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Repetitive Thought in Psychopathology: The Relation of Rumination and Worry to Depression and Anxiety Symptoms

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The relation between repetitive thought and depression and anxiety symptoms was examined in an undergraduate sample. Individuals completed self-report measures of rumination, worry, depression, and anxiety as well as other related constructs including private self-consciousness, looming maladaptive style, cognitive style, cognitive content, and future outlook. Regression analyses and tests for significant differences between partial correlations were utilized to assess the study hypotheses. The results indicated that rumination and worry overlap in their association with depression and anxiety symptoms, and that rumination may be an especially important component of this overlap. Secondary analyses demonstrated that rumination and worry are two distinct constructs, as their patterns of associations with related constructs were different.

Keywords: cognitive processes; comorbidity; mood; self-focused attention

Researchers have long been interested in the comorbidity between generalized anxiety disorder (GAD) and major depressive disorder (MDD; Kendall & Watson, 1989; Kessler, Chiu, Demler, & Walters, 2005). Some researchers have suggested that the two disorders share a similar underlying cognitive process. For example, Ingram (1990) proposed that self-focused attention is a cognitive process that is present in a variety of mental disorders, including anxiety and depression. Ingram (1990) put forward a model in which pathological-level self-focused attention exists in many disorders and is distinguished by its disorder-specific content. More recently, two specific types of repetitive self-focused attention, rumination and worry, have come under increasing scrutiny for their potential role in maintaining and exacerbating depression and anxiety pathology. Similarities noted between rumination and worry might be a key to understanding the overlap between depression and anxiety and lead to more efficient, combined interventions for these disorders.

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Defining the Constructs

Nolen-Hoeksema's (1987) response-style theory of depression (RST) introduced the concept of depressive rumination, repetitive thinking about the causes and consequences of one's negative mood. Research in clinical samples (Ciesla & Roberts, 2002; Kuehner & Weber, 1999) and evidence from studies of laboratory-induced negative mood suggest that engaging in rumination maintains dysphoric mood (Morrow & Nolen-Hoeksema, 1990). Rumination has also been found to prospectively predict onsets of major depression episodes (Just & Alloy, 1997; Nolen-Hoeksema, 2000; Spasojevic & Alloy, 2001). Laboratory studies have revealed rumination's ability to disrupt healthy cognition and behavior. For example, dysphoric individuals who engaged in a rumination task were more impaired in concentration (Lyubomirsky, Kasri, & Zehm, 2003), memory tasks (Hertel, 1998; Park, Goodyer, & Teasdale, 2004), and problem-solving skills (Donaldson & Lam, 2004; Lyubomirsky & Nolen-Hoeksema, 1995) and rated themselves as less likely to engage in pleasant activities than did dysphoric individuals who engaged in distraction (Lyubomirsky & Nolen-Hoeksema, 1993). Together, these findings support the theory that rumination exacerbates depressed mood.

Borkovec, Robinson, Pruzinsky and DePree (1983) defined the construct of worry as "a chain of thoughts and images, negatively affect-laden and relatively uncontrollable. The worry process 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" (p. 10). Worry is a diagnostic criterion symptom of GAD and thus is present in all diagnosed GAD cases (American Psychiatric Association, 2000). Worry is associated with intolerance of uncertainty (e.g., Ladouceur, Gosselin, & Dugas, 2000) and poor problem orientation and elaboration (Stober, Tepperwien, & Staak, 2000).

The separate literatures on rumination and worry suggest that the constructs share some common characteristics. Both are self-focused, repetitive, perseverative thought processes associated with inflexible cognitive styles. Both constructs are implicated in the maintenance of negative affect and the impairment of some cognitive skills. Despite these similarities, research suggests that the two constructs are distinct. For example, rumination and worry may have different developmental origins (see Spasojevic & Alloy, 2002, for depression and Cassidy, 1995, for worry), self-reported purposes (Watkins, 2004), and cognitive content (Beck, Brown, Steer, Eidelson, & Riskind, 1987; Papageorgiou & Wells, 1999).

Repetitive Thought in Depression and Anxiety

Although traditionally rumination is associated with depression and worry is associated with anxiety, this categorization may not reflect reality. In fact, the data suggest that worry is present in MDD (Starcevic, 1995). In a laboratory study, a rumination condition produced higher worry ratings than a distraction condition, regardless of participants' initial dysphoric or nondysphoric status (Vickers & Vogeltanz-Holm, 2003). There is mounting evidence that rumination and anxiety are associated (for a review, see Thomsen, 2006). Rumination is present in anxiety (Wolfradt & Engelmann, 1999) and predicts changes in both depression *and* anxiety symptoms (Nolen-Hoeksema, 2000). Rumination was a prospective predictor of increases in depression and anxiety symptoms four days after receiving a midterm grade, whether or not the grade was disappointing (Sarin, Abela, & Auerbach, 2005). Finally, rumination maintained induced anxious mood in a nondepressed undergraduate sample (Blagden & Craske, 1996).

A growing body of literature has *directly* examined the overlap between rumination and worry. Factor analyses of the constructs have concluded that rumination and worry are distinct, but closely related. In a large, nonclinical undergraduate sample, rumination and worry factors

were positively correlated with each other and with measures of depression and anxiety, despite emerging as separate factors (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002). Similarly, in a sample of nonclinical adolescents between the ages of 12 and 17, rumination and worry were distinct but correlated factors (Muris, Roelofs, Meesters, & Boomsma, 2004). Muris et al. (2004) found that rumination was no longer associated with depression in analyses that controlled for either worry or anxiety. However, worry continued to predict anxiety in analyses that controlled for either rumination or depression, suggesting that worry may have a particularly important role in mood and anxiety symptoms in adolescents (Muris et al., 2004).

