

Distinct and Overlapping Features of Rumination and Worry: The Relationship of Cognitive Production to Negative Affective States

David M. Fresco,¹ Ann N. Frankel,¹ Douglas S. Mennin,¹ Cynthia L. Turk,¹ and Richard G. Heimberg^{1,2}

Worry and rumination are cognitive processes, often represented as verbal or linguistic activities. Despite similarities in definition and description, worry has been most closely examined in relation to anxiety whereas rumination has traditionally been related to depression. This distinction remains in spite of high rates of comorbidity between anxiety and depression. This study sought to better understand the distinct and overlapping features of worry and rumination as well as their relationship to anxiety and depression. Seven hundred eighty-four unselected college students completed self-report measures of worry, rumination, anxiety, and depression. Items from the respective worry and rumination scales were submitted to factor analysis, which revealed a four-factor solution comprised of 2 worry factors and 2 rumination factors. A Worry Engagement factor as well as a Dwelling on the Negative factor emerged as distilled measures of worry and rumination, respectively. Scores on these factors were highly correlated with each other and demonstrated equally strong relationships to both anxiety and depression. Findings from this study suggest that worry and rumination represent related but distinct cognitive processes that are similarly related to anxiety and depression.

KEY WORDS: worry; rumination; anxiety; depression.

Worry, as defined by Borkovec, Robinson, Pruzinsky, and Depree (1983) and rumination, as defined by Nolen-Hoeksema (1998), have emerged from distinct research traditions as constructs of importance to the understanding of anxiety and depression. Indeed, worry has mostly been studied in relation to anxiety, and rumination has been studied in relation to depression.

¹Adult Anxiety Clinic of Temple University, Department of Psychology, Temple University, Philadelphia, Pennsylvania.

²Correspondence should be directed to Richard G. Heimberg, Adult Anxiety Clinic of Temple University, Department of Psychology, Weiss Hall, Temple University, 1701 North 13th Street, Philadelphia, Pennsylvania 19122-6085; e-mail: rheimber@nimbus.ocis.temple.edu.

Borkovec and colleagues have been instrumental in furthering our understanding of worry. Borkovec et al. (1983, p. 10) define worry as “a chain of thoughts and images, negatively affect-laden and relatively uncontrollable; it represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes; consequently, worry relates closely to the fear process.” Worry is regarded as the hallmark feature of generalized anxiety disorder (GAD; American Psychiatric Association, 1994), but is common to all anxiety disorders (Barlow, 1988) and to depression (Molina, Borkovec, Peasley, & Person, 1998; Starcevic, 1995). Borkovec’s avoidance theory of worry holds that worry is a predominantly verbal activity that may allow individuals to look away from more emotionally arousing material, which in turn allows them to disengage from emotional pain and regain a sense of emotional and physiological control (Borkovec, 1994). By worrying, individuals successfully avoid aversive images, somatic anxiety, and other negative emotions. Thus, worry serves as an avoidance response that interferes with emotional processing and thus prevents the extinction of fear. Furthermore, by avoiding anxiety-producing stimuli or feelings in the short run, worried individuals prevent themselves from adequately processing situationally relevant information, which in turn, may prevent them from deploying their most adaptive coping resources. In the long run, individuals who engage in chronic worry experience all of these negative consequences and may fail to adequately resolve stressors that arise (Borkovec, 1994).

Nolen-Hoeksema (1998, p. 239) defines rumination, or more specifically ruminative responses to depression, as “behaviors and thoughts that passively focus one’s attention on one’s depressive symptoms and on the implications of these symptoms.” Like worry, rumination is described as a largely cognitive or verbal activity. Just as worry is thought to contribute to the maintenance of anxiety by interfering with emotional processing, Nolen-Hoeksema (1998) posits that rumination prolongs and worsens depression. In the absence of an active coping response, Nolen-Hoeksema (1998) suggests that distracting one’s self from thinking about one’s stressors and the symptoms that arise from them is superior to ruminating about them, and a number of empirical studies with clinically depressed and dysphoric populations support this assertion (see Nolen-Hoeksema, 1998, for a review). In contrast, Borkovec, Alcaine, and Behar (in press) suggest that when individuals worry, they tend to think about matters in a superficial fashion, which in turn, serves as a distraction from more distressing thoughts and emotions. However, they regard the accessing of emotional content without avoiding it as more adaptive than engaging in worry or other forms of distraction. Thus, despite substantial similarities between worry and rumination, theorists view the functional relationship of worry to anxiety and of rumination to depression in considerably different ways.

