Explaining the Gender Difference in Depressive Symptoms

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It was hypothesized that women are more vulnerable to depressive symptoms than men because they are more likely to experience chronic negative circumstances (or strain), to have a low sense of mastery, and to engage in ruminative coping. The hypotheses were tested in a 2-wave study of approximately 1,100 community-based adults who were 25 to 75 years old. Chronic strain, low mastery, and rumination were each more common in women than in men and mediated the gender difference in depressive symptoms. Rumination amplified the effects of mastery and, to some extent, chronic strain on depressive symptoms. In addition, chronic strain and rumination had reciprocal effects on each other over time, and low mastery also contributed to more rumination. Finally, depressive symptoms contributed to more rumination and less mastery over time.

Women experience depression more often than men, whether depression is indexed by levels of depressive symptoms or by diagnosed unipolar depressive disorders (Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Nolen-Hoeksema, 1990, 1995; Weissman & Klerman, 1977). This gender difference in depressive symptoms appears to emerge in early adolescence and then remains throughout the adult life span (Kessler et al., 1993; Nolen-Hoeksema & Girgus, 1994).

Although the existence of a gender difference in depressive symptoms is well established, the reasons for this gender difference are not clear (McGrath, Keita, Strickland, & Russo, 1990; Nolen-Hoeksema, 1987, 1990, 1995). A variety of social and personality explanations for women's greater vulnerability to depressive symptoms have been offered. The relationships among the social and personality factors leading to more depression in women have not been explored. Instead, most of these factors have been tested separately, with the other factors being ignored. In the study reported here, we examined how social conditions and personality characteristics affect each other and contribute to the gender difference in depressive symptoms.

Role of Environment in the Gender Difference in Depressive Symptoms

Behavioral and feminist theories of women's greater vulnerability to depressive symptoms compared with that of men gener-

ally attribute this vulnerability to the negative consequences of women's lower social status and power (Bandura, 1986; Miller, 1976; Radloff, 1975; Seligman, 1975). Because of this lower status and power, women experience more negative events and have less control over important areas of their lives than men. A host of specific negative life events or circumstances have been proposed to play a role in the greater vulnerability to depression of women than of men (for reviews, see McGrath et al., 1990, and Nolen-Hoeksema, 1990). Some of the most frequently cited include work overload and unequal power and status in heterosexual relationships.

Although women may make less money than men, they appear to work more hours per week than men when all the roles that they perform are considered. Women often work full time in the paid workforce and do nearly all the child care and domestic work of the home (Barnett, Brennan, & Marshall, 1994; Crosby, 1982). In addition, women are increasingly "sandwiched" between caring for young children and caring for sick and older family members. This work overload is proposed to contribute to a sense of burnout and general distress, including depressive symptoms, in women (Gove & Tudor, 1973; Hobfoll, 1991; McIntosh, Keywell, Reifman, & Ellsworth, 1994).

Another chronic strain for women may be that they do not feel valued for who they are or for their roles in their partnerships and families (Jack, 1991; Miller, 1976). They may "silence" their opinions and desires in favor of keeping a positive emotional tone in their relationships (Helgeson, 1994; Jack, 1991). When they do try to voice their opinions and desires, they may feel unappreciated or unheard.

How would these negative circumstances lead to depression in women? Behavioral and cognitive theories of depression have suggested that a chronic lack of control over their environment leads people to develop a generalized expectation that they cannot control events; this situation then leads to the symptoms of depression—lowered motivation, passivity, self-esteem loss, and the

inability to see opportunities to control the environment (Bandura, 1977; Lewinsohn, Hoberman, Teri, & Hautzinger, 1985; Seligman, 1975). The generalized expectation of no control has been labeled learned helplessness (Seligman, 1975), low self-efficacy (Bandura, 1977), and low mastery (Dweck, 1975; Pearlin & Schooler, 1978).

In keeping with feminist theories, Nolen-Hoeksema (1987, 1991) has argued that women's lack of social power also contributes to their tendency to engage in rumination more than men when distressed. Rumination involves passively and repetitively focusing on one's symptoms of distress ("I'm so tired," "I'm so unmotivated") and on the meanings and consequences of the distress ("What's wrong with my life" "My boss is going to get annoyed if I keep missing deadlines"). Both questionnaire studies and laboratory studies have found that women are more likely than men to ruminate and focus on emotion when sad or depressed (cf. Butler & Nolen-Hoeksema, 1994, Nolen-Hoeksema, Morrow, & Fredrickson, 1993, and Nolen-Hoeksema, Parker, & Larson, 1994). Women may ruminate more because they are searching for ways in which they can control their environment and their distress but do not feel efficacious about exerting that control and thus remain stuck in rumination. In turn, a number of laboratory and field studies have shown that people who engage in rumination when distressed show longer and more severe periods of depressive symptoms and are more likely to develop full depressive disorders than those who do not engage in rumination (Alloy & Abramson, 1997; Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 1993; Nolen-Hoeksema et al., 1994).

In sum, several theories suggest that the greater experience of negative life events of women than of men may lead both to low mastery and to rumination; these, in turn, contribute to more depression in women than in men.

Effects of Mastery and Rumination on Stressful Experiences

Just as the environment can shape personality, personality factors can influence individuals' environments (Caspi, in press; Magnusson, 1990; Sameroff, 1983). Thus, less mastery and more rumination may contribute to more stressful experiences in women's lives. Because women do not believe that they have control over their lives, they may not exert the control that they do have, leading to more negative life events (Bandura, 1986; Seligman, 1975). For example, they may not seek better jobs or remove themselves from inequitable and stressful partnerships.

Rumination may also contribute to more stress over time. Previous research has shown that rumination can interfere with problem solving (cf. Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998, and Lyubomirsky & Nolen-Hoeksema, 1995). Thus, women's greater tendency to ruminate compared with that of men may impede women from solving their current problems and cause them to accumulate new problems. Rumination also contributes to increasingly negative thinking and thus may be a cause of low mastery (Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1995; Pyszczynski & Greenberg, 1987).

Models of the Gender Difference in Depressive Symptoms

We suggest the following feedback effects model of the greater vulnerability to depressive symptoms of women than of men on the basis of an integration of the theories just discussed. According to this model, women experience more chronic strain than men, have a lower sense of mastery than men, and are more prone to rumination than men. Each of these factors contributes additively to women's greater vulnerability to depressive symptoms. However, chronic strain, low mastery, and rumination contribute to each other as well, keeping women bound in a cycle of low control over their environments and frequent experiences of depressive symptoms.

