

REPETITIVE NEGATIVE THINKING: A TRANSDIAGNOSTIC CORRELATE OF AFFECTIVE DISORDERS

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Recent research suggests that repetitive negative thinking is a transdiagnostic phenomenon that is present across affective disorders. Notably, multiple measures of repetitive negative thinking exist, including some that are disorder-specific and others that are transdiagnostic. To date, no studies have examined whether these measures are captured by a latent Repetitive Negative Thinking factor or how these measures are differentially associated with symptoms of affective disorders, including mood, anxiety, and obsessive-compulsive spectrum disorders. Across two separate studies, Mechanical Turk participants completed measures of rumination, post-event processing, dampening of positive affect, and two transdiagnostic measures of repetitive thinking, as well as measures of depression, physiological anxiety, social anxiety, obsessive-compulsive disorder, and body dysmorphic disorder. Using structural equation modeling, evidence of a single Repetitive Negative Thinking latent factor was found. Moreover, positive associations emerged between the latent factor and all five clinical symptom measures. Notably, few differences emerged in the magnitude of the associations between measures of repetitive negative thinking and psychological symptoms. Together, findings support a transdiagnostic conceptualization of repetitive negative thinking.

Keywords: Repetitive Negative Thinking; Transdiagnostic; Anxiety; Depression; Obsessive-Compulsive; Cognitive Style

Repetitive negative thinking is typically characterized by perseverative and uncontrolled thoughts about negative aspects of past and future events, one's current situation, or one's emo-

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tional state and psychological symptoms (Ehring & Watkins, 2008; Mahoney, McEvoy, & Moulds, 2012). In some cases, repetitive negative thinking represents a central component of a diagnosis (e.g., worry is a core feature of generalized anxiety disorder; GAD; American Psychiatric Association, 2013). Other times, while not a formal diagnostic criterion, it is associated with increased vulnerability for particular disorders (Drost, van der Does, van Hemert, Penninx, & Spinhoven, 2014). For example, rumination is an established risk factor for major depressive disorder (MDD; Nolen-Hoeksema, Wisco, & Lubomirsky, 2008), whereas post-event processing has been theoretically and empirically linked with symptoms of social anxiety disorder (SAD; Brozovich & Heimberg, 2008). Examining the literature more broadly, research has linked repetitive negative thinking to a variety of affective disorders, including mood, anxiety, eating, obsessive-compulsive spectrum, and trauma-related disorders (Ehring & Watkins, 2008; Kollei & Martin, 2014). Because of this, some researchers have begun to conceptualize repetitive negative thinking as a single, transdiagnostic construct (e.g., Mahoney et al., 2012). However, relatively little research has empirically assessed whether different facets of repetitive negative thinking may be captured by an overarching latent factor. Further, no studies have examined the associations between such a factor and symptoms of depression, anxiety, or other affective disorders.

Evidence supporting a transdiagnostic conceptualization of repetitive negative thinking comes primarily from research on rumination and worry. Findings from this literature indicate that individuals with MDD, SAD, and GAD report similar levels of rumination and worry (McEvoy, Watson, Watkins, & Nathan, 2013). Additionally, when ruminative thoughts have been compared to worried thoughts experienced by the same individual, very few differences have been found (Watkins, Moulds, & Mackintosh, 2005). Using structural equation modeling, a bifactor model in which indicators simultaneously load onto one shared factor (i.e., repetitive negative thinking) and one of two discrete factors (i.e., rumination or worry) has been found to better fit the data than a two factor model in which items only load onto rumination or worry (McEvoy & Brans, 2013; Topper, Molenaar, Emmelkamp, & Ehring, 2014). Notably, within bifac-

tor models, both shared and discrete factors have been found to predict anxiety and depression symptoms.

Despite initial support for considering repetitive negative thinking as a transdiagnostic factor, further investigation is needed. Much of the extant work has focused on the comparison of rumination and worry without considering other aspects of repetitive negative thinking. Even in studies examining individuals with SAD, for instance, comparisons of post-event processing with rumination or worry have been conspicuously omitted (e.g., McEvoy et al., 2013). Research also suggests that certain individuals may respond to positive affect with repetitive negative thoughts, such as "This is too good to be true," or "My streak of luck is going to end soon." This cognitive style, referred to as dampening, functions to diminish the intensity of positive emotions (Wood, Heimpel, & Michela, 2003). A study by Feldman, Joormann, and Johnson (2008) found that dampening was associated with depression symptom severity, as well as the habitual use of rumination. Though such findings provide preliminary evidence that dampening represents an additional form of repetitive negative thinking, this has yet to be tested.