Few studies have examined the relationships among rumination, worry, depression, and anxiety. Segerstrom, Tsao, Alden, and Craske (2000) reported strong zero-order correlations between worry and rumination in both undergraduate and clinical samples. Furthermore, using structural equation modeling, Segerstrom et al. found that a latent variable (repetitive thought) comprised of manifest variables of rumination and worry was significantly associated with both depression and anxiety. In another study (Blagden & Craske, 1996), rumination was associated with greater

anxiety while listening to anxiety-evoking music than was distraction. These studies suggest that worry and rumination may be less distinct from one another and less distinctly related to anxiety and depression than often suggested. This study was conducted to further elucidate the similarities and differences between worry and rumination and their relationships to anxiety and depression. Specifically, the goals of this study were to (1) to examine the overlap between and distinctiveness of worry and rumination via factor analysis, and (2) to examine the relationship of worry and rumination factors to anxious and depression symptoms.

METHOD

Participants

Seven hundred eighty-four unselected undergraduate students participated in return for partial course credit in an introductory psychology class. Women comprised the majority of the sample (67.2%). The racial composition of the sample was 39.0% Caucasian, 37.7% African American, 11.7% Asian, 3.5% Latino/Hispanic, 0.4% Middle Eastern, 0.2% Native American, and 7.4% mixed racial heritage. The average age of participants was 20.2 years ($SD = 4.2$ years).

Measures

The *Penn State Worry Questionnaire* (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item inventory designed to assess trait worry and to capture the generality, excessiveness, and uncontrollability characteristics of pathological worry (e.g., “My worries overwhelm me”; “I worry all the time”). Each item is rated on a 1 (*not at all typical of me*) to 5 (*very typical of me*) Likert-type scale. Among samples of college undergraduates, the PSWQ has repeatedly demonstrated good internal consistency and good test-retest reliability over intervals as long as 8–10 weeks (Meyer et al., 1990). In this sample, the PSWQ achieved a Cronbach’s alpha of .90.

The *Response Styles Questionnaire* (RSQ; Nolen-Hoeksema & Morrow, 1991) is a 71-item self-report measure used to identify four coping strategies in response to depressed mood: problem solving, distraction, engaging in dangerous activities, and rumination. In this study, the entire 71-item measure was administered and, the Ruminative Responses Scale (RRS) was extracted from that measure and utilized in the analyses described below. The RRS consists of 22 items on a Likert-type scale, with values ranging from 1 (*almost never*) to 4 (*almost always*). Items such as “go away by yourself and think about why you feel this way” or “try to understand yourself by focusing on your depressed feelings” are used to assess ruminative coping responses to depressed mood. The internal consistency of the RRS is good ($\alpha = .89$; Nolen-Hoeksema & Morrow, 1991). In this sample, the RRS achieved a Cronbach’s alpha of .90.

The *Mood and Anxiety Symptom Questionnaire-Short Form* (MASQ; Watson & Clark, 1991) is a 62-item measure assessing symptoms that commonly occur in the

mood and anxiety disorders. The short form is comprised of four subscales. The General Distress Anxious Symptoms subscale includes 11 items that are indicators of anxious mood but do not provide strong differentiation from depressed mood (e.g., “Felt nervous”; “Had an upset stomach”). The General Distress Depressive Symptoms subscale contains 12 items that are indicators of depressed mood but do not provide strong differentiation from anxious mood (e.g., “Felt sad”; “Felt like crying”). The Anxious Arousal subscale is comprised of 17 items assessing symptoms of somatic tension and hyperarousal (e.g., “Startled easily”; “Was trembling or shaking”). The Anhedonic Depression subscale consists of 22 items assessing symptoms relatively specific to depression such as loss of pleasure in usual activities, disinterest, low energy (e.g., “Felt like nothing was very enjoyable”) and reverse-keyed items assessing positive emotional experiences (e.g., “Felt cheerful”). Each item is rated on a 1 (*not at all*) to 5 (*extremely*) Likert-type scale.

