood. As in Study 1, however, for the vast majority of findings to be reported, neither positive nor negative mood served as a significant covariate in the relevant analyses. And once again, a post hoc analysis in which median-split mood scores were used as a factor in our primary analysis (i.e., an assessment of the Plan Evaluation Questionnaire scores) revealed a nonsignificant role for both positive and negative affect (both $F_s < 1$). The 3 (out of 12) results in which either positive or negative mood did act as at least a marginally significant covariate (i.e., $p < .10$) are discussed in further detail below.

PLAN EVALUATION QUESTIONNAIRE

Supporting our hypothesis and replicating the findings of Study 1, ruminators, in contrast to nonruminators, reported lower ratings on our plan evaluation composite ($M_s = 4.09$ vs. 4.73), $t(63) = 2.24$, $p < .05$. That is, ruminators were relatively less satisfied, confident, and committed to their plans to improve the curriculum than were nonruminators.

QUESTIONS ABOUT THE VIDEO PRESENTATION

As expected, ruminators were less satisfied than nonruminators with their video presentations in general ($M_s = 4.06$ vs. 4.69), $t(66) = 2.18$, $p < .05$, and were less willing to make the videotape available to the committee ($M_s = 3.10$ vs. 4.26), $t(66) = 3.07$, $p < .01$. In addition, ruminators were more unhappy than nonruminators with their physical appearance on the videotape ($M_s = 3.65$ vs. 2.06), $t(60) = 3.79$, $p < .001$, and more concerned with the sound of their voice ($M_s = 3.74$ vs. 1.91), $t(56) = 5.00$, $p < .0001$. They also listed relatively more reasons (other than those already suggested) as to why they would not want the committee to view their videotape ($M_s = 1.32$ vs. 0.54), $t(42) = 2.61$, $p < .05$.

THOUGHT SAMPLE

Analysis of the 8-min thought sample completed by participants revealed that ruminators were rated as expressing more negative affect in their free associations than were nonruminators ($M_s = 4.71$ vs. 3.91), $t(57) = 2.28$, $p < .05$. Group differences in expression of positive affect and in whether participants mentioned their proposals proved to be nonsignificant (both $p_s > .10$). This latter finding represents a departure from Study 1, in which ruminators were found to dwell more on their proposals than were nonruminators. Whether this discrepancy reflects the fact that Study 2 relied on a different (and presumably more valid) coding procedure (i.e., making use of two raters rather than a single coder) or some other factor, it is important to point out that past

investigations have found obsessive dwelling not to be a necessary component of rumination (Morrow & Nolen-Hoeksema, 1990).

VIDEOTAPE RATINGS

Relative to nonruminators, ruminators were rated as expressing less overall confidence in their plan on the videotape ($M_s = 4.38$ vs. 5.27), $t(61) = 2.24$, $p < .05$, and less personal confidence ($M_s = 4.15$ vs. 5.09), $t(63) = 2.37$, $p < .05$. However, there were no significant group differences in ratings of overall expressed positivity or negativity. As in Study 1, ruminators also made relatively more allusions to needing more time ($M_s = 1.50$ vs. 1.21), $t(57) = 2.32$, $p < .05$. Finally, ruminators tended to take less time than nonruminators during both the video presentation of their plan ($M_s = 1.45$ min vs. 2.85 min), $t(45) = 3.49$, $p < .001$, and during the "interview" by the confederate ($M_s = 2.98$ min vs. 4.60 min), $t(64) = 2.98$, $p < .01$.

ROLE OF MOOD

As mentioned above, ruminators and nonruminators differed in initial positive and negative affect, and mood acted as a significant (or near significant) covariate in analyses of three of the statistically significant findings previously reported, all of which involved ratings provided by independent judges. These included judges' ratings of (a) negative affect found in participants' thought samples (for which positive affect acted as a significant covariate), $F(1, 65) = 5.17$, $p < .05$; (b) level of participants' overall confidence in their plan as expressed on videotape (for which positive affect again acted as a significant covariate), $F(1, 62) = 6.06$, $p < .05$; and (c) participants' level of personal confidence as expressed on videotape (for which positive affect acted as a significant covariate, $F[1, 64] = 11.94$, $p < .01$, and negative affect, as a marginally significant covariate, $F[1, 64] = 3.45$, $p < .07$). For each of these three measures, the introduction of positive affect as a covariate reduced the significance of the difference between ruminators and nonruminators to nonconventional levels (i.e., $p > .10$), whereas the introduction of negative affect into an analysis of participants' rated personal confidence reduced the significance of that finding from $p < .02$ to $p < .09$. Accordingly, it seems appropriate to conclude that mood (especially positive mood) played some role in influencing our judges' ratings of the difference between ruminators and nonruminators. Of importance, however, for all of our self-report measures, including our primary dependent variable (i.e., the plan evaluation composite), as well as our "objective" external ratings (e.g., participants' allusions to needing more time to devise a plan), a difference in initial affect did not appear to play a significant role in the results reported. In short, as in Study 1, rumi-

nation was associated with the predicted effects on confidence and certainty; mood was not.