We tested this feedback effects model in a two-wave longitudinal investigation of approximately 1,100 community-based adults ranging in age from 25 to 75 years and who were interviewed once and then again 1 year after the first interview. The two-wave panel design allowed us to examine the effects of chronic strain, low mastery, and rumination on each other and on depression over time.

We compared this model to a series of alternative models. The first, and most parsimonious, alternative model predicted that rumination, mastery, strain, and depressive symptoms would each be related to gender but would not predict each other over time. We call this model the gender effects-only model.

The second alternative model, the depression effects model, predicted that people with more depressive symptoms would show more rumination and strain and lower mastery over time, because depression impairs people's functioning in many domains and enhances negative thinking. We still predicted, however, that the relationships among rumination, mastery, and strain over time predicted for the feedback effects model would remain significant even after the effects of depressive symptoms on these variables were accounted for. If rumination, mastery, and strain continued to predict each other over time in the depression effects model, then any effects seen in the feedback effects model likely would not be attributable simply to a common association of rumination, mastery, and strain with depression.

The third alternative model was the interaction effects model, which predicted that the interaction between rumination and chronic strain or between rumination and mastery, would predict a significant variance in depressive symptoms over and above the individual variables. This model is essentially a diathesis stress model like those popular in the literature on psychopathology, stress, and coping (e.g., Abramson, Metalsky, & Alloy, 1989). Although this model is consistent with previous theorizing about the synergistic effects of rumination and stress and of rumination and low mastery (i.e., Nolen-Hoeksema, 1991), it is different from the feedback effects model described above. The feedback effects model focuses on the dynamic relationships among chronic strain, low mastery, and rumination that maintain and enhance each of these factors over time.

Method

Participants

The participants were adults who 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 phone numbers in these communities were chosen randomly and then called. The person answering the phone was asked if anyone living in the household was between 25 and 35, 45 and 55, or 65 and 75 years old. 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 that they were not interested in participating, 3.3% said that they did not have time to participate, and 3.7% said that they would participate but then did not return repeated phone calls to schedule a first interview, resulting in a sample of 1,317 people for the first interview. Of these, 1,132 people participated in a second interview 1 year later. Significant differences were found between those who did and those who did not participate in both interviews on both self-reported and interviewer-rated depressive symptoms, with the people dropping out of the study scoring higher on both depression measures at the first interview than the people participating in the second interview ($ps < .05$). The analyses reported in this paper were done with only those people who participated in both interviews.

A total of 395 participants were 25 to 35 years old (212 of these were women), 473 were 45 to 55 years old (247 of these were women), and 264 were 65 to 75 years old (145 of these were women). The ethnic distribution of the sample was as follows: 72% European American, 7% African American, 6% Asian American, 9% Hispanic or Chicano, and 6% mixed or other ethnicity. Eighteen percent of the participants were single, 54% were married or cohabiting, 3% were in a committed relationship but not cohabiting, 16% were separated or divorced, and 9% were widowed.

Nineteen percent of the participants had a high school degree or less education, 27% had some college education, 26% had a college degree, 8% had some postgraduate education, and 20% had a graduate or professional degree. The median income of the sample was $40,000 to $50,000. There were no significant gender differences in age or ethnic distribution. Women had less education than men, $t(1130) = 4.14$, $p < .001$, and lower incomes, $t(1104) = 5.39$, $p < .001$.

Procedures

All participants were interviewed in person, usually at the participant's home, by an extensively trained 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 interviewer 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 a participant to use a Likert-type scale or to choose from among a group of possible answers, the interviewer 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

Depressive symptoms. Participants completed the 13-item form of the Beck Depression Inventory (BDI) (Beck, Ward, Mendelsohn, Mock, & Erbaugh, 1961) 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 alpha coefficient 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 the first interview (Time 1) and from 0 to 26 at the second interview (Time 2).

Interviewers completed the 17-item Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1960) regarding the participants 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. 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 alpha coefficient 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 correlations between HRSD scores and BDI scores were .61 at the first interview and .67 at the second interview. Because the HRSD and the BDI were correlated so highly and showed the same pattern of results when they were used separately in the analyses reported below, we created one composite measure of depressive symptoms by standardizing scores on each variable and then averaging these standardized scores separately for each wave. We refer to these composite measures as Time 1 depressive symptoms and Time 2 depressive symptoms. Scores on this composite measure ranged from −1.15 to 6.85 at Time 1 and from −1.04 to 4.93 at Time 2.

Chronic strain. Five sources of chronic strain were assessed: lack of affirmation in close relationships, role burden, housework inequities, childcare inequities, and other parenting strains. To assess participants' sense of affirmation in their close relationships, we asked those in marriages or partnerships to complete the Affirmation Scale (Vanfossen, 1981), which includes three items that tap the degree to which respondents feel affirmed by their partners (e.g., "My partner is someone who appreciates me just as I am"). The items were scored so that higher scores meant less partner affirmation. The alpha coefficient for this scale at the first interview was .76, and the test–retest reliability across the two interviews was .66.

Overall role burdens and overload were assessed by asking all respondents how many hours per week they spend in each of four domains: employed labor, housework (cleaning, cooking, and shopping), child care (directly caring for a child and transporting a child), and caring for an older or ill family member, on a scale of 0 for 0 hr, 1 for 0 to 5 hr, 2 for 5 to 10 hr, and so on, to 9 for 40 hr or more per week (Crosby, 1982). We summed the participant's scores across each of these domains to obtain a total hours of work score. The test–retest correlation between scores on this measure was .74. (An alpha coefficient was not calculated because there is no reason to expect that answers about the four domains of work would be internally consistent.)

Participants who were married or cohabiting completed a subscale of the Who Does What? Scale (Cowan & Cowan, 1988) that assesses the couple's division of household tasks, including laundry, cooking, care of the yard, and car maintenance. Respondents rated each item from 1 to 9, for "how it is now," with 1 indicating that the respondent does it all, 9 indicating that the respondent's partner does it all, and 5 indicating that the partners share the task about equally. Scores were transformed so that higher numbers meant that the respondent was doing more work; then, a simple average of the scores in each area was computed to index housework equity. The alpha coefficient for this scale at the first interview was .90, and the test–retest correlation across the two interviews was .73.