Procedure

The PSWQ, RSQ, and MASQ were administered as part of a larger questionnaire battery given to introductory psychology students during the first week of the semester. Participants took the questionnaire packets home to complete, and approximately 76% returned them the following week. Participants who completed the packet received credit toward fulfillment of course requirements. This procedure was followed for two successive semesters (Fall 1997, $n = 527$; Spring 1998, $n = 257$). The subsamples for each semester did not differ on sex, race, or age. Thus, all analyses are based on the entire sample.

RESULTS

Exploratory Factor Analysis

The 22 items from the Ruminative Response Scale and the 16 items from the Penn State Worry Questionnaire were submitted to common factor analysis³ with varimax rotation⁴ to investigate whether items from these scales formed factors comprised of elements from each scale. Six factors emerged with eigenvalues greater than one. Using the scree plot method, a four-factor solution was retained. Table I presents the initial communality estimates as well as the rotated factor loadings for all items. An item was considered to load onto a factor if its factor loading exceeded .40. An item was considered to load on more than one factor if the difference between the factor loadings was less than .10.

³Based on the recommendations of Floyd and Widaman (1995), common factor analysis was chosen over principal components analysis. Common factor analysis is preferable when one wishes to understand the relationships among manifest variables to suspected latent variables. Further, estimates derived from common factor analysis tend to hold up better than estimates derived from principal components analysis to confirmatory replication with new data.

⁴Given the overlap between worry and rumination, the common factor analysis was also conducted with oblique rotation, which allows factors to correlate with one another. The results obtained in this analysis were nearly identical to the ones derived with varimax rotation. Details of this analysis are available from the first author.

Table 1. Rotated Factor Loadings and Initial Communality Estimates for Common Factor Analysis of the Penn State Worry Questionnaire (PSWQ) and the Ruminative Response Scale of the Response Style Questionnaire (RSQ)

Item and item wording	Factor 1	Factor 2	Factor 3	Factor 4	Initial comm. estimate
Factor 1: Worry Engagement ($\alpha = .94, M = 28.66, SD = 10.00$)					
PSWQ15. I worry all the time.	.816	.247	.024	.110	.748
PSWQ7. I am always worrying about something.	.800	.262	.121	.198	.758
PSWQ14. Once I start worrying, I can't stop.	.788	.282	.059	.076	.699
PSWQ13. I notice that I have been worrying about things	.769	.198	.108	.253	.701
PSWQ12. I've been a worrier all my life.	.734	.122	.114	.112	.580
PSWQ4. Many situations make me worry.	.728	.284	.038	.287	.696
PSWQ5. I know I shouldn't worry about things, but I just can't help it.	.690	.180	.079	.350	.661
PSWQ2. My worries overwhelm me.	.645	.320	.126	.259	.607
PSWQ9. As soon as I finish one task I start to worry about everything else I have to do.	.630	.244	.052	.137	.531
PSWQ6. When I am under pressure, I worry a lot.	.621	.201	.075	.335	.562
PSWQ16. I worry about projects until they are all done.	.574	.065	.112	.159	.437
Factor 2: Dwelling on the negative ($\alpha = .87, M = 22.26, SD = 6.37$)					
RSQ15. Think about how passive and unmotivated you feel.	.152	.640	.189	.051	.440
RSQ5. Think about how alone you feel.	.105	.599	.225	.191	.447
RSQ43. Think about how sad you feel.	.151	.588	.334	.246	.558
RSQ6. Think I won't be able to do my job/work because I feel so badly.	.121	.582	.064	-.026	.369
RSQ7. Think about your feelings of fatigue and achiness.	.190	.549	.091	-.077	.353
RSQ44. Think about all your shortcomings, failings, faults, mistakes.	.238	.538	.288	.254	.538
RSQ21. Think Why can't I get going?	.169	.532	.214	.016	.413
RSQ8. Think about how hard it is to concentrate.	.189	.519	.050	.022	.345
RSQ61. Think about how angry you are with yourself.	.176	.505	.246	.174	.421
RSQ40. Think Why do I have problems other people don't have?	.295	.480	.272	.212	.449
RSQ46. Think about how you don't feel up to doing anything.	.194	.480	.237	.060	.368
RSQ19. Think about how you don't seem to feel anything any more.	.136	.421	.218	-.016	.256
Factor 3: Active Cognitive Appraisal ($\alpha = .81, M = 14.32, SD = 4.66$)					
RSQ68. Isolate yourself and think about the reasons why you feel sad.	.120	.295	.713	.115	.577
RSQ56. Go someplace alone to think about your feelings.	.003	.126	.636	.021	.461
RSQ25. Go away by yourself and think about why you feel this way.	.020	.134	.597	-.030	.429
RSQ70. Try to understand yourself by focusing on your depressed feelings.	.071	.379	.565	.084	.509
RSQ53. Analyze your personality to try to understand why you are depressed.	.043	.264	.554	.003	.450
RSQ18. Analyze recent events to try to understand why you are depressed.	.001	.337	.464	-.012	.364
RSQ67. Listen to sad music.	.137	.224	.439	.120	.326
Factor 4: Absence of Worry ($\alpha = .69, M = 9.36, SD = 3.22$)					
PSWQ8. I find it easy to dismiss worrisome thoughts.	-.377	-.114	-.005	-.547	.421
PSWQ10. I never worry about anything.	-.377	-.082	-.070	-.514	.397
PSWQ3. I don't tend to worry about things.	-.325	-.030	.031	-.511	.327
PSWQ1. If I don't have enough time to do everything, I don't worry about it.	-.185	-.030	.007	-.473	.253
Items loading on multiple factors or no factors					
PSWQ11. When there is nothing more I can do about a concern, I don't worry about it any more.	-.253	-.055	.016	-.340	.203
RSQ22. Think Why do I always react this way?	.191	.419	.347	.079	.420
RSQ28. Write down what you are thinking about and analyze it.	.034	.021	.350	-.123	.162
RSQ30. Think about a recent situation, wishing it had gone better.	.151	.378	.323	.108	.299