Finally, it should be noted that the Repetitive Thinking Questionnaire (RTQ; McEvoy, Mahoney, & Moulds, 2010) has recently emerged as a transdiagnostic measure of repetitive negative thinking. The RTQ is composed of two subscales: Repetitive Negative Thinking (RNT), which assesses the degree to which one engages in this cognitive style, and Absence of Repetitive Thinking (ART), which assesses one's ability to disengage from negative thoughts. Research has found associations between the RNT subscale and a wide variety of affective symptoms in both unselected and clinical samples (Mahoney et al., 2012; McEvoy et al., 2010). The ART subscale, on the other hand, has demonstrated inconsistent associations with symptoms, raising some questions about the subscale's relevance to the repetitive negative thinking literature (Mahoney et al., 2012; McEvoy et al., 2010). Given the nature of the RTQ and its subscales, it is expected to have considerable overlap with other aspects of repetitive negative thinking, but again, this has yet to be tested empirically.

By expanding the literature to include a broader array of constructs, we can test the limits of the assertion that repetitive

negative thinking is truly transdiagnostic. In order to do this, however, two things need to be established. First, it is critical to examine whether each of these measures is assessing the same underlying construct. No studies to date have looked at how multiple measures of repetitive negative thinking load onto a single latent factor. Moreover, it is necessary to assess whether this latent factor is associated with psychological symptoms. Finally, from a practical perspective, it will be important to examine which measures of repetitive negative thinking are most closely associated with which symptoms. This could inform future research on repetitive negative thinking by guiding decisions on which measures to include for which samples.

The current investigation addressed these three areas of inquiry within two separate studies, using samples of persons recruited through Amazon's Mechanical Turk (MTurk). MTurk is an online labor platform that is frequently used to conduct behavioral research (e.g., Mason & Suri, 2012; Paolacci, Chandler, & Ipeirotis, 2010). Recent research indicates that MTurk participants have higher rates of clinical symptoms, particularly social anxiety and depression, than traditional community samples (Arditte, Çek, Shaw, & Timpano, 2015; Shapiro, Chandler, & Mueller, 2013). Given that repetitive negative thinking is dimensionally distributed throughout the population, yet also associated with psychopathology (e.g., Mennin & Fresco, 2013), MTurk is an ideal population within which to study this construct.

In the first study, we examined several measures of repetitive negative thinking as they related to symptoms of depression, physiological anxiety, and social anxiety. Aim 1 examined whether each proposed repetitive negative thinking construct loaded onto a single latent factor. It was hypothesized that a latent factor indicated by rumination, post-event processing, dampening, repetitive negative thinking, and to a somewhat lesser extent absence of repetitive thinking, would fit the data well. Aim 2 assessed whether this latent factor predicted psychological symptoms. Based on previous research, greater levels of the latent factor were expected to be associated with greater symptoms of depression, physiological anxiety, and social anxiety. Finally, the study examined whether each repetitive negative

thinking measure was differentially related to symptom measures. Here, hypotheses were grounded in research supporting a bifactor model of repetitive negative thinking. Whereas it was predicted that all measures of repetitive negative thinking would be associated with all symptom measures, it was also predicted that the strength of these associations would differ depending on the measure (e.g., rumination would be more strongly related to depression than to physiological or social anxiety).

Study 2 sought to replicate findings from Study 1 by testing whether a latent repetitive negative thinking factor indicated by rumination, post-event processing, and dampening would continue to predict symptoms of depression, physiological anxiety, and social anxiety in a second MTurk sample. Study 2 also extended the findings from Study 1, by examining whether the latent factor was associated with symptoms of obsessive-compulsive disorder (OCD) and body dysmorphic disorder (BDD), two obsessive-compulsive spectrum disorders. It was predicted that greater repetitive negative thinking would be related to more severe OCD and BDD symptoms.

STUDY 1

METHOD

Participants

A sample of $N = 126$ individuals were recruited from MTurk. Persons were required to be 18 years or older, reside in the United States, and have an approval rating ≥ 90 to participate. Demographic characteristics of the sample were consistent with previous research on MTurk (e.g., Behrend, Sharek, Meade, & Wiebe, 2011; Goodman, Cryder, & Cheema, 2013; Shapiro et al., 2013); the average age was 35.66 ($SD = 12.49$) years, 61% percent of the sample identified as female, and 80% identified as White/Caucasian.

Measures of Repetitive Negative Thinking

Ruminative Responses Scale (RRS). The RRS (Trenor, Gonzalez, & Nolen-Hoeksema, 2003) is a 22-item measure of rumination in

response to dysphoric mood. Items are rated on a 4-point scale with anchors 1 (Almost Never) to 4 (Almost Always).

