

**The Effects of Repetitive Worry and
Rumination on State-Based Emotion Regulation**

BY

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SUMMARY

Worry and rumination are associated with both anxiety and depression, which are turn associated with broad deficits in emotion regulation. However, the nature of the relationship between worry, rumination, and emotion regulation is unclear. In the current study, we examined the impact of repetitive periods of worry and rumination on self-reported, state-based emotion regulation.

Although worry and rumination negatively impacted state-based emotion regulation *strategies*, there was no impact on the *clarity* of emotions. However, this effect was no longer significant after controlling for negative affect. Using bootstrapping procedures, we found that negative affect mediated the relationship between worry/rumination and deficits in emotion regulation strategies. Moreover, we found that worry and rumination did not differ from one another.

These results suggest that some indices of state-based emotion regulation may be state-based and vulnerable to periods of negative affect, whereas other indices may be trait-based and stable. These results also suggest that worry and rumination share similar consequences in terms of affect and affect regulation. Theoretical and clinical implications are discussed.

The Effects of Repetitive Worry and Rumination on State-Based Emotion Regulation

Worry, defined as anxious apprehension about a potential future event, is the core feature of general anxiety disorder (GAD) (American Psychiatric Association, 2000). Worry is further characterized as a cognitive attempt to prepare for and prevent potential future threats (Borkovec, Alcaine, & Behar, 2004). In contrast to worry, rumination has traditionally been associated with depression. The term *depressive rumination* refers to a maladaptive focus on one's depressive symptoms (Nolen-Hoeksema, 2000). However, other definitions of rumination include repetitive thinking about past mistakes and failures (Trapnell & Campbell, 1999), as well as brooding—making passive comparisons between one's current situation and some unattained standard (Treyner, Gonzalez, & Nolen-Hoeksema, 2003). Both types of thinking—worry and rumination—are more broadly defined as negative repetitive thinking, typically with maladaptive consequences (Watkins, 2008).

Despite their differences in content, worry and rumination overlap substantially across disorders. For example, although worry levels are highest in GAD, worry is also elevated in MDD (Chelminski & Zimmerman, 2003; Starcevic, 1995). Similarly, depressive rumination conveys vulnerability to future episodes of both depression and anxiety (Nolen-Hoeksema, 2000), and is similarly correlated with both types of symptoms in cross-sectional research (Armey et al., 2009). Lastly, in an unselected sample, worry and rumination were highly correlated with one another, and were similarly related to both anxiety and depression (Fresco, Frankel, Mennin, Turk, & Heimberg, 2002). Given high rates of comorbidity between GAD and MDD (Brown & Barlow, 1992; Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Kessler et al., 2005), common genetic factors (Kendler et al., 2003), and similarly elevated levels of

negative affect (Brown, Chorpita, & Barlow, 1998), this overlap between worry and rumination is not surprising.

In addition to sharing the common cognitive processes of worry and rumination, GAD and MDD are also associated with similar patterns of emotion dysregulation. For example, in a large unselected undergraduate sample, symptoms of GAD and MDD were both associated with difficulties on each of four dimensions of emotion regulation (ER): maladaptive management, poor understanding, and heightened intensity of emotions, as well as negative reactivity to emotions (Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). However, after controlling for depression, symptoms of GAD were uniquely associated with maladaptive management of emotions. In contrast, after controlling for GAD, symptoms of depression were uniquely associated with poor understanding of emotions. In a clinical sample, maladaptive forms of cognitive ER (rumination and suppression) were similarly and strongly associated with both depression and anxiety (Aldao & Nolen-Hoeksema, 2010). Similarly, a recent meta-analysis found that rumination, suppression, and avoidance were each associated with anxiety and depression, as well as with eating and substance-related disorders (Aldao, Nolen-Hoeksema, & Schweizer, 2010).

Emotion dysregulation in GAD may also involve difficulties with acceptance of negative emotions, goal-directed behavior and impulse control during negative emotional experiences, emotional clarity and awareness, and access to ER strategies (Gratz & Roemer, 2004). Deficits in each of these components of ER (except awareness of emotions) are associated with levels of trait worry and analogue GAD status, even after controlling for negative affect (Salters-Pedneault, Roemer, Tull, Rucker, & Mennin, 2006). Additionally, difficulties in these ER

domains are associated with severity of GAD symptoms, even after controlling for anxious affect, depressed affect, and mindfulness (Roemer et al., 2009).