Other research paradigms have been utilized to examine the underlying process similarities in rumination and worry. Watkins, Moulds, and Mackintosh (2005) compared rumination and worry thoughts in a sample of nonclinical adults (mean age = 34.9). Participants generated rumination and worry thoughts and rated their general descriptors, appraisal, associated emotion, and response strategies. Rumination and worry differed on seven of the total 53 comparisons. Watkins et al. (2005) contrasted these relatively few differences to a similar study by Langlois, Freeston, and Ladouceur (2000) that found worries and obsessions to differ on 34 of 38 variables. The researchers concluded that the difference in temporal orientation (rumination was more past-focused and worry was more future-focused) in combination with the overall *lack* of differences in form, appraisals, and strategies suggest that rumination and worry are alike in process but differ in content and goal orientation (Watkins et al., 2005).

Segerstrom, Tsao, Alden, and Craske (2000) tested the relationship of rumination and worry to depression and anxiety in a group of undergraduate psychology students and outpatients (Segerstrom et al., 2000). Depressive rumination was more highly correlated with symptoms of depression than anxiety. The reverse was true as well; worry was more highly correlated with symptoms of anxiety than depression. However, in a second study, rumination and worry did not differentially predict depression or anxiety. General repetitive thought was shown to be a shared feature of rumination and worry (Segerstrom et al., 2000).

Muris, Roelofs, Rassin, Franken, and Mayer (2005) examined a mediational model of neuroticism and anxiety and depression in a nonclinical undergraduate sample. The results supported a model in which worry and rumination partially mediated the relationship between neuroticism and anxiety and fully mediated the relationship between neuroticism and depression (Muris et al., 2005). Importantly, the researchers also found that rumination and worry were no longer correlated with each other after controlling for neuroticism. They suggested that neuroticism is the underlying similarity between the two constructs.

In summary, the research reviewed here suggests that rumination and worry are highly related to each other and to both depression and anxiety symptoms. Self-focused attention, general repetitive thought, and neuroticism are processes that may lead to both rumination and worry. Temporal specificity and cognitive content may be two of the key differences.

The Current Investigation and Hypotheses

The primary aim of this study was to explore how rumination and worry, individually, are related to depression and anxiety symptoms. The study also tested whether rumination and worry can be differentiated by examining their relationships with other cognitive factors including private self-consciousness, looming maladaptive style, cognitive style, depressive cognition, anxious cognition, and future outlook.

Depressive and Anxious Symptoms

Given that some research has found that rumination and worry are more strongly associated with their related mood state (depression and anxiety, respectively), we hypothesized that rumination

would be associated with the general depressive distress and anhedonic depression subscales of the Mood and Anxiety Symptom Questionnaire (MASQ) and that worry would be associated with the general anxious distress and anxious arousal MASQ subscales.

Private Self-Consciousness

Some research suggests that self-consciousness is related to depression more than to anxiety (Nix, Watson, Pyszczynski, & Greenberg, 1995). In a meta-analysis by Mor and Winquist (2002), public self-consciousness was related to social anxiety and private self-consciousness was related to depression. Thus, we hypothesized that private self-consciousness would be more strongly related to rumination than to worry.

Looming Maladaptive Style

Riskind, Williams, Gessner, Chrosniak, and Cortina (2000) suggest that looming maladaptive style is a cognitive risk factor for anxiety and not for depression. Thus, we hypothesized that worry would be more strongly associated with looming maladaptive style than would rumination.

Cognitive Style

Alloy et al. (2000) and Hankin, Abramson, Miller, and Haeffel (2004) report that negative cognitive style is associated with depression and not with anxiety. Thus, we predicted that rumination, but not worry, would be associated with negative cognitive style.

Cognitive Content

It was predicted that worry would correlate with anxious cognitive content and rumination would correlate with depressed cognitive content.

Future Outlook

Some research suggests that depression and rumination are past-focused and that anxiety and worry are future-focused (Beck et al., 1987; Papageorgiou & Wells, 2004; Watkins et al., 2005). However, at least one study suggests that rumination is associated with both positive and negative future thinking (Lavender & Watkins, 2004). Thus, this study provided an important assessment of whether future thinking differs between rumination and worry. It was hypothesized that worry would be more strongly associated with future outlook than would rumination.

Method

Participants

A total of 364 undergraduate participants (72% female) were recruited from introductory psychology classes at Temple University and were given class credit for their participation. The final sample was diverse (49% White, 17.9% Black, 3.6% Hispanic American, 20.6% Asian American, 3.8% foreign, and 5.2% other or missing). The mean age of the sample was 19.46 years (SD = 2.60) and ranged from 17 to 44.

Materials

Psychological Symptomatology. The Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) is a 21-item self-report questionnaire used to assess the psychological and somatic symptoms of depression. The BDI is the most widely used self-report instrument for depressive

symptoms and has been extensively validated in both undergraduate and general adult samples (Beck, Steer, & Garbin, 1988; Lyubomirsky & Nolen-Hoeksema, 1993; Snaith & Taylor, 1985; Vickers & Vogeltanz-Holm, 2003). The BDI was used in this study as an index of the participants' current level of depressive symptoms.