Post-Event Processing Questionnaire—Revised (PEPQ-R). The PEPQ-R (McEvoy & Kingsep, 2006) is an 8-item measure of repetitive thinking about perceived inadequacy experienced following a social situation occurring in the past two weeks. Items are rated on a visual analogue scale with anchors 0 (Not at all) to 100 (Totally agree).

Responses to Positive Affect Scale (RPA). This study utilized the Dampening subscale of the RPA (Feldman et al., 2008), which measures the habitual use of repetitive thinking as a strategy to dampen or reduce positive moods. The subscale consists of 8 items, which are rated on a 4-point scale with anchors 1 (Almost never) to 4 (Almost always).

Repetitive Thinking Questionnaire (RTQ). The RTQ (McEvoy et al., 2010) is a transdiagnostic measure of repetitive thinking, with two subscales: Repetitive Negative Thinking (RTQ-RNT; 27 items) and Absence of Repetitive Thinking (RTQ-ART; 4 items). All items are rated on a 5-point scale with anchors 1 (Not at all true) to 5 (Very true).

Measures of Psychological Symptoms

Center for Epidemiological Studies Depression Scale (CES-D). The CES-D (Radloff, 1977) is a 20-item measure of depression symptom severity experienced within the past week. Participants rate the extent to which they experienced each symptom on a scale from 1 (Rarely or none of the time, less than 1 day) to 4 (Most or all of the time, 5–7 days).

Anxiety Subscale of the Depression, Anxiety, Stress Scales-21 (DASS-Anxiety); Henry & Crawford, 2005). The study utilized the 7-item anxiety subscale of the DASS-21, which assesses physiological symptoms of anxiety. Participants rate the extent to which they have been bothered by each symptom on a scale from 0 (Did not apply to me at all) to 3 (Applied to me very much).

Social Interaction Anxiety Scale (SIAS). The SIAS (Mattick & Clarke, 1998) is a 20-item measure of anxiety experienced in the

context of social interactions and is frequently used to assess symptoms of SAD. Items are rated on a 5-point scale from 0 (Not at all characteristic or true of me) to 4 (Extremely characteristic or true of me).

Procedures

All procedures were approved by the University of Miami's Institutional Review Board. Participants completed informed consent online prior to initiating the survey. After providing consent, participants completed a questionnaire battery, including the measures described above, as well as a demographics questionnaire. At the end of the survey, participants were compensated \$1.00 for their time. This rate of compensation is commensurate with previous MTurk research (e.g., Horton & Chilton, 2010).

Data Analytic Plan

Structural equation modeling was conducted using MPlus (Version 6.12; Muthén & Muthén, 1998–2011). Analyses were first conducted to examine whether the five indicators loaded onto a Repetitive Negative Thinking latent factor. Model fit was assessed using the χ^2 test of model fit, root mean square error of approximation (RMSEA), comparative fit index (CFI), and Standardized Root Mean Square Residual (SRMR) based on recommendations laid forth by Hooper, Coughlan, and Mullen (2008), as well as through the examination of factor loadings. Analyses were then conducted to examine the associations between the latent factor and depression, physiological anxiety, and social anxiety symptoms.

To examine associations between measures of repetitive negative thinking and psychological symptoms, SPSS Statistics (Version 22; IBM Corp., 2013) and a Microsoft Excel macro for examining the significance of the difference between dependent *r*s (Cohen & Cohen, 1983) were used to determine how each measure of repetitive negative thinking was differentially related to symptoms of depression, physiological anxiety, or social anxiety.

TABLE 1. Study 1 Descriptive Statistics for Measures of Repetitive Negative Thinking (RRS, PEPQ-R, Dampening, RTQ-RNT, RTQ-ART) and Psychological Symptoms (CES-D, DASS-Anxiety, SIAS)

Measure	α	<i>M (SD)</i>	Minimum	Maximum
RRS	.94	47.15 (14.62)	22	76
PEPQ-R	.94	38.66 (29.28)	0.00	98.50
Dampening	.87	15.28 (5.43)	8	30
RTQ-RNT	.95	82.17 (23.18)	27	129
RTQ-ART	.87	8.08 (3.94)	4	20
CES-D	.93	16.70 (12.25)	0	45
DASS-Anxiety	.86	9.76 (10.29)	0	38
SIAS	.96	34.17 (18.67)	0	80

Note. RRS = Ruminative Responses Scale; PEPQ-R = Post-Event Processing Scale—Revised; Dampening = Dampening subscale of the Responses to Positive Affect Scale; RTQ-RNT = Repetitive Negative Thinking subscale of the Repetitive Thinking Questionnaire; RTQ-ART = Absence of Repetitive Thinking subscale of the Repetitive Thinking Questionnaire; CES-D = Center for Epidemiological Studies Depression Scale; DASS-Anxiety = Anxiety subscale of the Depression, Anxiety, Stress Scales; SIAS = Social Interaction Anxiety Scale.