Clearly, both GAD and MDD involve the overlapping and interrelated processes of worry, rumination, and emotion dysregulation. Despite the prominence of these constructs in research on GAD and related disorders, few studies have examined the potential causal link between negative repetitive thinking and emotion dysregulation. One study found that perceived coping ability (an ER-related variable) statistically mediated the relationship between worry and symptoms of anxiety and depression in an unselected sample (Hong, 2007). One possible explanation for the relationship between worry and emotion dysregulation is that the worry process actively disrupts ER. In the only previous study to examine this possibility, a brief (5-minute) worry induction was not associated with subsequent decreases in acceptance, clarity, or awareness of emotions compared to neutral and relaxation inductions; participants with GAD reported greater difficulties on these domains regardless of the induction condition (McLaughlin, Mennin, & Farach, 2007). However, worry (and neutral thinking) was associated with decreases in perceived access to emotion regulation *strategies*. Among participants in the worry and neutral inductions, those with GAD reported greater difficulties with ER strategies compared to those without GAD; among participants in the relaxation induction, no differences were found between those with GAD and those without. This suggests that state-based access to ER strategies may be more likely to be impacted by negative repetitive thinking than are other ER domains. Nonetheless, these results suggest that at least some domains of state-based ER are stable in the presence of negative repetitive thinking. However, methodological limitations may limit the conclusions drawn from this study. Most notably, the worry period was only 5-minutes long,

whereas naturally occurring periods of worry may be substantially longer. ER may be more likely to change during more prolonged periods of worry (or rumination).

An additional possible explanation for the relationship between worry and emotion dysregulation is that both are caused by a third variable, such as negative affect (NA). Given the centrality of NA and the trait-like tendency to experience NA in response to stressors (i.e., neuroticism) in models of anxiety and depression (Barlow, Allen, & Choate, 2004; Brown et al., 1998; Watson, 2005), this possibility may be especially plausible. This would suggest that state-based ER changes in response to worry or rumination, but primarily as a function of change in NA.

The current study sought to elucidate the relationships between worry, rumination, and emotion dysregulation by examining the impact of negative repetitive thinking on state-based ER. Participants were pre-selected based on high levels of GAD and depression symptoms, and were randomly assigned to undergo a 20-minute period of idiographic worry, rumination, or neutral repetitive thinking. Affect and state-based ER (*ER strategies/maladaptive management of emotions* and *clarity/poor understanding of emotions*) were assessed at baseline and at 5-minute intervals. We hypothesized that prolonged worry and rumination would lead to emotion dysregulation across all four domains compared to neutral thinking. In terms of differential effects of worry and rumination, we predicted that worry would be most strongly associated with deficits in ER strategies/maladaptive management of emotions, whereas rumination would be most strongly associated with the lack of emotional clarity/poor understanding of emotions. This prediction was based on the finding that *maladaptive management of emotions* (which is similar to ER *strategies*) is more strongly associated with symptoms of anxiety, whereas *poor*

understanding of emotions is most strongly associated with symptoms of depression (Mennin et al., 2007).

This study also examined the relationship between trait-based ER and affective responses to worry and rumination. We hypothesized that trait-based ER would moderate the effect of worry and rumination on affect, such that participants who report higher levels of emotion dysregulation would experience greater negative affect in response to worry and rumination. This prediction is based on the theoretical definition of ER as the ability to modulate responses to emotional stimuli (e.g., Gross, 1998). Additionally, we hypothesized that trait-based ER would also moderate the relationship between worry and anxious affect, as well the relationship between rumination and depressed affect, given that experimental worry inductions are most strongly associated with anxious affect, whereas rumination inductions are most strongly associated with depressed affect (McLaughlin, Borkovec, & Sibrava, 2007).