Note. Items were considered to load on a factor if its loading score exceeded 0.40 and the difference between the loadings on other factors was greater than 0.10. Because the Ruminative Response Scale consists of items distributed throughout the 71-item Response Style Questionnaire (RSQ), item numbers reflect their placement in the larger RSQ.

Factor 1 consisted of the 11 positively coded PSWQ items and was labeled *Worry Engagement*. This factor had an eigenvalue of 11.68 and accounted for 30.73% of the variance. Factor 2 consisted of 12 items from the Ruminative Response Scale whose content reflected a general tendency to dwell on the negative consequences of feeling depressed. This factor was labeled *Dwelling on the Negative*. It had an eigenvalue of 4.24 and accounted for 11.16% of the variance. Factor 3 consisted of seven RRS items whose general content reflected an active appraisal of one's situation while depressed and was labeled *Active Cognitive Appraisal*. Factor 3 had an eigenvalue of 1.72 and accounted for 4.54% of the variance. Finally, Factor 4 consisted of four negatively coded PSWQ items (e.g., "I find it easy to dismiss worrisome thoughts," and "I never worry about anything.") and was labeled *Absence of Worry*. This factor had an eigenvalue of 1.42 and accounted for 3.73% of the variance. Three RRS items and one PSWQ item were dropped for low factor loadings or for loading on more than one factor.⁵ Factor scores were computed from this four-factor solution. Sample means and standard deviations as well as Cronbach's alpha for factor scores were also calculated. These scores are presented in Table I.

Zero-order correlations were computed to examine the relationship among the factor scores. Worry Engagement and Dwelling on the Negative demonstrated a strong positive correlation with each other ($r = .46$) and negative correlations with Absence of Worry ($r_s = -.54$ and $-.22$ respectively). Active Cognitive Appraisal was also positively correlated with Worry Engagement ($r = .29$) and Dwelling on the Negative ($r = .57$) and modestly negatively correlated with Absence of Worry ($r = -.14$). All zero-order correlation coefficients were significant at $p < .005$.

Worry and rumination factor scores were also correlated with the four subscales of the MASQ. As seen in Table II, Dwelling on the Negative and Worry Engagement demonstrated similarly strong correlations with MASQ subscales with coefficients ranging from .39 to .59 and .30 to .51, respectively. Active Cognitive Appraisal demonstrated small to moderately sized correlations with the MASQ subscales—ranging from .14 to .33. Finally, Absence of Worry demonstrated small negative correlations with MASQ subscales—ranging from $-.06$ to $-.26$.