RESULTS

Sample Characteristics

Descriptive statistics for all measures are presented in Table 1. Overall, internal consistency ranged from good to excellent (all α s \geq .86) and each measure was normally distributed. Notably, participants endorsed higher levels of psychological symptoms, particularly depression and social anxiety, than are typically seen in nonclinical samples. On the CES-D, the sample mean was higher than the recommended clinical cutoff of 16 (Radloffs, 1977) and 44% of the sample met this threshold. Likewise, on the SIAS, the sample mean was just shy of the recommended clinical cutoff of 36 and 48% of the sample met this threshold. The sample mean on the DASS-Anxiety fell within the Mild anxiety range (Lovibond & Lovibond, 1995).

Repetitive Negative Thinking Latent Factor and Psychological Symptoms

Model 1 examined the presence of a Repetitive Negative Thinking latent factor as indicated by the RRS, PEPQ-R, the Dampening subscale of the RPA, and the RTQ-RNT and RTQ-ART sub-

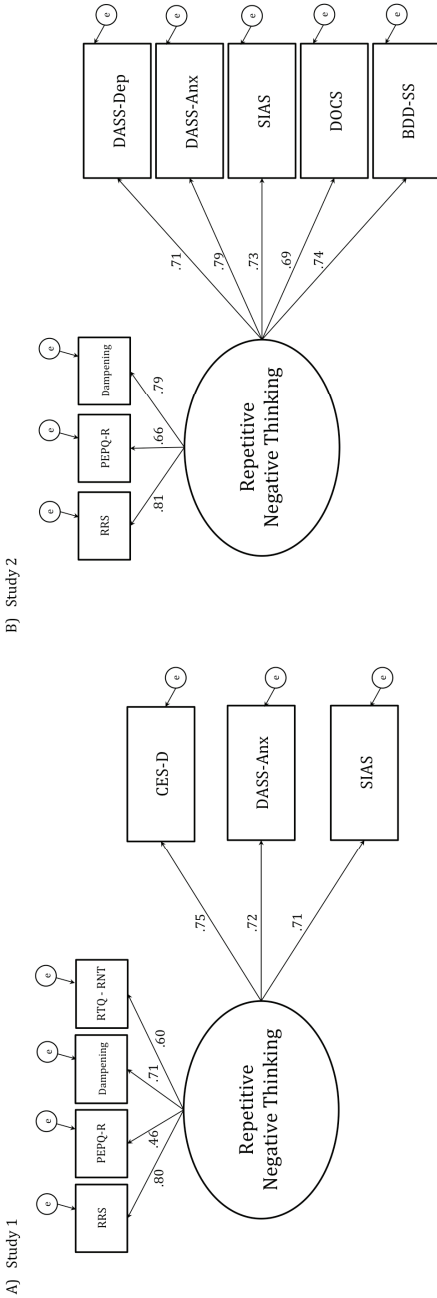


FIGURE 1. Final models examining relations between a latent Repetitive Negative Thinking factor and psychological symptom measures.

Note. Models present standardized coefficients; All $ps < .001$; Study 2 model includes correlated residuals between (1) RRS and DASS-Depression, (2) Dampening and DASS-Depression, and (3) PEPQ-R and SIAS; RRS = Ruminative Responses Scale; PEPQ-R = Post-Event Processing Scale-Revised; Dampening = Dampening subscale of the Repetitive Thinking Questionnaire; RTQ-RNT = Repetitive Negative Thinking subscale of the Repetitive Thinking Questionnaire; CES-D = Center for Epidemiological Studies Depression Scale; DASS-Anx = Anxiety subscale of the Depression, Anxiety, Stress Scales; SIAS = Social Interaction Anxiety Scale; DASS-Dep = Depression subscale of the Depression, Anxiety, Stress Scales-21; DOCS = Dimensional Obsessive-Compulsive Scale; BDD-SS = Body Dysmorphic Disorder-Symptom Scale.