SUMMARY

The findings of this study generally supported our predictions and replicated the results of Study 1. That is, on a composite measure, ruminators were less satisfied, less confident, and less committed than nonruminators to their plans for the revision of the university curriculum. In addition, we found that ruminators were less willing to allow the relevant committee to view their videotaped presentations and were relatively more dissatisfied with them, especially in terms of their own physical appearance and the sound of their voice. This latter finding may reflect the self-focused nature of rumination (Lyubomirsky & Ross, 1999; Morrow & Nolen-Hoeksema, 1990), which is likely to increase self-consciousness, resulting in more dissatisfaction with one's personal attributes. Of interest, although ruminators were more likely to mention needing additional time to prepare their plan during the videotaped presentation, they did not spend as much time as nonruminators presenting their solutions. Their brevity of presentation in this study may well indicate the lack of satisfaction and confidence they felt with regard to their own plan—a plan they evidently believed required more preparation and deliberation before they were ready to commit to it.

Finally, we found that ruminators consistently exhibited lower overall confidence during the videotaped presentations of their plans and more negative thoughts immediately after those presentations. These results are not surprising given previous research indicating that rumination negatively biases one's thoughts and self-evaluations (Lyubomirsky et al., 1998, 1999; Lyubomirsky & Nolen-Hoeksema, 1995; Nolen-Hoeksema & Morrow, 1993b). And while these particular findings may be a function of ruminators' tendency to experience more negative (and/or less positive) mood, it is worth reemphasizing that mood did not statistically account for the difference between ruminators and nonruminators in the vast majority of our findings.

That is not to say that mood did not play a role in the processes investigated in these studies. The situations we created for participants were fraught with uncertainty and performance pressures, which could be expected to induce mild distress in many participants. Based on previous studies of rumination, we speculate that the response of ruminators to this mild distress is very different from that of nonruminators. Ruminators focus on this distress, think about it, and let it affect their thinking about the task at hand, leading both to enhanced negative affect and increasing uncertainty. Nonruminators do not appear to focus on the putative mild distress induced by the situation; they attend to the task at hand

and engage in problem solving. Thus, whereas the level of distress induced by the situation may have remained mild for nonruminators, ruminators' tendency to focus on this distress is likely to have amplified it and enhanced its subsequent effects on their thinking. This is precisely the pattern revealed in previous studies of induced rumination (Lyubomirsky et al., 1998, 1999, in press; Lyubomirsky & Nolen-Hoeksema, 1995; Nolen-Hoeksema & Morrow, 1993a).

GENERAL DISCUSSION

Previous research has suggested that rumination is associated with negatively biased thinking, poorer problem solving, and increased negative mood (Lyubomirsky et al., 1998, 1999, in press; Lyubomirsky & Nolen-Hoeksema, 1995), yet ruminators keep on ruminating; indeed, rumination appears to be a highly stable individual difference variable (Nolen-Hoeksema et al., 1993, 1999; Nolen-Hoeksema & Davis, 1999). The current research was designed to examine one of the possible contributors to ruminators' persistent rumination. In the two studies reported here, participants identified as ruminators and nonruminators on the basis of their scores on the Ruminative Responses Scale were asked to generate plans in response to two types of community and personal problems, that is, to revise a university's housing system (Study 1) and to improve the undergraduate curriculum (Study 2). Our findings showed that ruminators were generally less satisfied, less confident, and less committed to the plans they devised than were nonruminators. Ruminators also appeared to require more time before feeling comfortable with their solutions than did nonruminators. Finally, ruminators were relatively more likely to show evidence of dwelling on their plans at the end of the study session (Study 1) as well as dissatisfaction, negative thoughts, and lack of confidence regarding the presentation of their plans (Study 2).

These two studies, together with previous investigations in related domains (e.g., Davey, 1994; Lyubomirsky et al., 1999; Tallis, Eysenck, & Mathews, 1991; Wicklund & Ickes, 1972), suggest that rumination is disruptive to the initiation of instrumental behaviors such as the implementation of potential solutions to problems. The intervening processes that inhibit and interfere with the capacity of individuals to perform such instrumental behaviors appear to include reduced confidence and satisfaction with problem solutions (or "plans"), reduced willingness to commit to these solutions, negative thoughts about them, and a greater need for more time and information before committing to them. These processes appear to represent a substantial barrier to the successful implementation of self-generated solutions and a significant reason for continued rumination.

Rumination and Problem Solving

It is worth noting an apparent discrepancy between previous research on problem solving and the current studies. A recent investigation found that students induced to ruminate in response to a negative mood were not any less confident about solutions they generated to their own problems than other groups (Lyubomirsky et al., 1999). Of course, the studies reported here did not make use of a rumination induction but rather relied on the selection of individuals with a prior history of rumination. That history may have included a number of instances in which the poor solutions generated by ruminators led to further stress, which may then contribute to a general uncertainty. Our method of selecting "natural" ruminators allowed us to tap into that history, whereas inducing rumination in the laboratory would not necessarily do so.