To further assess the relationship of the factor scores to measures of depression and anxiety, tests of dependent correlations (Bruning & Kintz, 1987) were conducted. For two of the subscales, MASQ-Anxious Arousal and MASQ-General Distress Depressive Symptoms, the zero-order correlation with Dwelling on the Negative was statistically stronger than that of Worry Engagement although the magnitude of the difference did not exceed Cohen's criterion for a small effect (Cohen, 1977). Both Dwelling on the Negative and Worry Engagement were generally more highly correlated with MASQ subscales than was Active Cognitive Appraisal. Differences in dependent correlations comparing Dwelling on the Negative and Active Cognitive Appraisal approached or exceeded Cohen's criterion for a medium effect (Cohen, 1977); differences in dependent correlations between Worry Engagement and Active

⁵Two additional factor analyses were conducted on the data from this study. In one case just the PSWQ items were included. The same two factors of Worry Engagement and Absence of Worry emerged. In the second factor analysis, just the RRS items were included. In this case, the same two-factor solution with Dwelling on the Negative and Active Cognitive Appraisal factors emerged.

Table II. Differences in Dependent Correlations Between Dwelling on the Negative, Worry Engagement, and Active Cognitive Appraisal^a

	Dwell (a)	Worry (b)	Appraise (c)	Absence (d)	Difference a vs. b		Difference a vs. c		Difference b vs. c	
					<i>t</i> (781)	<i>d</i>	<i>t</i> (781)	<i>d</i>	<i>t</i> (781)	<i>d</i>
MASQ-AA	.39**	.30**	.24**	-.06	2.68**	.19	4.91**	.35	1.50	.11
MASQ-AD	.42**	.38**	.14**	-.21**	1.23	.09	9.38**	.67	6.09**	.44
MASQ-GDA	.46**	.46**	.28**	-.18**	0.00	.00	6.12**	.44	4.82**	.35
MASQ-GDD	.59**	.51**	.33**	-.26**	2.82**	.20	9.70**	.69	5.03**	.36
Corrected-AA	.26**	.18**	.20**	.01	2.23**	.16	1.88	.13	0.48	.03
Corrected-AD	.31**	.30**	.09*	-.21**	0.29	.02	7.68**	.55	5.66**	.40

Note. Dwell, Dwelling on the Negative; Worry, Worry Engagement; Appraise, Active Cognitive Appraisal; Absence, Absence of Worry; MASQ-AA, Mood and Anxiety Symptom Questionnaire (MASQ)-Anxious Arousal Scale; MASQ-AD, MASQ-Anhedonic Depression Scale; MASQ-GDA, MASQ-General Distress Anxious Symptoms Scale; MASQ-GDD, MASQ-General Distress Depressive Symptoms Scale; Corrected-AA, MASQ-AA controlling for MASQ-AD; Corrected-AD, MASQ-AD controlling for MASQ-AA; *d*, Cohen's *d* effect size conventions (Cohen, 1977), small = .20, medium = .50, large = .80.

^aTests of dependent correlations between Absence of Worry and the other three factor scores were also computed. Differences between Absence of Worry and the other factor scores were generally in the medium to large range using Cohen's effect size conventions for *d* (Cohen, 1977). Differences with Dwelling on the Negative ranged from .66 to 1.41; differences with Worry Engagement ranged from .59 to 1.06; differences with Active Cognitive Appraisal ranged from .46 to .90.

* *p* < .05 (two-tailed). ** *p* < .01 (two-tailed).

Cognitive Appraisal approached Cohen's criterion for a medium effect for three of four MASQ subscales (Cohen, 1977).

Although the MASQ was selected as the measure of depressive and anxious symptoms because of its relatively distinct scales of Anxious Arousal and Anhedonic Depression, these two measures were relatively highly correlated ($r = .33$) in this sample. Consequently, "corrected" measures of Anxious Arousal and Anhedonic Depression were computed by conducting linear regression analyses and saving the unstandardized residuals. In general, compared to correlations with uncorrected measures of anhedonic depression and anxious arousal, correlations between factor scores and corrected measures of anhedonic depression and anxious arousal produced a similar, but attenuated, pattern of findings. The one notable exception was that Dwelling on the Negative differed from Worry Engagement but not Active Cognitive Appraisal in the magnitude of correlation with Anxious Arousal (see Table II).

In summary, Dwelling on the Negative and Worry Engagement demonstrated similarly strong positive correlations with measures of depression and anxiety—with Dwelling on the Negative demonstrating a small, but significantly stronger, relationship than Worry Engagement to two raw measures and one corrected measure. Further, both Dwelling on the Negative and Worry Engagement demonstrated significantly stronger relationships than did Active Cognitive Appraisal to the measures of depression and anxiety. However, the magnitude of this difference was somewhat larger for Dwelling on the Negative (see footnote *a* in Table II).