TABLE 2. Inter-Correlations Among Measures of Repetitive Negative Thinking and Psychological Symptoms Measures in Study 1

	2.	3.	4.	5.	6.	7.	8.
1. RRS	.36**	.58**	.52**	-.10	.60**	.57**	.56**
2. PEPQ-R	-	.27*	.32**	.08	.24*	.41**	.44**
3. Dampening	-	-	.38**	.11	.59**	.52**	.50**
4. RTQ-RNT	-	-	-	-.15	.46**	.41**	.41**
5. RTQ-ART	-	-	-	-	-.02	.03	-.05
6. CES-D	-	-	-	-	-	.57**	.55**
7. DASS-Anx	-	-	-	-	-	-	.52**
8. SIAS	-	-	-	-	-	-	-

Note. RRS = Ruminative Responses Scale; PEPQ-R = Post-Event Processing Scale-Revised; Dampening = Dampening subscale of the Responses to Positive Affect Scale; RTQ-RNT = Repetitive Negative Thinking subscale of the Repetitive Thinking Questionnaire; RTQ-ART = Absence of Repetitive Thinking subscale of the Repetitive Thinking Questionnaire; CES-D = Center for Epidemiological Studies Depression Scale; DASS-Anxiety = Anxiety subscale of the Depression, Anxiety, Stress Scales; SIAS = Social Interaction Anxiety Scale. * $p < .01$; ** $p < .001$.

scales. This model was not a good fit to the data, $\chi^2(5) = 12.37$, $p = .03$; RMSEA = .11; CFI = .94; SRMR = .05. Whereas the RRS, PEPQ-R, Dampening subscale, and RTQ-RNT subscale were all significant indicators of the latent construct ($ps < .001$), the RTQ-ART subscale was not ($\beta = -.08$, $SE = .10$, $p = .45$). Given this, we tested a modified model in which we removed the RTQ-ART as an indicator. Here, the model fit the data well, $\chi^2(2) = 1.07$, $p = .58$; RMSEA = .00; CFI = 1.00; SRMR = .02, and each indicator loaded onto the latent factor (RRS: $\beta = .87$, $B = .91$, $SE = .06$; PEPQ-R: $\beta = .43$, $B = .90$, $SE = .08$; Dampening: $\beta = .66$, $B = .26$, $SE = .07$; RTQ-RNT: $\beta = .60$, $B = 1.00$, $SE = .07$; all $ps < .001$).

Next, participants' CES-D, DASS-Anxiety, and SIAS scores were regressed onto the latent factor. This model fit the data well, $\chi^2(11) = 16.12$, $p = .14$; RMSEA = .06; CFI = .99; SRMR = .03. In addition, results supported the hypothesis, as the latent factor was significantly associated with each of the three symptom measures (CES-D: $\beta = .76$, $B = .67$; $SE = .05$; DASS-Anxiety: $\beta = .72$, $B = .54$; $SE = .06$; SIAS: $\beta = .71$, $B = .96$, $SE = .05$, all $ps < .001$). This final model is presented in Panel A of Figure 1.

Associations between Indicators and Psychological Symptoms. All inter-correlations among variables are presented in Table 2. Unsurprisingly, the RRS, PEPQ-R, Dampening subscale of the RPA, and RTQ-RNT were each significantly correlated with each

TABLE 3. Tests of the Difference in Magnitude in Correlations Between Measures of Repetitive Negative Thinking and Psychological Symptoms

Measure	<i>t</i> (<i>df</i> = 123)	<i>p</i>
RRS		
CES-D vs. DASS-Anx	.45	.65
DASS-Anx vs. SIAS	.71	.48
SIAS vs. CES-D	.16	.87
PEPQ-R		
CES-D vs. DASS-Anx	3.99	< .001
DASS-Anx vs. SIAS	1.42	.16
SIAS vs. CES-D	1.26	.21
Dampening		
CES-D vs. DASS-Anx	.31	.76
DASS-Anx vs. SIAS	0.00	1.00
SIAS vs. CES-D	.80	.43
RTQ-RNT		
CES-D vs. DASS-Anx	1.38	.17
DASS-Anx vs. SIAS	1.30	.20
SIAS vs. CES-D	1.87	.06

Note. RRS = Ruminative Responses Scale; PEPQ-R = Post-Event Processing Scale-Revised; Dampening = Dampening subscale of the Responses to Positive Affect Scale; RTQ-RNT = Repetitive Negative Thinking subscale of the Repetitive Thinking Questionnaire; CES-D = Center for Epidemiological Studies Depression Scale; DASS-Anxiety = Anxiety subscale of the Depression, Anxiety, Stress Scales; SIAS = Social Interaction Anxiety Scale.

other, as well as with symptoms of depression, physiological anxiety, and social anxiety. The RTQ-ART was not significantly correlated with either the other measures of repetitive negative thinking or with the three symptom measures.