Participants who had children living in their homes at least part time completed a subscale of the Who Does What? Scale (Cowan & Cowan, 1988) that assesses child-care tasks, including feeding, dressing, and arranging for child care. Respondents rated each item from 1 to 9, for "how it is now," with 1 indicating that the respondent does it all, 9 indicating that the respondent's partner does it all, and 5 indicating that the partners share the task about equally. Scores were transformed so that higher numbers meant that the respondent was doing more work; then, a simple average of the scores in each area was computed to index child-care equity. The alpha coefficient at the first interview was .97, and the test–retest correlation across the two interviews was .80.

Participants with children also completed the Parenting Strain Questionnaire (developed for this study), which asks respondents to indicate how much strain they experience as a result of 26 aspects of parenting, such as lack of sleep, children having social or medical problems, children being moody or fussy, or disagreements with partners or ex-partners about child rearing, on a scale from 1 (*no strain*) to 10 (*a lot of strain*). We averaged participants' scores across the 26 items to create a total parenting strain

Table 1
Means and Standard Deviations of All Variables for Men and Women

Variable	Time	Women		Men		F for gender difference
		M	SD	M	SD	
Depressive symptoms	1	0.07	1.02	−0.10	0.99	9.80**
	2	0.08	1.00	−0.08	0.98	
Mastery	1	20.82	3.38	21.73	3.58	−18.95**
	2	21.17	3.32	21.89	3.48	
Rumination	1	42.01	10.64	39.64	10.03	20.37**
	2	40.02	10.66	37.38	9.50	
Chronic strain	1	0.07	0.63	−0.17	0.43	53.21**
	2	0.08	0.63	−0.16	0.54	

** $p < .01$.

measure. The alpha coefficient at the first interview was .87, and the test–retest correlation across the two interviews was .57.

Participants' scores on the affirmation, total hours of work, housework equity, child-care equity, and parenting strain measures were each standardized and then averaged within each interview to derive composite measures of chronic strain for Time 1 and Time 2. We averaged scores on these measures so that the composite scores would be more interpretable, but a summed version of these standardized scores yielded the same pattern of results as those reported below. The test–retest correlation for the composite chronic strain variable across the two interviews was .78.[1] Scores on the composite chronic strain variable ranged from −2.05 to 1.95 at Time 1 and from −2.12 to 1.77 at Time 2.

Mastery. The Perceived Mastery Scale (Pearlin & Schooler, 1978) was used to index the sense of mastery versus helplessness that respondents felt about their lives. This measure has seven items, such as "I can do just about anything I really set my mind to" and "I often feel helpless in dealing with the problems of life," which respondents rate on a scale from 1 (*strongly agree*) to 4 (*strongly disagree*). Scores were transformed so that higher numbers indicated more perceived mastery. This scale had an alpha coefficient at the first interview of .78 and a test–retest correlation across the two interviews of .66. Scores on this scale ranged from 7 to 28 at Time 1 and from 7 to 28 at Time 2.

Ruminative coping. The Response Styles Questionnaire (see 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 Response Styles Questionnaire includes 22 items describing responses to depressed mood 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 the 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 alpha coefficient 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 have reported acceptable convergent and predictive validity for the Ruminative Responses Scale (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema & Morrow, 1991).

Results

Participants' mean scores and standard deviations at both interviews on each of the measures are presented in Table 1. Table 1 also shows the results of analyses for gender differences on each of the measures. Specifically, we submitted participants' scores on each measure administered at Time 1 and Time 2 to a repeated measures analysis of variance with gender as the between-subjects predictor variable. Table 1 shows the F ratio for the main effect of gender in each analysis. Significant gender differences were found on all measures, with women scoring higher on depressive symptoms, chronic strain,[2] and rumination and lower on mastery.

Table 2 shows the concurrent correlations among all of the measures (the correlations along the diagonal are the test–retest correlations for the same measure from Time 1 to Time 2). At both Time 1 and Time 2, higher levels of depressive symptoms were correlated with more chronic strain, more rumination, and less mastery. In addition, more chronic strain was related to more rumination and less mastery at Time 1 and Time 2. Rumination and mastery were significantly correlated at both Time 1 and Time 2.

Testing the Models

Structural equation modeling (Arbuckle, 1997) was used to test the above-described models of the relationships over time among gender, rumination, chronic strain, mastery, and depressive symptoms. The first model tested was the gender effects-only model, which predicted that gender would be related to each of the variables of interest but that these variables would have no effect on each other (Figure 1). A series of path models was constructed from the covariance matrix of study variables. In Figure 1, standardized coefficients are given for each path. This model fit the

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[1] Individual measures of the same domain (e.g., quality of relationship with one's partner or parenting demands) were significantly correlated with one another. A table of intercorrelations between the individual measures is available from Susan Nolen-Hoeksema.

[2] Women also had significantly less favorable scores than men on all the individual scales making up the composite chronic strain variables.

Table 2

Cross-Sectional Correlations Among All Variables

Variable	Depressive symptoms	Rumination	Mastery	Chronic strain
Depressive symptoms	(.59**)	.47**	−.45**	.12**
Rumination	.52**	(.67**)	−.23**	.20**
Mastery	−.46**	−.28**	(.66**)	−.10**
Chronic strain	.12**	.19**	−.07*	(.78**)

Note. Correlations along the diagonal (values in parentheses) are test–retest correlations for the same measure from Time 1 to Time 2. Correlations above the diagonal are from Time 1 scores. Correlations below the diagonal are from Time 2 scores.

$* p < .05.$ $** p < .01.$

data poorly: goodness-of-fit $\chi^2(24, N = 1090) = 910.53, p < .001$, goodness-of-fit index (GFI) = .843, Tucker–Lewis Index (TLI) = .641, comparative fit index (CFI) = .761, root-mean-square error of approximation (RMSEA) = .184.

Note, however, that gender was a significant predictor of Time 1 scores on all variables and a significant predictor of Time 2 scores on all variables except mastery, even after controlling for Time 1 scores on the same variable. In other words, female gender was significantly associated with more depression, rumination, and chronic strain and with less mastery at Time 1 and with more depression, rumination, and chronic strain at Time 2, after controlling for Time 1 scores on these variables.