Methods

Participants

Participants were 78 undergraduate students who participated for credit in an introductory psychology course. The sample was predominantly female (83%) and racially diverse (38% Caucasian, 23% Asian/Pacific Islander, 22% Hispanic, 8% other, and 4% Black). The mean age was 19.42 years. A total of 27 participants were randomized to the worry induction, 27 were randomized to rumination, and 25 were randomized to neutral repetitive thinking. Participants were run in groups of 2-4 individuals per experimental session.

To be selected to participate, participants must have reported high levels of both GAD and depression symptoms. Although all participants met criteria for comorbid analogue GAD and depression during the pre-screening phase, not all participants continued to meet these

criteria during the time of study entry. Nonetheless, participants who did not meet full criteria for both analogue GAD and depression were include in these analyses, given that they had recently reported high levels of a variety of symptoms. Overall, the sample reported high levels of anxiety and depression (see Table 1). We selected this sample in order to understand the mechanisms of worry and rumination in the context of significant symptoms of psychopathology.

Measures

Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ is a 16-item self-report measure of the frequency and intensity of worry. Items include “I am always worrying about something” and “my worries overwhelm me.” The PSWQ has demonstrated high internal consistency and good retest reliability. Among individuals with GAD, PSWQ scores are uncorrelated with measures of anxiety and depression, suggesting that trait worry is a distinct construct. Because levels of trait worry could influence affective responses to the worry induction, the current study used the PSWQ to ensure that worry was equivalent across randomly assigned induction groups.

Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman et al., 2002). The GAD-Q-IV is a 9-item self-report measure of worry, physical symptoms of GAD, and distress and impairment associated with both worry and physical symptoms. GAD-Q-IV scores have demonstrated 2-week retest reliability and kappa agreement of .67 with structured-interview-based diagnoses of GAD. A score of 5.7 or greater yields high sensitivity (83%) and specificity (89%) to interview-diagnoses of GAD. In the current study, the GAD-Q-IV was used to select participants who met criteria for analogue GAD.

Rumination and Reflection Questionnaire, rumination subscale (RRQ; Trapnell & Campbell, 1999). The rumination subscale of the RRQ is a 12-item self-report measure of self-

and past-focused attention to mistakes, personal shortcomings, and interpersonal difficulties. Items include statements such as, “Long after an argument or disagreement is over with, my thoughts keep going back to what happened,” and “I often reflect on episodes in my life that I should no longer concern myself with.” High scores on the rumination subscale are associated with psychological distress, and internal consistency is excellent. In the current study, the rumination subscale was used to ensure that trait rumination was equivalent across randomly assigned induction groups. This measure was chosen over alternative measures of rumination (e.g., the Ruminative Responses Scale; Treynor et al., 2003) because of the conceptual similarity and temporal distinction with worry. Both scales measure intrusive and negative repetitive thoughts, yet they clearly differ in terms of temporal orientation; the PSWQ concerns future-oriented stimuli whereas the rumination subscale primarily references the past.

Beck Depression Inventory – II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure of the affective, cognitive, and behavioral symptoms of depression, including ratings of sadness, pessimism, indecisiveness, and loss of pleasure. The BDI-II has demonstrated high internal consistency and excellent retest reliability (Beck et al., 1996; Sprinkle et al., 2002). A total score of 16 or greater identifies clinical-interview-based diagnoses of current major depressive episodes with a sensitivity of .84 and a specificity of .82 (Sprinkle et al., 2002). In the current study, the BDI-II was used to select participants who met criteria for analogue depression.

Behavioral Inhibition System/Behavioral Approach System Scale (BIS/BAS Scale; Carver & White, 1994). The BIS/BAS Scale is a 24-item self-report measure of the behavioral tendencies to avoid potentially aversive or harmful stimuli (BIS; behavioral inhibition) and to approach potentially rewarding stimuli (BAS; behavioral activation). In the current study, the

BIS subscale was used as a proxy for neuroticism, the tendency to respond negatively potential stressors. Given the centrality of neuroticism in some current conceptualizations of anxiety and depression (e.g., Griffith et al., 2010; Hettema et al., 2006), the BIS was used in the current study to ensure that the relationships between ER and affective responding were not better accounted for by neuroticism.

Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The PANAS is a 20-item self-report measure of positive (e.g., excited, proud, interested) and negative (e.g., nervous, hostile, irritable) affect. In the current study, participants indicated the extent to which they experienced each emotion during the preceding repetitive thinking periods. The *in-the-moment* version of the PANAS has demonstrated high internal consistency and sensitivity to fluctuations in mood, and the negative affect (NA) subscale in particular is associated with psychopathology and psychological distress. In the current study, the PANAS was used to measure emotional responses to the repetitive-thinking inductions. Internal consistency of the NA subscale during the baseline assessment was good (Cronbach's $\alpha = .77$); internal consistency was also good during the inductions, with individual item responses collapsed across subsequent administrations ($\alpha = .88$).

Difficulties in Emotion Regulation Scale—Trait Version (DERS-T; Gratz & Roemer, 2004). The DERS-T is a 36-item self-report measure of six ER domains: (1) *nonacceptance of emotions* (e.g., “When I’m upset, I feel guilty for feeling that way”), (2) *difficulties engaging in goal-directed behavior* (e.g., “When I’m upset, I have difficulty focusing on other things”), (3) *impulse control* (e.g., “When I’m upset, I become out of control”), (4) *emotional awareness* (e.g., “I pay attention to how I feel”), (5) *access to emotion regulation strategies* (e.g., “When I’m upset, I believe that wallowing in it is all I can do”), and (6)

emotional clarity (e.g., “When I’m upset, I have difficulty making sense out of my feelings”).

The DERS-T total score has demonstrated good internal consistency and retest reliability, and is highly correlated with an alternative measure of ER (the Negative Mood Reactivity scale; Catanzaro & Mearns, 1990). The subscales have demonstrated adequate internal consistency and good retest reliability (Gratz & Roemer, 2004). In the current study, the DERS-T was used to ensure that trait-based ER was equivalent across randomly assigned induction groups, as well as to examine the effects of trait-based ER on affective responses to the inductions.

State-based emotion regulation. To assess state-based ER, we adapted the DERS-State Version (DERS-S; McLaughlin et al., 2007). The DERS-S measures *in-the-moment* perceptions of *nonacceptance*, *awareness*, *strategies*, and *clarity*. For example, “When I’m upset, I have difficulty making sense of my feelings” was reworded to, “I am having difficulty making sense of my feelings.” In the current study, each item was rephrased to reflect the previous phase (e.g., “I *had* difficulty making sense of my feelings). Participants indicated the extent to which each statement applied during the preceding repetitive thinking periods. Because *nonacceptance* and *awareness* are less strongly linked to symptoms of anxiety and depression (Mennin et al., 2007), we included only the *strategies* (DERS-S-ST) and *clarity* (DERS-S-CL) subscales. In the current study, internal consistency was excellent for baseline administrations of the DERS-S-CL (Cronbach’s $\alpha = .84$) and DERS-S-ST ($\alpha = .88$) subscales; internal consistency was similarly high during the inductions, with individual item responses collapsed across subsequent administrations (α s = .91 and .88, respectively).

We also adapted trait-based measures of *maladaptive management* (MM) and *poor understanding* (PU) of emotions (Mennin et al., 2007) to provide concurrent measures of *strategies* and *clarity*, respectively. In the trait-based version, participants indicate on a 5-point

scale the degree to which each item applies to them in general. Items on the MM subscale assess perceived control and tolerance of negative emotions (e.g., “I feel comfortable that I can control my level of anxiety”), and items on the PU subscale assesses the perceived ability to identify and interpret emotions (e.g., “I am often confused about what emotion I am feeling”). In the current study, we adapted these items to address state-based ER during the repetitive thinking inductions (e.g., “I *was* confused about what emotion I *was* feeling.”). Participants indicated the degree to which each statement applied during the preceding repetitive thinking periods. In the current study, internal consistency was good for baseline administrations of the MM (Cronbach’s $\alpha = .84$) and PU ($\alpha = .80$) subscales; internal consistency was higher during the inductions, with individual item responses collapsed across subsequent administrations (α s = .93 and .95, respectively).