The magnitude of the associations between measures of repetitive negative thinking and psychological symptoms was thus examined for all measures except the RTQ-ART. These results are presented in Table 3. Findings revealed no significant differences in the magnitude of associations between the RRS and symptom measures, the Dampening subscale of the RPA and symptom measures, or between the RTQ-RNT and symptom measures. These measures of repetitive negative thinking were similarly associated with symptoms of depression, physiological anxiety, or social anxiety. In contrast, the PEPQ-R was more strongly related to symptoms of physiological anxiety ($r = .41$) than to symptoms of depression ($r = .24$).

DISCUSSION

Study 1 examined repetitive negative thinking as a transdiagnostic correlate of depression and anxiety symptoms in a sample of individuals recruited from MTurk. The study's first aim tested the assertion that measures of repetitive negative thinking load onto a single latent factor. As predicted, the RRS, PEPQ-R, Dampening subscale of the RPA, and the RTQ-RNT were all significant indicators of a latent Repetitive Negative Thinking factor. The second aim was to examine the associations between this latent factor and symptoms of depression, physiological anxiety, and social anxiety. Again, results confirmed hypotheses, as greater repetitive negative thinking was associated with greater symptom severity across each of the three symptom measures.

Conversely, our findings revealed that the RTQ-ART did not load onto the latent factor, nor was it significantly associated with any of the three symptom measures. This suggests that the ability to disengage from thoughts, as it is captured by the RTQ-ART, is not simply the inverse of repetitive negative thinking, but rather an orthogonal cognitive style that is unassociated with either repetitive negative thinking or symptoms of depression and anxiety. Though contrary to our hypothesis, these findings are consistent with some previous literature (e.g., McEvoy et al., 2010). Considering the current findings in conjunction with previous research, it is concluded that the RTQ-ART subscale is not especially relevant to research on repetitive negative thinking.

The final aim of Study 1 was to examine the unique associations between each repetitive negative thinking measure and psychological symptom measures. Results partially supported predictions based on a bifactor conceptualization of repetitive negative thinking (McEvoy & Brans, 2013; Topper et al., 2014). The RRS, PEPQ-R, Dampening subscale, and the RTQ-RNT were each correlated with symptoms of depression, physiological anxiety, and social anxiety. However, when the magnitude of the associations between measures of repetitive negative thinking and clinical symptoms were compared, only one out of twelve comparisons emerged as significant.

STUDY 2

METHOD

Participants

A sample of $N = 228$ individuals were recruited from MTurk for participation in Study 2. Eligibility criteria were identical to those reported in Study 1. The average age was 31.01 ($SD = 8.75$) years, 50% of the sample identified as female, and 87% of the sample identified as White/Caucasian.

Measures of Repetitive Negative Thinking

Study 2 included the RRS, PEPQ-R, and the Dampening subscale of the RPA as measures of repetitive negative thinking.

Measures of Psychological Symptoms

The study included the DASS-Anxiety as a measure of physiological anxiety and the SIAS as a measure of social anxiety. In addition, Study 2 included the Depression subscale of the DASS-21, Dimensional Obsessive-Compulsive Scale, and the Body Dysmorphic Disorder-Symptom Scale. Descriptions of these latter measures are provided below.

Depression Subscale of the DASS-21 (DASS-Depression; Henry & Crawford, 2005). Study 2 employed the 7-item Depression subscale of the DASS-21 to assess current depression symptom severity. Participants rated the extent to which they were bothered by each symptom on a scale from 0 (Did not apply to me at all) to 3 (Applied to me very much).

Dimensional Obsessive-Compulsive Scale (DOCS). The DOCS (Abramowitz et al., 2010) is a 20-item measure of obsessive-compulsive symptoms. Items are rated on a scale from 0 to 4 (anchors vary across items), based on the extent to which they applied to the participant in the past month.

Body Dysmorphic Disorder-Symptom Scale (BDD-SS). The BDD-SS (Wilhelm, 2006; Wilhelm, Phillips, & Steketee, 2012) is a 55-item questionnaire that assesses seven BDD symptom clusters. Par-

TABLE 4. Study 2 Descriptive Statistics for Measures of Repetitive Negative Thinking (RRS, PEPQ-R, Dampening) and Psychological Symptom Measures (DASS-Anxiety, DASS-Depression, SIAS, DOCS, and BDD-SS)

Measure	α	<i>M</i> (<i>SD</i>)	Minimum	Maximum
RRS	.95	45.63 (14.76)	22	81
PEPQ-R	.98	22.60 (30.59)	0.00	100.00
Dampening	.87	15.22 (5.10)	8	27
DASS-Anxiety	.89	8.06 (9.29)	0	42
DASS-Depression	.93	11.76 (11.28)	0	42
SIAS	.97	36.14 (21.21)	0	80
DOCS	.94	12.67 (11.63)	0	53
BDD-SS	.94	15.25 (10.62)	0	44