The State-Trait Anxiety Inventory-Trait Version (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) is a 20-item self-report scale that measures chronic levels of anxiety. Participants answered on a four-point scale (from "1 = almost never" to "4 = almost always") about how they generally feel (e.g., "I get in a state of tension or turmoil as I think over my recent concerns and interests"; Turk, Heimberg, & Mennin, 2004). The STAI has demonstrated strong psychometric properties in over 3,000 studies (Bieling, Antony, & Swinson, 1998). This study utilized a seven-item STAI-A subscale that had depression-related items removed in order to improve the measurement of anxiety (Bieling et al., 1998). In this study, the STAI-A was used as a measure of anxious symptomatology.

The Mood and Anxiety Symptom Questionnaire Short Form (MASQ-SF; Watson, & Clark, 1991) is a 62-item self-report measure of the elements of the tripartite model. The scale has four subscales: general distress depression (GDD), general distress anxiety (GDA), anxious arousal (AA), and anhedonic depression (AD). Participants responded on a five-point Likert scale (from "1 = not at all" to "5 = extremely") to describe how much they had been experiencing a certain emotion or behavioral symptom during the past week. Sample items include, "Felt slowed down," and "Short of breath." The MASQ has demonstrated strong psychometric properties (Watson et al., 1995). In this study, the MASQ was used to measure anxious arousal and depressive anhedonia (low positive affect), as well as overlapping general negative affect (Watson et al., 1995).

Repetitive Thinking. The Ruminative Responses Scale (RRS), a subscale of the Response Style Questionnaire (Nolen-Hoeksema & Morrow, 1991), is a 22-item self-report questionnaire that is used to measure the extent to which a person engages in depressive rumination. Items include, "I think about how hard it is to concentrate" and are answered on a four-point Likert scale ("1 = almost never" to "4 = almost always"). The RRS has shown strong concurrent and predictive validity and test–retest reliability (Bagby, Rector, Bacchiochi, & McBride, 2004; Butler & Nolen-Hoeksema, 1994; Kasch, Klein, & Lara, 2001; Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema & Morrow, 1991; Ward, Lyubomirsky, Sousa, & Nolen-Hoeksema, 2003). There is debate as to whether or not the RRS represents a single factor. Although some studies found that rumination is actually two separate factors (Bagby & Parker, 2001; Treynor, Gonzalez, & Nolen-Hoeksema, 2003), Knowles, Tai, Christensen, and Bentall (2005) performed a factor analysis on the entire RSQ and found a single factor for rumination (with distraction and problem-solving on another factor, and risk-taking on a third factor). Siegle, Moore, and Thase (2004) compared many measures of rumination in order to determine if there is a single construct of rumination. They found that the measures may differ in the type of rumination they assess and recommend that researchers label the type of rumination measure they have used in a study. In order to maintain consistency with the majority of the literature, in this study the RRS served as an index of the participant's likelihood of engaging in ruminative thinking in response to negative mood.

The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger & Borkovec, 1990) is a 16-item self-report measure of the construct of worry. Items include, "I know I should not worry about things, but I just cannot help it," and participants select an answer that best describes them in general on a five-point Likert scale (from "1 = not at all typical of me" to "5 = very typical of me"). The PSWQ has demonstrated high internal consistency, test–retest reliability, and convergent validity (Davey, 1993; Meyer et al., 1990; Stober, 1998; van Rijsoort, Emmelkamp, & Vervaeke, 1999). The PSWQ was used as an index of the extent to which participants engage in excessive, uncontrollable, and pervasive worry (Turk et al., 2004).

Related Constructs. The Private Self-Consciousness Scale (PRSC; Fenigstein, Scheier, & Buss, 1975), a subscale of the Self-Consciousness Scale, is a 10-item self-report measure of one's

tendency to focus attention on one's private thoughts, feelings, and goals. Items include "I'm always trying to figure myself out" and "I'm alert to changes in my mood." Items are scored on a "0 = extremely uncharacteristic" to "4 = extremely characteristic" scale. The PRSC has demonstrated good psychometric properties (Anderson, Bohon, & Berrigan, 1996; Bernstein, Teng, & Garbin, 1986; Fenigstein et al., 1975). The PRSC was used in this study to assess the extent to which participants are conscious of their "inner feelings, thoughts, and physical sensations" (Trapnell & Campbell, 1999, p. 284).

The Looming Maladaptive Style Questionnaire–Revised (LMSQ-R; Riskind et al., 2000) is a 24-item self-report measure of one's "tendency to view potentially threatening situations as rapidly unfolding or escalating toward dreaded outcomes" (p. 839). The questionnaire consists of six short vignettes about two types of social and physical looming events with four follow-up questions for each vignette. For example, given a passage about suspicious actions of a romantic partner, participants were asked, "Is the level of threat of losing your relationship staying fairly constant, or is it growing rapidly larger with each passing moment?" Each question was answered on a five-point Likert scale. The LMSQ demonstrated high internal consistency, test–retest reliability and convergent, divergent, and predictive validity (Riskind et al., 2000; Williams, Shahar, Riskind, & Joiner, 2005). The LMSQ-R was used in this study as an index of a danger schema that predicts anxiety over depression (Riskind et al., 2000).