The second model tested was the feedback effects model (Figure 2). This model has three components. First, it predicts that gender is related to rumination, mastery, and strain but will not be related to depression after controlling for rumination, mastery, and strain. In other words, rumination, mastery, and strain mediate the relationship between gender and depression. Second, this model predicts that rumination, mastery, and strain will contribute to more depressive symptoms. Third, this model predicts that rumination, mastery, and strain will contribute to each other over time.[3] This model provided a very good fit to the data: goodness-of-fit $\chi^2(11, N = 1090) = 52.91, p < .001$, GFI = .989, TLI = .963, CFI = .989, RMSEA = .059.

The path coefficients shown in Figure 2 indicated that gender was related to rumination, mastery, and strain, as it was in the previous model. Because we did not theorize a direct effect of gender on depressive symptoms once rumination, mastery, and strain were controlled for, we did not include a path from gender to depressive symptoms in the model. To more fully test whether rumination, mastery, and strain mediated the relationship between gender and depressive symptoms, we used an additional model in which a direct path from gender to depressive symptoms was allowed. Adding this path did not improve the fit of the overall model: goodness-of-fit $\chi^2(10, N = 1090) = 52.68, p < .001$, GFI = .989, TLI = .959, CFI = .988, RMSEA = .063. In addition, the coefficient for the path was not significant, standardized $\beta = -.01, t(1085) = -0.46, p = ns$. Thus, rumination, strain, and mastery did fully mediate the relationship between gender and depressive symptoms.[4]

In accord with our predictions for the feedback effects model, rumination and low mastery contributed to more depressive symptoms at both Time 1 and Time 2 (Figure 2).[5] Strain did not have

a direct effect on depressive symptoms but appeared to have an indirect effect through higher levels of rumination over time. That is, high strain at Time 1 was associated with more rumination at Time 2, after controlling for rumination at Time 1. In turn, rumination at Time 2 predicted depressive symptoms at Time 2. Mastery appeared to have both a direct effect on depressive symptoms and an indirect effect through higher levels of rumination. Rumination was associated with higher levels of strain at Time 2, after controlling for strain at Time 1. Time 2 mastery was predicted only by Time 1 mastery.

The third model tested, the depression effects model, predicted that depressive symptoms at Time 1 would be associated with higher levels of rumination and strain and lower levels of mastery at Time 2, over and above the effects of the Time 1 variables already in the model. Figure 3 shows the key results of the structural equation modeling used to test these predictions. To simplify Figure 3, we have shown only those coefficients on paths that are new to the model (and are not in Figure 2) or that have changed from those shown in Figure 2 as a result of adding the new paths to the model. The model shown in Figure 3 fits the data very well: goodness-of-fit $\chi^2(8, N = 1090) = 12.54, p = .13$, GFI = .997, TLI = .994, CFI = .999, RMSEA = .023. Depressive symptoms at Time 1 did predict Time 2 rumination and mastery, after controlling for Time 1 measures of these variables. Depressive symptoms at Time 1 did not predict Time 2 strain. Some of the path coefficients predicting Time 2 rumination, strain, or mastery and shown in Figure 2 became smaller in Figure 3, but the only path that was significant in Figure 2 but became nonsignificant in Figure 3 was the path from mastery at Time 1 to rumination at Time 2. When depressive symptoms at Time 1 were added to the model, mastery no longer was a significant predictor of Time 2 rumination. Even after depressive symptoms at Time 1 were added to the model, however, strain and rumination predicted scores for each other at Time 2.

The final model tested was the interaction effects model, which predicted that the cross products of rumination and strain and of rumination and mastery would predict significant variance in de-

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[3] Rumination, mastery, and strain were expected to have cross-sectional reciprocal effects on each other as well as to contribute to each other over time. Adding reciprocal relationships among cross-sectional measures of these variables would have created problems with the identification of the models, however. Instead, in the models represented in Figures 2, 3, and 4, we allowed for correlated errors between measures of rumination, mastery, and strain, separately within Time 1 and within Time 2, to represent the cross-sectional relationships among these variables (see Finkel, 1995). In addition, in the interaction effects model (Figure 4), we allowed for correlated errors between the interaction terms and the main effects terms, separately within Time 1 and within Time 2.

[4] Similarly, gender was no longer a significant predictor of Time 2 depressive symptoms, after controlling for either Time 1 or Time 2 measures of rumination, strain, and mastery.

[5] The reader may wonder whether Time 1 measures of rumination, strain, and mastery predict changes in depressive symptoms from Time 1 to Time 2. A separate analysis showed that Time 1 rumination and mastery predicted Time 2 depressive symptoms, after controlling for Time 1 depressive symptoms and chronic strain. Time 1 chronic strain did not predict Time 2 depressive symptoms in this equation, however. Thus, the pattern of results is identical to those presented in Figure 2.
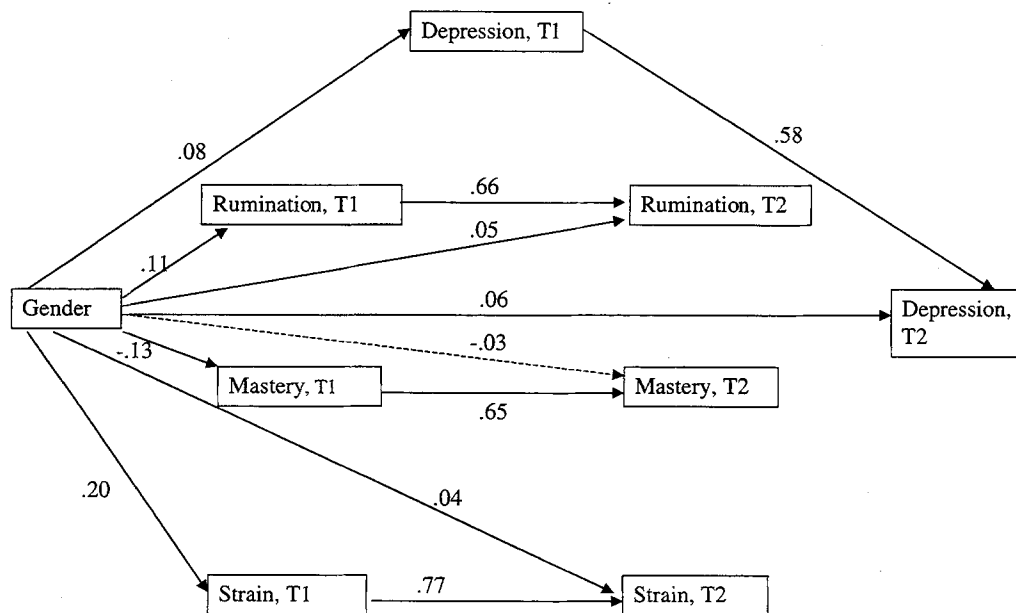
Figure 1. Gender effects-only model. All paths shown are significant at $p < .05$, except for that drawn with a broken line. T1 = Time 1; T2 = Time 2.