We suspect, however, that the present results may have differed from those of Lyubomirsky et al. for a number of additional reasons. First, the problems generated by participants in the prior investigation were not as complex as those presented in the current studies. In the study by Lyubomirsky and colleagues, participants were asked to list their own personal problems that they were currently experiencing. The most common problems cited were academic (i.e., "not doing well in Chemistry") and financial (i.e., "I spend too much money on entertainment")—both problems with easily generated solutions (i.e., "study harder" and "spend less"). In our studies, by contrast, participants were presented with the particularly complex tasks of revising the university housing policy and the undergraduate curriculum. These problems required numerous steps to address or resolve the relevant issues.

Second, the problems used in the prior study only affected the individual participant, whereas in the current studies, the solutions generated by the participants would affect countless others (many of whom could be considered potential evaluators with at least as much expertise in the relevant domain as the participants themselves). This possibility may have made the problems more daunting to our ruminating participants and, thus, reduced their confidence in their attempts to solve them. In a recent study, Nolen-Hoeksema and Jackson (2001) found that ruminators are more likely than nonruminators to suffer from "unmitigated communion" (Helgeson, 1994), that is, the tendency to worry excessively about the well-being of another to the detriment of their own well-being.

Third, because the problems addressed in the prior study were self-generated, the participants were likely to have listed personal problems that they had dealt with in the past and had already solved. Thus, they may not have had to think of "new" solutions and perhaps even had a

sense of which solutions had been effective for them on prior occasions (cf. Rusting & Nolen-Hoeksema, 1998).

Limitations and Future Questions

It is important to note that the correlational nature of our studies does not allow us to infer causality. We have suggested that a tendency to ruminate leads to a composite feeling characterized by diminished satisfaction, confidence, and commitment to self-generated solutions to problems, and this conclusion is consistent with at least one published study in which rumination served as a *manipulated* variable (Lyubomirsky & Nolen-Hoeksema, 1993). However, an alternative explanation is that uncertainty may induce one to engage in rumination. Indeed, it is possible that this relationship is bidirectional and that the process is even a cyclical or self-perpetuating one. As we have suggested, a situation that includes many uncertain elements may be especially aversive for chronic ruminators, who then engage in rumination, resulting in further uncertainty and lack of commitment to decisive action, heightening the uncertainty inherent in the relevant domain. In short, future experimental research needs to be conducted before causal inferences can be made.

The correlational nature of these studies also affects our ability to rule out other explanations for our findings, such as the possibility, suggested by some of the findings in Study 2, that our results were due to negative affect rather than rumination. However, covariance and post hoc median-split analyses indicated that the majority of our findings of differences between the judgments of ruminators and nonruminators could not be accounted for by differences in the two groups' levels of negative (or, for that matter, positive) affect.

Because ruminative style was measured using a self-report scale, namely, the RRS, we must be vigilant of inherent difficulties with this method. For example, participants were selected based on relatively extreme scores on the relevant measure, resulting in (at the very least) loss of statistical power due to the size of the resulting samples. In addition, participants may have been biased in their responses to the RRS or simply have been unaware of their cognitive and affective responses to negative moods and therefore unable to report them accurately. However, we believe that the participants themselves are our best resource for information about their own emotions and thoughts. It is also worth noting that any weakness or unreliability in our measure of rumination would presumably serve to increase error variance and thus would tend to obscure differences that might be seen more clearly with a more discriminating scale. In a sense, the finding of differences between groups designated in a relatively noisy fashion may be

testament to the magnitude and robustness of the relevant effects.

Finally, we hope that future research will enhance our understanding of the reasons why ruminators are so hesitant to take action. For example, it is possible that they are afraid of making the "wrong" decision partly because they realize that, as ruminators, if they act in a less than optimal fashion, they will be very critical of themselves (cf. Schwartz et al., 2002). It should be acknowledged, of course, that in the studies reported here, participants were not required to actually implement the solutions they proposed. However, they were asked to commit to them under conditions involving accountability before "official" bodies, and behavioral coding that revealed ruminators' desire for more time to formulate an effective plan of action supported our hypotheses. Nevertheless, further research will help determine whether, as we suspect, ruminators' reluctance to endorse particular solutions translates into actual behavioral impairment as well.

NOTES

1. Ruminators and nonruminators did not differ significantly in reported rates of hostility, $t < 1$, the third subscale of the MAACL. In addition, although trait depression levels were not assessed (in part so as to avoid revealing to participants the mood focus of our investigation), high correlations have been reported between the depressed mood subscale of the MAACL and the Beck Depression Inventory (Bloom & Brady, 1968).

2. The varying degrees of freedom associated with t tests conducted in this study and in Study 2 generally reflect the fact that we relied on Welch's (1938) solution, which adjusts for differences in variance between two samples of unequal size. In a small number of cases, they also reflect the fact that one or a few participants failed to complete the relevant measure.

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