Note. RRS = Ruminative Responses Scale; PEPQ-R = Post-Event Processing Scale—Revised; Dampening = Dampening subscale of the Responses to Positive Affect Scale; DASS-Anxiety = Anxiety subscale of the Depression, Anxiety, Stress Scales; DASS-Depression = Depression subscale of the Depression, Anxiety, Stress Scales; SIAS = Social Interaction Anxiety Scale; DOCS = Dimensional Obsessive Compulsive Scale; BDD-SS = Body Dysmorphic Disorder – Symptom Scale.

participants rate the overall severity of each symptom cluster during the past week using a scale from 0 (no problem) to 10 (very severe).

Procedures

MTurk workers who participated in Study 1 were ineligible to participate in Study 2. Procedures were identical to those described in Study 1. However, participants were informed that the survey, which included several other questionnaires assessing constructs beyond the scope of the current investigation, would take approximately one hour to complete and were compensated \$6.00 for their time and effort.

Data Analytic Plan

The data analytic plan employed in Study 2 was very similar to that described in Study 1. Sample characteristics were again examined using SPSS Statistics (Version 22; IBM Corp., 2013). Structural equation modeling was conducted using MPlus (Version 6.12; Muthén & Muthén, 1998–2011) and model fit was assessed using the χ^2 test of model fit, RMSEA, CFI, and SRMR, as well as through the examination of factor loadings and path coefficients.

RESULTS

Sample Characteristics

Descriptive statistics for all measures are presented in Table 4. Overall, internal consistency ranged from good to excellent (all α s \geq .87) and each measure was normally distributed. Again, participants reported elevated levels of social anxiety. DASS-Anxiety and DASS-Depression scores were both in the “Mild” range. The sample’s DOCS and BDD-SS means were comparable to those previously reported in nonclinical samples (Abramowitz et al., 2010; Fang et al., 2011). Consistent with findings from Study 1, measures of repetitive negative thinking were all correlated with each other (r s ranged from .49 to .54, all p s $<$.001), as well as with each of the five symptom measures (r s ranged from .46 to .71, all p s $<$.001).

Repetitive Negative Thinking Latent Factor and Psychological Symptoms

To test the hypothesis that the Repetitive Negative Thinking latent factor would predict elevated scores across the five symptom measures, participants’ DASS-Depression, DASS-Anxiety, SIAS, DOCS, and BDD-SS scores were regressed onto a latent factor indicated by the RRS, PEPQ-R, and Dampening subscale of the RPA. All three measures of repetitive negative thinking loaded onto the latent factor (p s $<$.001) and that the latent factor was associated with greater symptom severity across all five symptom measures (all p s $<$.001). However, tests of model fit were mixed, with χ^2 (10) = 24.67, p = .006, and RMSEA = .08, indicating poor fit, and CFI = .99 and SRMR = .02, indicating good fit.

As a result, a second model was tested, which correlated the RRS and Dampening subscale of the RPA residuals with the DASS-Depression residual and the PEPQ-R residual with the SIAS residual. This model is presented in Panel B of Figure 1. This model fit the data well, χ^2 (7) = 6.14, p = .52; RMSEA = .00; CFI = 1.00; SRMR = .01. All three measures of repetitive negative thinking were found to load onto the latent factor (p s $<$.001). In addition, results supported our hypothesis that the latent factor would be associated with elevated levels of psychological symp-

toms. Results replicated the findings from Study 1 linking repetitive negative thinking to depression ($\beta = .71, B = .40; SE = .05, p < .001$), physiological anxiety ($\beta = .79, B = .37; SE = .04, p < .001$), and social anxiety ($\beta = .73, B = .76; SE = .07, p < .001$). Moreover, repetitive negative thinking was found to predict more severe symptoms of OCD ($\beta = .69, B = .40; SE = .04, p < .001$) and BDD ($\beta = .74, B = .48; SE = .05, p < .001$).

DISCUSSION

Study 2 sought to replicate and extend the findings from Study 1 by examining the associations between a Repetitive Negative Thinking latent factor and symptoms associated with depressive, anxiety, and obsessive-compulsive spectrum disorders. Significant factor loadings confirmed that the RRS, PEPQ-R, and Dampening subscale all loaded onto a single latent factor. In addition, results replicated findings from Study 1; greater levels of the latent factor were associated with more severe symptoms of depression, social anxiety, and physiological anxiety. Finally, Study 2 extended the results of Study 1, finding that the latent factor was associated with greater levels of obsessive-compulsive and body dysmorphic symptoms. This is consistent with previous research (Ehring & Watkins, 2008; Kollei & Martin, 2014).