pressive symptoms, over and above the variance predicted by rumination, strain, or mastery alone (Figure 4). To test this model, we first centered scores on rumination, strain, and mastery separately at Time 1 and Time 2 and then created the cross products of rumination and strain and of rumination and mastery separately at Time 1 and Time 2. We then added these terms to the model represented in Figure 3, allowing paths from gender to the cross product of rumination and mastery at Time 1 and to the cross product of rumination and strain at Time 1.[6] We also allowed paths from these two cross product terms at Time 1 to depressive symptoms at Time 1 and to the cross products of rumination and strain and of rumination and mastery at Time 2 (to represent stability over time on this interaction variable). Finally, we allowed paths from the cross products of rumination and mastery and of rumination and strain at Time 2 to depressive symptoms at Time 2. This model fit the data well, although not as well as the depression effects model: goodness-of-fit $\chi^2(28, N = 1090) = 45.03$, $p = .02$, GFI = .994, TLI = .989, CFI = .996, RMSEA = .024. Figure 4 shows only the standardized coefficients for the paths that were added to this model. We do not show the coefficients for the paths for the variables making up the cross product terms because these coefficients can no longer be interpreted now that the cross products are in the equations.

Time 1 scores for the cross product of rumination and mastery predicted significant variance in Time 1 depressive symptoms, standardized $\beta = -.14$, $t(1084) = 5.66$, $p < .001$, but Time 1 scores for the cross product of rumination and strain did not predict significant variance in Time 1 depressive symptoms, standardized $\beta = .02$, $t(1084) = 0.89$, $p = ns$. To clarify the nature of the interaction between rumination and mastery, we split the sample into those in the top 25% of rumination scores at Time 1 (high ruminators, $n = .293$) and those in the bottom 25% of Time 1 rumination scores (low ruminators, $n = 278$) and examined the

relationship between mastery and depression separately in the two groups. Low mastery was more strongly associated with depressive symptoms among high ruminators, $r = -.42$, $p < .01$, than among low ruminators, $r = -.36$, $p < .01$.

Time 2 scores for the cross product of rumination and mastery predicted significant variance in Time 2 depressive symptoms, standardized $\beta = -.11$, $t(1084) = -4.89$, $p < .001$, and Time 2 scores for the cross product of rumination and strain also predicted significant variance in Time 2 depressive symptoms, standardized $\beta = .05$, $t(1084) = 2.25$, $p < .05$. To clarify the nature of these interactions, we split the sample into those in the top 25% of rumination scores at Time 2 (high ruminators, $n = 294$) and those in the bottom 25% of Time 2 rumination scores (low ruminators, $n = 289$) and examined the relationship between mastery and depression and between strain and depression separately in the two groups. Low mastery was more strongly associated with depressive symptoms among high ruminators, $r = -.45$, $p < .01$, than among low ruminators, $r = -.38$, $p < .01$. Among high ruminators, high strain was positively associated with depressive symptoms, $r = .04$, but among low ruminators, high strain was negatively associated with depressive symptoms, $r = -.08$, although neither correlation was statistically significant.

Summary of Modeling Results

In summary, tests of the gender effects-only model showed that women reported more chronic strain and rumination, less mastery,

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[6] The correlations between the two cross product terms were $-.17$ at Time 1 and $-.01$ at Time 2. Thus, multicollinearity between these terms did not appear to be a problem, and they were both added to the equations at one time.
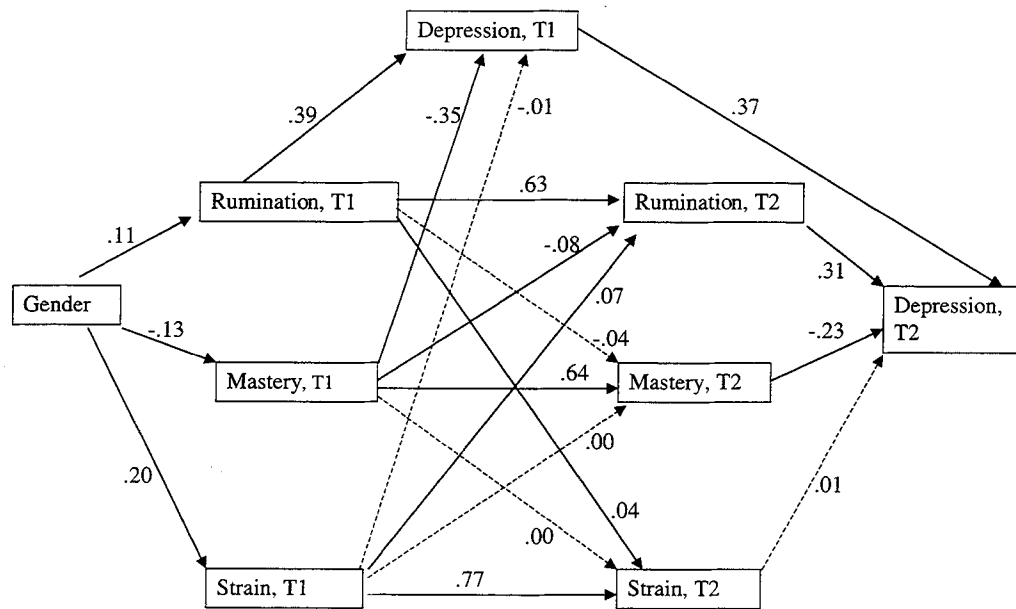
Figure 2. Feedback effects model. All paths shown are significant at $p < .05$, except for those drawn with broken lines. T1 = Time 1; T2 = Time 2.