The Cognitive Style Questionnaire (CSQ; Alloy et al., 2000) is an 84-item self-report measure of one's tendency to make negative inferences about the self and the causes and consequences of negative life events. In this study, the CSQ was revised to use only the 12 negatively valenced life events. For each event, participants select responses on seven-point Likert scales that assess the extent to which they make internal, global, and stable attributions about the cause of the event (CSQ-CA), infer negative consequences (CSQ-CO), and infer negative self-characteristics (CSQ-S). Sample negative situations include, "You really want to be in an intimate, romantic relationship, but aren't." Scales for each of the three subscales are obtained, with high scores designating a more negative cognitive style in each domain (Alloy et al., 2000; Hankin et al., 2004). The CSQ has demonstrated high internal consistency and 1-year retest reliability ($r = .80$; Alloy et al., 2000). The CSQ was predictive of depressive episodes (Alloy et al., 2000, 2006). The CSQ was used in this study as an index of three components of negative cognitive style.

The Cognition Checklist (CCL; Beck et al., 1987) is a 26-item self-report measure of anxious and depressive cognitions. Participants select an answer on a five-point Likert scale ranging from "never" to "always" about how often they have certain thoughts in various situations. Items include, "When I have to attend a social occasion I think, I'm a social failure" and "Life isn't worth living." Scores are calculated by adding the individual items that fit into two subscales, anxiety (CCL-A) and depression (CCL-D). The two subscales have high internal consistency and validity in both outpatients and undergraduates (Beck et al., 1987; Steer, Beck, Clark, & Beck, 1994). The CCL was used in this study as an index of participants' negative anxious and depressive thoughts about themselves.

The Future Outlook Inventory (FOI; Cauffman & Woolard, 1999) is an eight-item self-report measure of the tendency to look ahead and plan for the future. Items include "I make lists of things to do." Participants select an answer on a four-point scale from "never true" to "always true." Unpublished data suggests that the measure has good internal consistency ($\alpha = .71$) and convergent validity with a self-report measure of risk perception (Cauffman & Woolard, 1999). The FOI was used in this study as an index of the extent to which participants plan for the future.

A demographic questionnaire collected information on the participants' gender, academic year, race, age, and native language.

Procedure

Participants scheduled a time to meet with one of the study investigators and pick up the study questionnaires. When the participants arrived, the experimenter explained that they would be

completing questionnaires regarding their moods and that their responses would be kept confidential. They were instructed that they could skip any questions that made them uncomfortable and were encouraged to complete the packet in one sitting in a quiet place. Informed consent was obtained before they completed the questionnaires. Upon return of the questionnaires, participants were debriefed and given research credit.

Results

Preliminary Analyses

The means, standard deviations, and alpha coefficients of the study measures are reported in Table 1. The normality of the scores from each of the questionnaires was examined by calculating a Shapiro-Wilk Statistic and reviewing its graphical representation. The data met normality requirements, so the original scores were used in all analyses. The graphical representations also did not indicate a nonlinear relationship in the data, so the assumptions for hierarchical linear regression were met. Pearson correlations between all the variables are reported in Table 2.

Primary Analyses

We investigated whether rumination occurs specifically within the framework of depressed mood, whereas worry occurs specifically within the framework of anxious mood, or if these two types of repetitive thinking both occur along with both sets of symptoms. Hierarchical linear regressions with the RRS and PSWQ as predictors of the BDI, STAI-A, and MASQ subscales and the Meng, Rosenthal, and Rubin (1992) *z* test for significant difference between dependent correlations were performed to examine how rumination and worry related to depression and anxiety symptoms. Gender and the other types of repetitive thought (i.e., RRS when PSWQ was the predictor of interest) were controlled in all of the analyses. Given the number of hypotheses tested, a Bonferroni adjustment was used for the six *z* tests, leading to a critical *p* value of .008.

TABLE 1. Summary of Study Measure Means, Standard Deviations, and Alpha Coefficients

Measure	*M*	*SD*	*N*	α
BDI	8.57	8.13	364	.90
STAI-T	42.07	10.86	363	.93
STAI-A	13.73	4.17	363	.83
MASQ-GDA	20.13	7.28	361	.87
MASQ-AA	25.07	9.12	361	.90
MASQ-GDD	24.04	9.89	361	.93
MASQ-AD	58.71	15.14	361	.92
RRS	43.64	14.62	363	.95
PSWQ	34.22	14.50	363	.93
PRSC	23.36	5.79	361	.70
LMSQ	3.47	0.72	364	.90
CSQ	3.69	1.03	360	.95
CCL-A	50.01	10.01	364	.90
CCL-D	50.01	10.00	364	.94
FOI	2.68	0.49	361	.72