Of note, though all indicators and predicted paths were significant, the first model tested produced model fit indices that were somewhat inconsistent. To improve model fit, the residuals of several measures were correlated. In particular, the RRS and Dampening subscale residuals were correlated with the DASS-Depression residual, while the PEPQ-R residual was correlated with the SIAS residual. The fact that this improved model fit provides some competing support for previous bifactor conceptualizations of repetitive negative thinking (McEvoy & Brans, 2013; Topper et al., 2014). Alternatively, when considered in conjunction with the findings from Study 1, these results may indicate that adding symptoms of OCD and BDD into the model weakened model fit. Future research may thus look to elucidate the similarities and differences between repetitive negative thinking in depressive and anxiety disorders versus obsessive-compulsive spectrum disorders.

GENERAL DISCUSSION

The current investigation sought to examine repetitive negative thinking as a correlate of affective disorders within two separate studies conducted using MTurk. Findings supported the hypothesis that several measures of repetitive negative thinking would load onto a single latent factor, as well as the hypothesis that the latent factor would predict symptoms of depression, physiological anxiety, social anxiety, OCD, and BDD. Together, such findings suggest that the measures of repetitive negative thinking included in the current investigation, most of which were borne from disorder-specific literatures (Feldman et al., 2008; McEvoy & Kingsep, 2006; Treynor et al., 2003), may actually be assessing a disorder-non-specific (i.e., transdiagnostic) vulnerability.

Despite this, there may be other reasons to continue to consider a bifactor conceptualization of repetitive negative thinking. While there was clearly much overlap between the indicators of the Repetitive Negative Thinking latent factor, the standardized factor loadings were moderate in magnitude, suggesting that there are also unique differences between each indicator. Such differences may exist, for example, in thought content (e.g., past-versus future-oriented; internal versus external focus; Nolen-Hoeksema et al., 2008), as well as in the motivation to engage in one aspect of repetitive negative thinking over another (e.g., reduce the intensity of negative versus positive emotions). Understanding these differences may be important to our ability to predict who will engage in a particular facet of repetitive negative thinking and in what context, and may inform both etiological models of affective disorders and intervention techniques.

The current investigation should be considered in light of its limitations. For instance, despite the frequency with which previous research has studied worry as a facet of repetitive negative thinking (e.g., Watkins et al., 2005; McEvoy & Brans, 2013; Topper et al., 2014), worry was not included in our models as a discrete indicator of repetitive negative thinking. The exclusion of this construct was based upon the high degree of overlap in item content between the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), the most frequently used measure of worry, and the items of the RTQ. Still, worry could

have been captured through the use of another measure, such as the Brief Measure of Worry Severity (Gladstone et al., 2005). Likewise, given the role of repetitive negative thinking in the etiology and maintenance of GAD, including a measure of GAD symptom severity (e.g., Generalized Anxiety Disorder Questionnaire; Roemer, Borkovec, Posa, & Borkovec, 1995) would have strengthened our ability to draw conclusions about the transdiagnostic breadth of repetitive negative thinking. Though neither of these limitations detracts from the findings of the current study, future studies should look to expand the scope of their investigations to include these additional constructs.

In addition, the study relied solely on self-report measures within unselected samples of MTurk participants. Reliance on self-report is an inherent limitation of MTurk studies. Despite this, there may be unique benefits of studying repetitive negative thinking with MTurk participants that outweigh this limitation. Previous research has found that MTurk participants experience higher rates of clinical symptoms than community samples (Arditte et al., 2015; Shapiro et al., 2013), and this finding was confirmed in the current investigation. As such, MTurk offers a method for recruiting a relatively large sample (as compared to typical clinical samples) of individuals reporting greater rates of psychopathology (as compared to typical undergraduate research pool or community-based samples). Nevertheless, this study should be considered a starting point for this line of research, and future studies should look to replicate findings in clinical samples and using multi-modal assessments.

Despite its limitations, this investigation adds critical knowledge to our understanding of repetitive negative thinking as a transdiagnostic phenomenon. It represents the first set of studies to directly compare measures of post-event processing, dampening, and transdiagnostic assessments of repetitive thinking styles alongside rumination, and results supported the idea that measures of these discrete constructs are all indicators of the same latent factor. In addition, repetitive negative thinking measures were each associated with a range of psychological symptoms, including depression, anxiety, and obsessive-compulsive spectrum symptomatology. Clinically, repetitive negative thinking may represent an important target of disorder-specific and trans-

diagnostic interventions. In addition, given our findings, future research may consider studying individuals reporting high levels of repetitive negative thinking as a method for elucidating issues of comorbidity across affective disorders.

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