and more depressive symptoms at Time 1 and that gender was also a significant predictor of more chronic strain, rumination, and depressive symptoms at Time 2, after controlling for Time 1 measures of these variables. Tests of the feedback effects model showed that (a) rumination predicted more chronic strain over time, (b) chronic strain predicted more rumination over time, (c) mastery predicted more rumination over time, and (d) Time 2

mastery was predicted only by Time 1 mastery. Tests of the depression effects model showed that depressive symptoms at Time 1 predicted more rumination and less mastery over time but did not predict chronic strain. Both the feedback effects model and the depression effects model showed that (a) the gender difference in depressive symptoms was mediated by rumination, mastery, and chronic strain, (b) chronic strain appeared to have only indirect
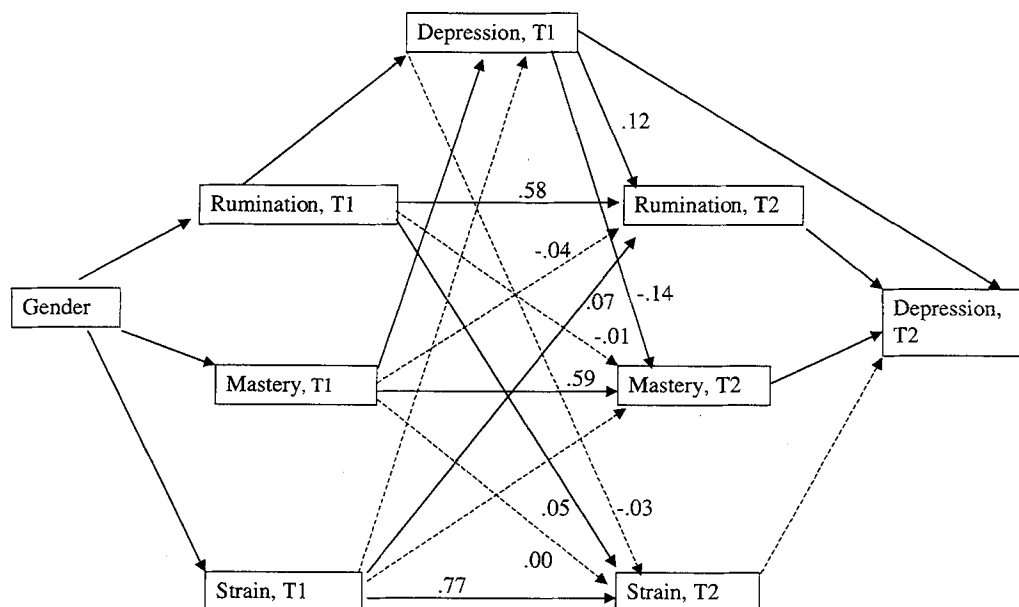

Figure 3. Depression effects model. All paths shown are significant at $p < .05$, except for those drawn with broken lines. Coefficients are given only for paths that were new to this model or that changed in this model. T1 = Time 1; T2 = Time 2.
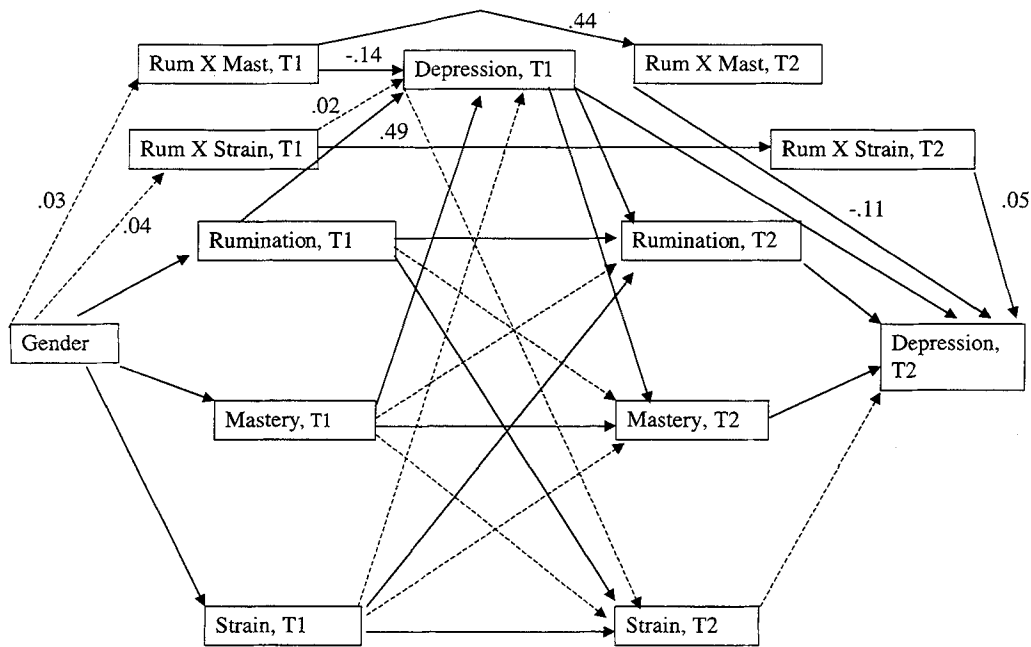
Figure 4. Interaction effects model. All paths shown are significant at $p < .05$, except for those drawn with broken lines. Coefficients are given only for paths that were new to this model. Rum × Mast = cross product of rumination and mastery; Rum × Strain = cross product of rumination and strain; T1 = Time 1; T2 = Time 2.

effects on depressive symptoms mediated through rumination, and (c) both rumination and mastery had direct effects on depressive symptoms. Finally, tests of the interaction effects model showed that rumination consistently amplified the effects of mastery on depressive symptoms at both Time 1 and Time 2 and that the interaction between rumination and chronic strain predicted significant variance in depressive symptoms at Time 2 but not Time 1. Overall, the model that fit the data best was the depression effects model, possibly because it was the most saturated model.

Discussion

The gender difference in depression is one of the most robust phenomena in epidemiology. Women are more prone to depression than men in many countries, cultures, and ethnicities (McGrath et al., 1990; Nolen-Hoeksema, 1990; Weissman & Klerman, 1977). The robustness of this phenomenon has led some theorists to suggest that it may have a biological basis, although little evidence for a biological basis has been found (see Nolen-Hoeksema, 1990, for a review). The results of this study suggest that the robustness of the gender difference in depression may be due to the relationships among chronic strain, rumination, mastery, and depression, which keep some women caught in a cycle of passivity and despair.