TABLE 2. Intercorrelations Between Study Measures

Measure	Gender	Ethnicity	Age	BDI	STAI-T	STAI-A	MASQ GDA	MASQ AA	MASQ GDD	MASQ AD	RRS	PSWQ	PRSC	LMSQ	CSQ	CCLA	CCLD	FOI
Gender	1.00	–0.11*	–0.04	0.11*	0.07	0.07	0.06	0.01	0.14*	0.04	0.14**	0.27**	–0.01	0.20**	0.03	0.07	0.10	0.05
Ethnicity	–0.11*	1.00	–0.06	0.01	0.00	–0.04	0.16**	0.06	0.00	–0.06	0.00	0.03	0.06	–0.08	0.09	–0.05	0.02	–0.07
Age	–0.04	–0.06	1.00	0.10	0.01	–0.02	0.03	0.01	–0.03	0.01	–0.07	–0.08	0.02	–0.02	0.00	0.01	–0.06	0.05
BDI	0.11*	0.01	0.10	1.00	0.76**	0.68**	0.66**	0.56**	0.77**	0.64**	0.61**	0.47**	0.26**	0.20**	0.37**	0.50**	0.66**	–0.08
STAI-T	0.07	0.00	0.01	0.76**	1.00	0.85**	0.70**	0.53**	0.78**	0.77**	0.71**	0.64**	0.24**	0.23**	0.45**	0.57**	0.75**	–0.15**
STAI-A	0.07	–0.04	–0.02	0.68**	0.85**	1.00	0.71**	0.57**	0.74**	0.56**	0.68**	0.67**	0.31**	0.29**	0.38**	0.57**	0.65**	–0.02
GDA	0.06	0.16**	0.03	0.66**	0.70**	0.71**	1.00	0.77**	0.78**	0.52**	0.61**	0.57**	0.31**	0.19**	0.37**	0.56**	0.56**	–0.04
AA	0.01	0.06	0.01	0.56**	0.53**	0.57**	0.77**	1.00	0.60**	0.37**	0.43**	0.35**	0.20**	0.07	0.25**	0.50**	0.42**	–0.09
GDD	0.14*	0.00	–0.03	0.77**	0.78**	0.74**	0.78**	0.60**	1.00	0.70**	0.73**	0.58**	0.31**	0.23**	0.44**	0.56**	0.73**	–0.07
AD	0.04	–0.06	0.01	0.64**	0.77**	0.56**	0.52**	0.37**	0.70**	1.00	0.56**	0.45**	0.15**	0.18**	0.37**	0.38**	0.60**	–0.19**
RRS	0.14**	0.00	–0.07	0.61**	0.71**	0.68**	0.61**	0.43**	0.73**	0.56**	1.00	0.59**	0.39**	0.29**	0.39**	0.60**	0.66**	–0.02
PSWQ	0.27**	0.03	–0.08	0.47**	0.64**	0.67**	0.57**	0.35**	0.58**	0.45**	0.59**	1.00	0.29**	0.41**	0.41**	0.51**	0.58**	0.12*
PRSC	–0.01	0.06	0.02	0.26**	0.24**	0.31**	0.31**	0.20**	0.31**	0.15**	0.39**	0.29**	1.00	0.10	0.15**	0.25**	0.23**	0.27**
LMSQ	0.20**	–0.08	–0.02	0.20**	0.23**	0.29**	0.19**	0.07	0.23**	0.18**	0.29**	0.41**	0.10	1.00	0.40**	0.32**	0.28**	0.08
CSQ	0.03	0.09	0.00	0.37**	0.45**	0.38**	0.37**	0.25**	0.44**	0.37**	0.39**	0.41**	0.15**	0.40**	1.00	0.37**	0.49**	–0.04
CCL-A	0.07	–0.05	0.01	0.50**	0.57**	0.57**	0.56**	0.50**	0.56**	0.38**	0.60**	0.51**	0.25**	0.32**	0.37**	1.00	0.65**	0.01
CCL-D	0.10	0.02	–0.06	0.66**	0.75**	0.65**	0.56**	0.42**	0.73**	0.60**	0.66**	0.58**	0.23**	0.28**	0.49**	0.65**	1.00	–0.10
FOI	0.05	–0.07	0.05	–0.08	–0.15**	–0.02	–0.04	–0.09	–0.07	–0.19**	–0.02	0.12*	0.27**	0.08	–0.04	0.01	–0.10	1.00

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

Table 3 displays the results for rumination's association with the depressive (BDI) and anxious (STAI-A) symptoms (controlling for worry and gender) and worry's association with depression and anxiety symptoms (controlling for rumination and gender). Rumination and worry were each correlated with the BDI while controlling for the other and gender (partial *r*s = .46 and .18, *p*s < .01, respectively). However, rumination was more strongly associated with the BDI than was worry ($z = 6.36$, $p < .008$). Rumination and worry also were each correlated with the STAI-A while controlling for the other and gender (partial *r*s = .48 and .47, *p*s < .01, respectively). They were equally strongly associated with the STAI-A ($z = .22$, *ns*).

Next, the MASQ subscales, general distress anxiety (MASQ-GDA), anxious arousal (MASQ-AA), general distress depression (MASQ-GDD), and anhedonic depression (MASQ-AD) were examined (see Table 4). Rumination and worry were each correlated with the MASQ-GDA while controlling for the other and for gender (partial *r*s = .41 and .35, *p*s < .01, respectively). Unexpectedly, there was no difference in the strength of these correlations ($z = 1.45$, *ns*). Rumination and worry were each significantly correlated with the MASQ-AA controlling for the other and for gender (partial *r*s = .30 and .14, *p*s < .01, respectively). Also contrary to hypotheses, the relationship was significantly stronger for rumination ($z = 3.44$, $p < .008$). Rumination and worry were each associated with the MASQ-GDD controlling for the other and gender (partial *r*s = .58 and .27, *p*s < .01, respectively). As predicted, rumination had a significantly stronger relationship with the MASQ-GDD subscale than did worry ($z = 7.31$, $p < .008$). Finally, rumination and worry were each significantly correlated with the MASQ-AD controlling for the other and for gender (partial *r*s = .41 and .19, *p*s < .01, respectively). As expected, rumination had a significantly stronger correlation with MASQ-AD than did worry ($z = 4.80$, $p < .008$).