Anxious, depressed, and relaxed affect. Consistent with previous studies using experimental repetitive thinking paradigms, we used single-item measures of anxious, depressed, and relaxed affect (Behar, Zuellig, & Borkovec, 2005; McLaughlin, Borkovec, & Sibrava, 2007). Participants indicated on a 1-to-5 Likert-type scale the extent to which they felt “anxious,” “depressed,” and “relaxed” during the preceding repetitive thinking periods. These items were added to assess for specific affective responses to the repetitive thinking inductions, i.e., anxious affect in response to worry or depressed affect in response to rumination.

Task engagement. Because state-based ER and affect could differ as a function of the degree of participant engagement during the experimental tasks, we assessed task engagement at multiple time-points during the induction procedures (at the end of each “phase”). Participants indicated the percentage of time during the previous phase in which they were engaged in the experimental task.

Procedure

Preliminary procedures. After completing the informed consent form, participants completed baseline trait and symptom questionnaires (PSWQ, GAD-Q-IV, RRQ, BDI-II, BIS), as well as state-based measures of *current* affect (PANAS and single-item measures) and ER (DERS-S-ST, MM, DERS-S-CL, and PU).

Participants then read definitions and instructions that corresponded to their repetitive thinking induction. Consistent with previous experimental investigations (e.g., McLaughlin et al., 2007) worry was defined as “troubling thoughts about possible future events or catastrophes” and rumination was defined as “troubling thoughts about past mistakes or failures.” This definition of rumination is also consistent with theoretical definitions (e.g., Trapnell & Campbell, 1999). Participants in the neutral induction read that they would be asked to think about past and future weekend activities with instructions regarding valence (positive vs. negative) of thought. After reviewing these instructions, participants in the worry [or rumination] inductions listed up to three topics about which they worry [or ruminate] most frequently and intensely. Participants in the neutral induction were asked to list up to three activities from the preceding or upcoming weekends. These idiographic thought samples were selected to elicit more meaningful and realistic affective responses than those that might be achieved by using nomothetical thought topics (e.g., each participant being asked to think about giving an upcoming speech). After reviewing definitions and generating topics, participants completed baseline assessments of state-based affect and ER.

Induction procedures. Participants underwent four consecutive, identical repetitive thinking inductions. Participants in the worry [or rumination] inductions were instructed as follows: “When the experimenter asks you to begin, please close your eyes and worry [or

ruminate] about your most troublesome topic as intensely as you can, until the experimenter asks you to stop. If you normally worry [or ruminate] about only one topic at time, please try to do the same during this period. However, if your thoughts change to another worry [rumination] topic, feel free to allow those thoughts to continue. It is OK to change topics if the change occurs naturally during the worry [or rumination] process.”

Participants assigned to the neutral induction were instructed as follows: “When the experimenter asks you to begin, please close your eyes and think about your weekend activities, in the way that you normally would, until the experimenter asks you to stop. If you normally think about only one activity at a time, please try to do the same during this period. However, if your thoughts change to another weekend activity, feel free to allow those thoughts to continue. Please just try to focus on past and future weekend activities.”

After reading the induction instructions, the procedure began. The inductions consisted of four phases, with each phase consisting of five one-minute periods. At the end of each one-minute period, the participants were prompted to write down the “last thing that was on [their] mind” before they were stopped by the experimenter. These thought samples were included in part to encourage participants to focus on their task. At the end of each one-minute period, participants also indicated the extent to which they noticed thoughts versus images during the preceding minute, as well as the extent to which they focused on the past, present, and future. The measure of thoughts versus images was included to replicate the previous finding that worry is more thought-based compared to rumination (McLaughlin, Borkovec, & Sibrava, 2007), and the measure of past- versus future-oriented content was included as a manipulation check, as well as to replicate previous findings that worry is relatively future-oriented whereas rumination is relatively past-oriented (McLaughlin et al., 2007; Watkins, Moulds, & Mackintosh, 2005).

These 1-minute periods (a one-minute thinking period followed by collection of the thought sample, thought/image rating, and past/present/future rating) were repeated four additional times, and five 1-minute periods constituted one “phase.” Immediately following each 5-minute phase, participants completed state-based assessments of affect and ER during the preceding repetitive thinking periods (i.e., during the previous phase). Prior to beginning the next phase, participants read a slightly modified version of the original repetitive thinking instructions. This procedure was repeated consecutively for a total of four phases, or 20 minutes of repetitive thinking (not including responses to questionnaires).