Women reported more chronic strain, a greater tendency to ruminate, and a lower sense of mastery than men. These gender differences in social and personality variables fully mediated the gender difference in depressive symptoms. Moreover, chronic strain, rumination, and mastery appeared to contribute to each other. Rumination consistently amplified the effects of mastery on depressive symptoms: Low mastery was more strongly associated

with depressive symptoms among high ruminators than among low ruminators. Further, low mastery at Time 1 predicted more rumination at Time 2, after controlling for rumination at Time 1. Thus, ruminators suffered more depressive symptoms when they had low mastery and, in turn, low mastery contributed to more rumination over time.

Rumination also amplified the effects of chronic strain on depressive symptoms at one of the testing sessions. The more consistent relationship between chronic strain and rumination, however, was a reciprocal effect: More chronic strain predicted more rumination over time, and more rumination predicted more chronic strain over time. Below we discuss the effects of each of the major variables in this study and the implications of our results.

Effects of Chronic Strain

The chronic strains reported by many women in this study were the grinding annoyances and burdens that come with women's lower social power. Women carried a greater load of the housework and child care and more of the strain of parenting than men. Women felt less affirmed and appreciated by their partners than men. There are doubtless other strains not included in our measure but experienced more often by women than by men, such as sexual harassment and the threat of violence, that also contribute to women's burden (McIntosh et al., 1994). Still, our measure of strains was correlated with higher levels of depressive symptoms, suggesting that these strains do contribute to women's greater vulnerability to depressive symptoms compared with men's.

The contribution of chronic strain to the gender difference in depressive symptoms appears to be mediated through rumination, however. That is, greater chronic strain was associated with a

greater tendency to ruminate in both cross-sectional and longitudinal analyses. However, there were no direct effects of chronic strain on depressive symptoms when rumination was included in the longitudinal analyses.[7] This result suggests that rumination is the intrapersonal consequence of chronic strain and the link between strain and depressive symptoms.

Why would chronic strains lead to more rumination in women? These grinding burdens may convince some women that there is little that they can do to control their lives; this feeling may then contribute to rumination. However, we suspect that most women (and men) under chronic strain hold out some hope that there is something that they can do to improve their situation and thus do not become fully hopeless and helpless (cf. Garber, Miller, & Abramson, 1980, and Wortman & Brehm, 1975). Instead, they search for some understanding of why their lives are not going as they wish, why they feel frustrated and distressed so much of the time, what they can do to convince their partners to share in the work of the home and child care (happily), and how they might be better appreciated by their partners and families. This searching may be manifested as the rumination that we saw more often in women than in men. Unfortunately, the answers to the questions that women ask themselves in their ruminations are not easy. Many women who, by objective standards, are in inequitable and non-nurturing relationships or are being directly discriminated against in the workplace do not—perhaps cannot—acknowledge that they are being victimized (Crosby, 1982). Even when they acknowledge their victimization, women often do not have the resources to break away from that victimization (Belle, 1982). If a woman does not want to break away from an inequitable relationship but wants to improve that relationship, the attitudes of the partner and the patterns of exchange between her and the partner, which may be entrenched, must be changed. Thus, many women under chronic strain may retain a moderate sense of mastery but may ruminate about the causes of their situation, their feelings about the situation, and what they should do about it. This rumination then contributes to depressive symptoms.

Many, perhaps most, women bear up under chronic strain remarkably well. The relatively small correlations between chronic strain and the other variables suggest that many women who were under chronic strain did not become ruminative, lose faith in their ability to control their lives, or develop depressive symptoms. How do women do this? Some women may accept strains as "the way things are" and find ways to live with them rather than ruminating about them. They may also shift their attention to aspects of their lives that they can control, thus maintaining a general sense of control over their lives (cf. Crosby, 1982, and Linville, 1987). Women may support each other through these strains, reducing the impact of strains on control beliefs, rumination, and depressive symptoms. In addition, having a positive, gratifying experience in one role, such as at work, may offset the impact of strain in other roles, such as the family, for many women (Barnett & Baruch, 1985; Barnett, Marshall, & Singer, 1992; Crosby, 1987; Kandel, Davies, & Raveis, 1985; Repetti & Crosby, 1984; Stewart & Malley, 1987).

Effects of Rumination

Rumination had a direct effect on depressive symptoms, as it has in previous studies (Nolen-Hoeksema & Larson, 1999; Nolen-

Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 1993; Nolen-Hoeksema et al., 1994). The mechanisms by which rumination exacerbates and maintains depressive symptoms may be numerous. Laboratory studies have shown that people induced to ruminate when in a depressed mood generate more negative memories from the past, are more pessimistic in their evaluations of hypothetical and real events in the present, and are more fatalistic about the future (Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1993, 1995). In turn, these negative cognitions may contribute to and prolong depressive symptoms directly or indirectly by impairing problem solving (Beck, Rush, Shaw, & Emery, 1979; Lyubomirsky & Nolen-Hoeksema, 1995). In addition, a field study suggested that people who ruminate may lose social support, perhaps because they continue to ruminate about their distress instead of taking action to overcome it and by doing so alienate others (Nolen-Hoeksema & Davis, 1999); in that study, low social support was associated with elevated depressive symptoms over time.

In this study, people who were more prone to ruminate evidenced more chronic strain over time. Rumination may maintain chronic strain because it drains people of the motivation, persistence, and problem-solving skills to change their situations. Laboratory studies have shown that people induced to ruminate when distressed are less willing to engage in activities that they can acknowledge might make them feel better and generate lower-quality solutions to complex interpersonal problems (Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1993, 1995). Failing to do what one can to overcome stressful situations, such as an unfulfilling marriage or an inequitable distribution of labor at home, perpetuates these situations.

Which comes first in women—rumination or chronic strain? We cannot know from this study because we entered the participants' lives after the feedback effects between rumination and chronic strain were well established. Women may be more prone than men to ruminate from an early age. The few studies of ruminative coping in early adolescents suggest that girls are more likely than boys to ruminate by this age (see Nolen-Hoeksema & Girgus, 1994). Some of the specific chronic strains that we measured in this study are unlikely to be present in the lives of most early-adolescent girls, because they involve parenting and overwork from multiple roles. Others, such as feeling unaffirmed by one's heterosexual partner, may already be present at this age for many girls. Only a longitudinal study beginning early in life could map the emergence of chronic strain and ruminative tendencies in women. The results of this study suggest that once chronic strain and rumination emerge, they have feedback effects on each other that may make it more difficult to overcome either one.