TABLE 3. Summary of Hierarchical Linear Regression Analyses for Rumination (RRS) and Worry (PSWQ) Predicting to Depression (BDI; *N* = 363) and Anxiety (STAI-A; *N* = 362) Symptoms

Dependent Variable = BDI							
Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
Rumination	1	Gender	2.12	.99	.11*	.11*	.01*
	2	PSWQ	0.27	.03	.48**	.46**	.21**
	3	RRS	0.28	.03	.50**	.46**	.17**
Worry	1	Gender	2.12	.99	.11*	.11*	.01*
	2	RRS	0.34	.02	.60**	.60**	.36**
	3	PSWQ	0.10	.03	.18**	.18**	.02**
Dependent Variable = STAI-A							
Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
Rumination	1	Gender	.68	.51	.07	.07	.01
	2	PSWQ	.20	.01	.70**	.68**	.46**
	3	RRS	.13	.01	.44**	.48**	.13
Worry	1	Gender	.68	.51	.07	.07	.01
	2	RRS	.20	.01	.69**	.68**	.46**
	3	PSWQ	.13	.01	.44**	.47**	.12**

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

TABLE 4. Summary of Hierarchical Linear Regression Analyses for Rumination (RRS) and Worry (PSWQ) Predicting to Subscales of the MASQ ($N = 360$)

Subscale	Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
General distress anxiety	Rumination	1	Gender	1.00	0.89	.06	.06	.00
		2	PSWQ	0.30	0.02	.60**	.58**	.34**
		3	RRS	0.21	0.02	.42**	.41**	.11**
	Worry	1	Gender	1.00	0.89	.06	.06	.00
		2	RRS	0.31	0.02	.62**	.61**	.37**
		3	PSWQ	0.18	0.03	.35**	.35**	.08**
Anxious arousal	Rumination	1	Gender	0.17	1.12	.01	.01	.00
		2	PSWQ	0.23	0.03	.37**	.36**	.13**
		3	RRS	0.22	0.04	.35**	.30**	.08**
	Worry	1	Gender	0.17	1.12	.01	.01	.00
		2	RRS	0.28	0.03	.44**	.44**	.19**
		3	PSWQ	0.10	0.04	.16**	.14**	.02**
General distress depression	Rumination	1	Gender	3.10	1.21	.14*	.14*	.02*
		2	PSWQ	0.40	0.03	.59**	.57**	.32**
		3	RRS	0.40	0.03	.59**	.58**	.22**
	Worry	1	Gender	3.10	1.21	.14*	.14*	.02*
		2	RRS	0.49	0.03	.72**	.72**	.51**
		3	PSWQ	0.16	0.03	.24**	.27**	.04**
Anhedonic depression	Rumination	1	Gender	1.38	1.86	.04	.04	.00
		2	PSWQ	0.49	0.05	.47**	.46**	.21**
		3	RRS	0.47	0.06	.45**	.41**	.13**
	Worry	1	Gender	1.38	1.86	.04	.04	.00
		2	RRS	0.59	0.05	.57**	.56**	.32**
		3	PSWQ	0.21	0.06	.20**	.19**	.03**

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

Secondary Analyses

Hierarchical linear regressions were performed to determine whether rumination (RRS) and worry (PSWQ) are associated with the other study measures in a theoretically coherent way. In all the following analyses examining the PSWQ, gender was entered in step 1, RRS was entered in step 2, and PSWQ was entered in step 3. In all the following analyses examining the RRS, gender was entered in step 1, PSWQ was entered in step 2, and RRS was entered in step 3. The related construct of interest for each specific regression was entered as the dependent variable. Meng et al.'s (1992) *z* test was used to determine if there were significant differences between the partial correlations for worry and rumination. Given the number of hypotheses tested, a Bonferroni adjustment was used for the six *z* tests, leading to a critical *p* value of .008.

As predicted, in the domain of private self-consciousness (PRSC), rumination was significantly associated with the PRSC controlling for worry and gender, but worry was not significantly correlated with the PRSC when controlling for rumination and gender (partial *r*s = .28 and .10, *p*s < .01 and *ns,* respectively, see Table 5). As predicted, for looming maladaptive style (LMSQ), worry, but not rumination, was correlated with the LMSQ controlling for the other response style and for gender (partial *r*s = .28 and .07, *p*s < .01 and *ns,* respectively; see Table 6).

TABLE 5. Summary of Hierarchical Linear Regression Analyses for Rumination (RRS) and Worry (PSWQ) Predicting to Private Self-Consciousness (PRSC; $N = 361$)

Dependent Variable = PRSC							
Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
Rumination	1	Gender	–.09	.71	–.01	–.01	.00
	2	PSWQ	.13	.02	.32**	.30**	.09**
	3	RRS	.13	.02	.33**	.28**	.07**
Worry	1	Gender	–.09	.71	–.01	–.01	.00
	2	RRS	.16	.02	.40**	.39**	.16**
	3	PSWQ	.05	.03	.12*	.10	.01

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

TABLE 6. Summary of Hierarchical Linear Regression Analyses for Rumination (RRS) and Worry (PSWQ) Predicting to Selected Cognition Measures