Results

Preliminary Analyses

Baseline differences. Before conducting our primary analyses, we conducted a series of univariate ANOVAs to test for baseline differences between groups on constructs that could influence affect and state-based ER in response to the repetitive thinking inductions (PSWQ, GAD-Q-IV, RRQ, BDI, NA, each DERS-T subscale, and each DERS-S subscale). Results indicated a trend for DERS-T-NON scores to differ between groups, $F(2, 74) = 2.90, p = .061$, with Tukey HSD post-hoc tests indicating that participants in the worry induction reported less acceptance of emotions compared to participants in the rumination induction ($p = .082$). Results also indicated a trend for baseline DERS-S-ST to differ between groups, $F(2, 74) = 2.63, p = .079$, such that participants in the worry induction reported greater difficulties with state-based ER strategies compared to participants in the neutral induction ($p = .067$). Finally, results indicated a trend for BDI scores to differ between groups, $F(2, 74) = 2.62, p = .079$, such that participants in the worry induction reported higher levels of depressive symptoms compared to participants in the neutral induction ($p = .068$).

Task engagement. We ran a series of four univariate ANOVAs to examine whether the percentage of time engaged in the induction during each phase differed as a function of Induction. We found a borderline-significant effect of Induction on Percent Time Engaged during Phase 1, $F(2, 74) = 2.68, p = .075$, and a Tukey HSD follow-up test revealed that participants in the rumination induction reported a higher degree of engagement compared to participants in the worry induction, $p = .069$. See Table 2 for mean levels of task engagement across inductions and phase.

Inclusion of covariates. Although none of these baseline differences (BDI, DERS-T-NON, DERS-S-ST, Percent Time Engaged – Phase 1) reached traditional levels of significance, we controlled for these variables in all subsequent MANCOVAs by including them as covariates. The reasons for this were twofold. First, given our relatively small sample size, true differences between groups could be present without reaching statistical significance. Second, given that both the worry and rumination inductions were expected to induce negative affect and emotion dysregulation, we controlled for these variables to avoid potentially finding between-groups differences that were solely due to pre-existing differences at baseline.

Effects of Inductions on Affect

To examine the affective responses to the inductions, we conducted a 3 (Induction: Worry, Rumination, Neutral) X 4 (Phase: 1st, 2nd, 3rd, 4th) mixed design MANCOVA, with Induction as the between subjects factor, Phase as the within subjects factor, and anxious affect, depressed affect, and negative affect as dependent variables. The overall MANCOVA did not reveal a significant multivariate main effect of Phase, $F(9, 603) = 1.73, p = .08$, or a Phase X Induction interaction, $F(18, 603) = .73, ns$. However, there was a significant multivariate main effect of Induction on affect, $F(3, 66) = 7.53, p < .001$; univariate follow-up tests revealed an

effect of Induction on negative, $F(2, 67) = 8.99, p < .001$, and depressed, $F(2, 67) = 9.68, p < .001$, affect but not on anxious affect, $F(2, 67) = 2.05, ns$. To examine the effects of Induction on negative and depressed affect, we conducted ANCOVAs with negative and depressed affect as dependent variables and paired comparisons between Inductions as independent variables (e.g., worry compared to neutral). Compared to participants in the neutral induction, those in the worry induction reported higher levels of negative, $F(1, 45) = 23.06, p < .001$, and depressed, $F(1, 45) = 14.72, p < .001$, affect. Participants in the rumination induction also reported higher levels of negative, $F(1, 44) = 10.88, p < .01$, and depressed, $F(1, 44) = 20.27, p < .001$, affect compared to participants in the neutral induction. Participants in the worry and rumination inductions reported similar levels of negative, $F(1, 47) = 1.83, ns$, and depressed, $F(1, 47) = .15, ns$, affect.