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[7] Additional analyses showed that chronic strain at Time 1 was a significant predictor of Time 2 depressive symptoms when the only other predictor variables in the model were Time 1 depressive symptoms and gender, $t(1090) = 2.32, p < .05$. When Time 1 rumination was added to the model, however, chronic strain at Time 1 was no longer a significant predictor of depressive symptoms at Time 2. This result suggests that rumination does indeed mediate the relationship between chronic strain and depressive symptoms.

Effects of Mastery

Although low mastery was associated with more depressive symptoms in the cross-sectional correlations, it had no direct effect on depressive symptoms in the models after controlling for the effects of other variables on depressive symptoms. This finding was somewhat surprising given the numerous theories suggesting that low mastery is associated with depression (e.g., Bandura, 1986; Seligman, 1975). Low mastery did have an indirect effect on depressive symptoms through its effect on rumination: People with low mastery at Time 1 were more ruminative at Time 2, and rumination at Time 2 was associated with more depression at Time 2. Low mastery may be a background personality characteristic that contributes to more rumination, but rumination is the variable with the proximal effect on depressive symptoms. In addition, low mastery may only contribute to depressive symptoms when it is paired with rumination: Tests of the interaction effects model consistently showed that the cross product of low mastery and rumination predicted significant variance in depressive symptoms. That is, a ruminator who feels out of control may be especially prone to depression.

Self-Perpetuating Effects of Depressive Symptoms

Our results illuminate the self-perpetuating effects of depressive symptoms. Depressive symptoms at Time 1 predicted more rumination and less mastery over time. In turn, rumination and low mastery both predicted more depressive symptoms. People who were more depressed at Time 1 may have become more ruminative and shown less mastery because their depressive symptoms were something to ruminate about and their symptoms made the negative, uncontrollable aspects of their lives more salient and accessible in their thoughts. Thus, the dynamics among depressive symptoms, rumination, and low mastery may account in part for the chronicity in each of these variables over time.

Limitations

We did not find a consistent and strong interaction effect between rumination and chronic strain in the prediction of depressive symptoms. If the response styles theory of the role of rumination in depression (i.e., Nolen-Hoeksema, 1991) were a traditional diathesis stress theory, serious questions about the theory would be raised. However, the response styles theory does not predict that rumination will contribute to depressive symptoms only in the wake of stressful events. Indeed, Nolen-Hoeksema (1991) argued that rumination can be particularly pernicious in the absence of obvious causes of distress, making it more difficult for individuals to answer ruminative questions about why they feel distressed. Not having an obvious attribution for distress makes it more difficult to generate activities that could overcome the causes of the distress and might make it more likely that people would generate inappropriate attributions for their distress, resulting in poor decisions (Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1993, 1995).

One limitation of this study is that all the variables were measured by self-report, except for the interviewer rating of depressive symptoms. The size of the sample, the number of variables measured, and the largely internal nature of the variables assessed required the use of self-report for most variables. The longitudinal design of the study allowed us to statistically control for Time 1 measures of depression before examining the relationship between the predictor variables and Time 2 measures of depression, thereby accounting, to some extent, for the effects of Time 1 measures of depression on respondents' reports of their personalities and social contexts. Still, confirmation of these results through non-self-report methods would be useful.

Because this was a correlational study, causal conclusions cannot be made. The longitudinal design of the study allows us some confidence in the conclusions that we have drawn from the correlations among the variables over time, however. In addition, the gender difference in rumination and the effects of rumination on depressive symptoms have been shown in controlled laboratory studies (Butler & Nolen-Hoeksema, 1994; Lyubomirsky et al., 1998; Lyubomirsky & Nolen-Hoeksema, 1993, 1995). It would be difficult or impossible to bring most of the other social and personality constructs measured in this study into the laboratory, however.

The test–retest correlations between the Time 1 and Time 2 measures of each construct in this study were high (Table 2), indicating relatively little change over time. This finding may account for the rather weak (although statistically significant) relationships between some of the Time 1 measures and Time 2 measures of different variables seen in the figures. Stronger relationships among rumination, negative life events, dispositional optimism, and depressive symptoms over time were found in a longitudinal study in which participants experienced a major loss during the study (Nolen-Hoeksema & Larson, 1999). Although this study was limited by not having such an event that might have triggered a greater interplay among rumination, mastery, chronic strain, and depressive symptoms, tapping into such an interplay usually means focusing on subgroups of people who are expected to have some triggering event over the period of a study, such as people with a seriously ill loved one. The experiences of such subgroups are informative, but the generalizability of the results of such a study can be questioned. One of our goals in this study was to test our major hypotheses with a randomly selected community sample. If depression, rumination, mastery, and chronic strain are stable in community samples over a 1-year period, then that is a reality that our models and data must take into account. The fact that most of our hypotheses were upheld by our results, despite the stability of each of the variables over time, lends significant support to our models.

The sample for this study was drawn from a large urban area and thus may not be representative of the general population. However, this sample has major advantages over the samples of many previous studies of gender differences in depressive symptoms, which have often been convenience samples of college students. In particular, the sample was ethnically, socioeconomically, and educationally diverse and included adults 25 to 75 years old.

Whether our conclusions can be generalized to explain gender differences in depressive disorders is an empirical question. Other studies have found that rumination predicts depressive disorders as well as depressive symptoms (Alloy & Abramson, 1997; Nolen-Hoeksema, 1999), although these studies have not investigated whether rumination mediates gender differences in depressive disorders. We suspect that depressive disorders in women may be more closely tied to severe traumas, such as sexual or physical

abuse, than to everyday strains, but this question must be addressed in future studies. We argue that depressive symptoms are important to study in their own right, however, because they decrease quality of life, are associated with increased health care costs, and are a risk factor for the development of depressive disorders (see Gotlib, Lewinsohn, & Seeley, 1995).

Conclusions

The results of this study suggest that women carry a triad of vulnerabilities to depressive symptoms compared to men: more chronic strain, a greater tendency to ruminate when distressed, and a lower sense of their mastery over their lives. In turn, these variables contribute to each other. So what is a depressed woman, under chronic strain and ruminating or lacking a belief that she can control her life, to do? Helping women achieve a greater sense of control over their circumstances and engage in problem solving rather than ruminating should be useful. Changing the social circumstances that many women face so that they do not have so much to ruminate about is equally important.

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