Subscale	*N*	Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
Looming maladaptive style	363	Rumination	1	Gender	0.34	0.09	.20**	.20**	.04**
			2	PSWQ	0.02	0.00	.39**	.38**	.14**
			3	RRS	0.00	0.00	.08	.07	.00
		Worry	1	Gender	0.34	0.09	.20**	.20**	.04**
			2	RRS	0.01	0.00	.27**	.27**	.07**
			3	PSWQ	0.02	0.00	.34**	.28**	.07**
Anxious cognitions	363	Rumination	1	Gender	1.71	1.23	.07	.07	.01
			2	PSWQ	0.36	0.03	.52**	.51**	.26**
			3	RRS	0.32	0.04	.47**	.44**	.14**
		Worry	1	Gender	1.71	1.23	.07	.07	.01
			2	RRS	0.42	0.03	.61**	.60**	.36**
			3	PSWQ	0.17	0.04	.25**	.24**	.04**
Depressive cognitions	363	Rumination	1	Gender	2.27	1.22	.10	.10	.01
			2	PSWQ	0.41	0.03	.60**	.58**	.33**
			3	RRS	0.33	0.03	.48**	.48**	.15**
		Worry	1	Gender	2.27	1.22	.10	.10	.01
			2	RRS	0.45	0.03	.66**	.65**	.42**
			3	PSWQ	0.21	0.03	.31**	.32**	.06**
Future outlook	360	Rumination	1	Gender	0.05	0.06	.04	.04	.00
			2	PSWQ	0.00	0.00	.12*	.12*	.01*
			3	RRS	0.00	0.00	–.14*	–.11*	.01*
		Worry	1	Gender	0.05	0.06	.04	.04	.00
			2	RRS	0.00	0.00	–.02	–.02	.00
			3	PSWQ	0.01	0.00	.20**	.16**	.03**

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

With regard to the anxiety subscale of the cognition checklist (CCL-A), rumination and worry were each correlated with the CCL-A controlling for the other and for gender (partial *r*s = .44 and .24, *p*s < .01, respectively, see Table 6). Unexpectedly, rumination had a significantly stronger association with CCL-A than did worry ($z = 4.43$, $p < .008$). With regard to the depression subscale of the cognition checklist (CCL-D), rumination and worry were each associated with the CCL-D controlling for the other and gender (partial *r*s = .48 and .32, *p*s < .01, respectively, see Table 6). As predicted, rumination was significantly more strongly associated with CCL-D than was worry ($z = 3.67$, $p < .008$).

For future outlook (FOI), rumination and worry were each correlated with the FOI controlling for the other and for gender (partial *r*s = -.11 and .16, *p*s < .05 and < .01, respectively, see Table 6). As predicted, worry had a significantly stronger association with FOI than did rumination ($z = 5.63$, $p < .008$).

The relationships of rumination and worry with the three subscales of the CSQ, cause (CSQ-CA), consequence (CSQ-CO), and self (CSQ-S), were examined (see Table 7). Rumination and worry were each significantly correlated with the CSQ-CA subscale while controlling for the other and for gender (partial *r*s = .15 and .20, *p*s < .01, respectively). Unexpectedly, there was no significant difference in the strength of these correlations ($z = 1.06$, *ns*). Rumination and worry were each significantly associated with the CSQ-CO while controlling for the other and gender (partial *r*s = .15 and .25, *p*s < .01, respectively). Unexpectedly, there was no significant difference in the strength of these correlations ($z = 2.13$, *ns*). Finally, rumination and worry were each significantly correlated with the CSQ-S (partial *r*s = .18 and .23, *p*s < .01 respectively). Unexpectedly, there was no significant difference in the strength of these correlations ($z = 1.07$, *ns*).

In summary, worry was more strongly related than rumination to looming maladaptive style and future outlook. In contrast, rumination was more strongly related than worry to

TABLE 7. Summary of Hierarchical Linear Regression Analyses for Rumination (RRS) and Worry (PSWQ) Predicting to Cognitive Style Questionnaire Subscales

Subscale	*N*	Predictor	Step	Variable	*B*	*SE B*	β	Partial *r*	ΔR^2
Cause	358	Rumination	1	Gender	0.07	.100	.04	.04	.00
			2	PSWQ	0.02	.003	.35**	.34**	.02**
			3	RRS	0.01	.003	.18**	.15**	.02**
		Worry	1	Gender	0.07	.100	.04	.04	.00
			2	RRS	0.02	.003	.32**	.32**	.10**
			3	PSWQ	0.01	.004	.25**	.20**	.04**
Consequence	358	Rumination	1	Gender	–0.04	.146	–.01	–.01	.00
			2	PSWQ	0.03	.004	.40**	.39**	.15**
			3	RRS	0.01	.005	.17**	.15**	.02**
		Worry	1	Gender	–0.04	.146	–.01	.01	.00
			2	RRS	0.03	.004	.34**	.34**	.11**
			3	PSWQ	0.02	.005	.30**	.25**	.06**
Self	358	Rumination	1	Gender	0.31	.163	.10	.10	.01
			2	PSWQ	0.04	.005	.40**	.39**	.15**
			3	RRS	0.02	.005	.21**	.18**	.03**
		Worry	1	Gender	0.31	.163	.10	.10	.01
			2	RRS	0.03	.005	.36**	.36**	.13**
			3	PSWQ	0.03	.006	.27**	.23**	.05**

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

anxious arousal, general depression distress, anhedonic depression, private self-consciousness, anxious cognitions, and depressive cognitions. Finally, rumination and worry had statistically equivalent associations with general anxious distress and with three subscales of negative cognitive style.