DISCUSSION

The main purpose of this study was to examine the distinctive and overlapping features of worry and rumination as well as the nature of their relationships to depression and anxiety. Indeed, our findings shed some light on these issues. First, although correlated with one another, worry and rumination also maintained a degree of distinctiveness. The four-factor solution that emerged from a factor analysis of PSWQ and RRS items produced factors consisting of items from just one of the scales. No factors contained items from both scales.

In the case of worry, an 11-item Worry Engagement factor demonstrated a slightly higher Cronbach's alpha than the 16-item PSWQ. Furthermore, Absence of Worry did not relate as strongly as Worry Engagement to the MASQ measures of depression and anxiety. These findings suggest that the positively worded worry items may form the component of trait worry that is more highly associated with negative affective states. In a separate study of the PSWQ from the same database, Fresco, Heimberg, Mennin, and Turk (in press) used confirmatory factor analysis to demonstrate that Worry Engagement and Absence of Worry were first-order factors that served as indicators for a second-order general worry factor.

The factor analysis revealed two distinct facets of rumination that related somewhat differently to depression and anxiety. Although Dwelling on the Negative and Active Cognitive Appraisal were positively correlated with depression and anxiety, Dwelling on the Negative was more highly correlated with both. Thus, Dwelling on

the Negative appears to tap the more maladaptive component of rumination whereas Active Cognitive Appraisal may represent a cognitive process associated with depression and anxiety but that is less destructive than Dwelling on the Negative.

Worry and rumination originated in separate theoretical and research traditions, and their hypothesized role in the onset and maintenance of negative mood states is also relatively distinct. However, given the lack of empirical specificity of worry to anxiety and rumination to depression and the relatively high correlation between them (Segerstrom et al., 2000) and among their components (this study), new conceptualizations are called for. One possible way to understand the similarities between worry and rumination is to consider that they may both serve an avoidance function. For example, Dwelling on the Negative, which seems to be a passive focus on one's current mood state, was more strongly related to anxiety and depression than Active Cognitive Appraisal, which seems to involve integrating one's emotional experience with an understanding of one's self and one's circumstances. To the extent that one is able to access emotions adaptively to understand what one's needs are and what actions should be taken to get those needs met, depression and anxiety may be more short-lived. Although future research is needed to bear this out, it may be that Dwelling on the Negative in the short term may blunt some aspects of the affective experience but over the long term inhibit emotional processing and ability to deploy adaptive coping resources. In this way, Dwelling on the Negative would function in a manner very similar to what has been hypothesized for worry.

Dwelling on the Negative and Worry Engagement were highly correlated and related similarly to measures of anxiety and depression. Nevertheless, they loaded on different factors, suggesting that individuals are able to differentiate these two processes. It may be that while anxious and depressive symptomatology do not differentiate these constructs, other indices would. For example, the cognitive process of Worry Engagement may involve more questioning and uncertainty than Dwelling on the Negative.

Alternatively, Dwelling on the Negative and Worry Engagement may occur at different points in time in the same person. For example, a person may dwell on the negative after stress, bringing on depressive or anxious feelings. In turn, she or he may worry about other matters as a means to avoid the painful self-focus of dwelling on the negative. The short-run benefit is a reduction of self-focused negative emotions; however, the long-run cost is inadequate emotional processing of the stressful situation resulting in prolongation of the distress associated with some event rather than tidy, but emotionally evocative, resolution.

Findings from this study clearly indicate that worry and rumination are multidimensional and related but distinct cognitive processes that each have a relationship to both depression and anxiety. Further study of the components of each appears warranted. However, two methodological limitations (use of a cross-sectional design and the use of a nonclinical population) prevent greater generalizability of our findings until additional research has been conducted. Future research utilizing a longitudinal design and including measures of social desirability, coping, and life stress would definitely contribute to our understanding of the components of worry and rumination. An extension of these findings to a clinical population would also be beneficial. In addition, we chose to define worry solely in the way discussed by

Borkovec and colleagues and rumination in the way described by Nolen-Hoeksema and colleagues. Replication with other measures (and operationalizations) of worry and rumination would support the validity of the findings from this study.

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