Discussion

With regard to the primary study hypotheses, our findings support the idea that rumination and worry do overlap in their relation with depression and anxiety symptoms. Both rumination and worry contributed to both depression and anxiety symptoms individually. Although much attention is currently focused on rumination in the domain of depression and worry in the domain of anxiety, the results of this study imply that both constructs should be assessed in individuals who are experiencing either set of symptoms. A second important finding is that rumination appeared to have an especially significant role in the overlap between depressive and anxious symptoms. These findings are in contrast to Muris et al. (2004) who found the opposite in a 12–17-year-old adolescent sample. Thus, there may be an important developmental change that affects the impact of rumination and worry. Given that such few studies have examined these constructs in younger samples, more research needs to be done.

Overall, the pattern of results from our secondary analyses suggested that rumination and worry can be distinguished based on their varying pattern of associations with related constructs. Rumination was associated with self-consciousness and depressive and anxious symptoms and cognitions. Worry was associated with a future-focused and looming cognitive style. Together, these findings suggest that rumination and worry are similar but distinct patterns of distressed thinking that contribute to the overlap between anxiety and depression symptoms. The results fit with tripartite models that posit that negative affect is a feature common to depression and anxiety disorders (e.g., Barlow & Campbell, 2000; Clark & Watson, 1991; Mineka, Watson, & Clark, 1998). Although the tripartite models differ in precise structure, they agree that MDD and GAD are both distress disorders marked by high, consistent levels of subjective distress (Watson, Gamez, & Simms, 2005). Thus, rumination and worry may be the components of general distress that mediate the relation between neuroticism and depression and anxiety outcome (e.g., Muris et al., 2005). Interestingly, in this sample, it appears that rumination may be the more distressing response style, in that it was more strongly related than worry to several symptom measures and negative cognitions. The presence of rumination in both depression and anxiety highlights the need for creating psychotherapeutic interventions to target and reduce ruminative thinking. These interventions could be useful to target the general distress component in both depression and anxiety disorders.

Several of the results were unexpected. For example, worry was as highly correlated with the three negative cognitive style subscales as was rumination. Brozina and Abela (2006) recently found that, in children, negative inferences about consequences of events and about the self are predictive of both depressive and anxiety symptoms, whereas negative inferences about the causes of negative events are uniquely predictive of depressive symptoms. In light of this new research, it is surprising that in this study the negative causes subscale had a statistically equivalent association with rumination and worry. However, this unexpected finding may simply highlight worry and rumination's common role in general distress. It was also unexpected that rumination was more strongly related to anxious arousal and anxious cognitions than was worry. It is important to note that the depressive rumination questionnaire asks participants to respond with what they typically do when they are feeling down. Thus, the depressive rumination measure may be priming participants to think about negative affect and thus have led to the higher correlation with these anxiety measures. Furthermore, this finding may be evidence that, in this sample, rumination was an especially distressing response style.

Strengths and Limitations

This study built on a growing area of research and examined a broad array of constructs related to rumination and worry. Further, in examining the associations between worry and rumination and depression, anxiety, and related constructs, we controlled for the other type of repetitive thinking. Another strength of the sample that may lead to improved generalizability is the greater ethnic diversity of the sample as compared to many undergraduate samples.

Despite these strengths, this study had several limitations that should be taken into consideration. First, the sample consisted of primarily female, nonclinical undergraduates. Future research should address these questions in broader nonconvenience community and clinical samples.

A second limitation of the study is that all of the measures were self-report questionnaires and, thus, higher associations between the constructs may result because of shared method variance. In general, distinguishing between depression and anxiety symptoms is difficult because of their overlapping features of general distress. As previously discussed, diagnoses of depression and GAD are often comorbid (see review by Mineka et al., 1998). Although the phenomenon of comorbidity occurs in the general population, part of the overlap might be due to how the disorders are defined and assessed. Many symptoms, including restlessness, fatigue, difficulty concentrating, irritability, and sleep disturbance (Howell, Brawman-Mintzer, Monnier, & Yonkers, 2001) can be found in both depression and anxiety and may be a source of invalid comorbidity as assessed in this study. Further, the constructs of worry and rumination are not equivalently theoretically related to anxiety and depression. Worry is a definitional component of GAD, whereas rumination is not a definitional component of depression.

A third general limitation relates to the study design. Given the cross-sectional design, no causal interpretations can be drawn from the results. Finally, the order in which the questionnaires were completed may influence the participants' responses. For example, answering questions about depression symptoms may alter participants' mood and subsequent responses to the other questionnaires.

Future Directions

The limitations of this study may be addressed in future studies that include a large sample that is diverse in symptoms and age range and has been assessed through clinician-rated diagnostic interviews. Longitudinal, prospective designs would be best able to determine the effects of repetitive thought on mood and anxiety disorder outcome. An experimental study utilizing depression and anxiety inductions would be important to assess the effects of rumination and worry. Researchers should attempt to bridge the gap between the depression and anxiety literatures by both acknowledging the comorbidity of the two disorders and trying to make clear distinctions between their symptom overlap. Finally, research could be expanded to include other disorders hypothesized to include repetitive thought, such as bipolar and obsessive–compulsive disorders.

In the future, research should broaden our understanding of these repetitive thinking styles so that we might use our understanding of rumination and worry to improve interventions for the distress associated with depression and anxiety. Toward that aim, research should examine what aspects of rumination and worry are most destructive, the repetitive thinking process or the negative content, and examine which aspects are easier to change. It is possible that focusing on interventions for the repetitiveness is unnecessary and that simply changing the content to be repetitive thinking about positive memories may be a useful intervention. Thus, future research on the overlap between rumination and worry can be expanded to address treatment implications.

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