Effects of Inductions on Emotion Regulation

To examine the effects of the inductions on state-based emotion regulation, we conducted a 3 (Induction) X 4 (Phase) mixed design MANCOVA, with Induction as the between subjects factor, Phase as the within subjects factor, and DERS-S-CL, PU, DERS-S-ST, and MM as dependent variables. The overall MANCOVA did not reveal multivariate main effect of Phase, $F(12, 384) = 1.05, ns$, or a Phase X Induction interaction, $F(12, 384) = .71, ns$. However, there was a significant multivariate main effect of Induction, $F(4, 40) = 2.89, p < .05$; univariate follow-up tests revealed an effect of Induction on DERS-S-ST, $F(1, 43) = 7.99, p < .01$, but not on DERS-S-CL, $F(1, 43) = 1.02, ns$, PU, $F(1, 43) = .51, ns$, or MM, $F(1, 43) = .12, ns$. To examine the effect of Induction on DERS-S-ST, we conducted ANCOVAs with DERS-S-ST as the dependent variable and paired comparisons between Inductions as independent variables (e.g., worry compared to neutral). Compared to participants in the neutral condition, those in the worry condition reported higher scores (poorer emotion regulation) on the DERS-S-ST, $F(1, 45)$

= 13.70, $p < .01$. Participants in the rumination induction also reported higher scores on the DERS-S-ST compared to participants in the neutral induction, $F(1, 44) = 7.88, p < .01$.

Participants in the worry and rumination inductions reported similar scores on the DERS-S-ST, $F(1, 47) = .001, ns$.

Because (1) state-base emotion regulation could vary as a function of affect, (2) DERS-S-ST was highly correlated with both negative and depressed affect, and (3) the worry and rumination inductions were associated with higher levels of negative and depressed affect compared to the neutral induction, we examined whether DERS-S-ST still varied as a function of Induction after adding negative and depressed affect as additional covariates. We conducted a 3 (Induction) X 4 (Phase) mixed design ANCOVA with Induction as the between subjects factor, Phase as the within subjects factor, DERS-S-ST as the dependent variable, and negative and depressed affect as additional covariates. The overall ANCOVA did not reveal a main effect of Phase, $F(3, 123) = .51, ns$, or a Phase X Induction interaction, $F(3, 123) = 1.73, ns$. Importantly, there was also no main effect of Induction on DERS-S-ST, $F(1, 41) = .003, ns$, indicating that DERS-S-ST no longer varied as a function of Induction after controlling for negative and depressed affect.

Mediation Analysis

Because we found that the effect of Induction on ER strategies was no longer significant after controlling for negative and depressed affect, we conducted a mediation analysis to examine whether either of these affect variables statistically mediated the relationship between Induction and ER strategies. First, we collapsed across the worry and rumination inductions because they did not significantly differ in their report of negative and depressed affect during the inductions. This generated a dichotomous induction variable (worry/rumination or neutral).

We then applied bootstrapping procedures described by Preacher and Hayes (2008) to test a multiple mediator model with covariates using 5000 bootstrap resamples and 95% confidence intervals. We simultaneously examined the direct effects of both negative and depressed affect, while controlling for BDI, DERS-T-NON, baseline DERS-S-ST, and Percent Time Engaged – Phase 1.

Both IV-to-mediator paths (Induction to negative and depressed affect) were significant ($p < .001$), as were both mediator-to-DV paths (negative affect to DERS-S-ST, $p < .001$, and depressed affect to DERS-S-ST, $p = .031$) (see Figure 1). The total effect of Induction on DERS-S-ST was also significant, $p < .001$, but the direct effect was not. The test for the significance of the difference between the total and direct effects was significant for negative affect as a mediator (lower and upper limits = .12 and .56), but not for depressed affect as a mediator (lower and upper limits = -.02 and .45). Negative but not depressed affect mediated the relationship between the inductions and ER strategies.

Predictors of Affective Responses to Worry and Rumination

To examine whether measures of trait-based emotion regulation predicted affective response to the worry and rumination inductions, we first collapsed across the worry and rumination inductions, given that these two inductions did not differ in their report of negative and depressed affect during the inductions. We then conducted a series of regression analyses in which mean levels of negative and depressed affect were regressed onto the trait ER subscales, while controlling for neuroticism and the dependent affect variable at baseline. Trait-based measures of ER did not predict negative or depressed affect during the worry and rumination inductions (see Table 4). Because our results suggest that ER may fluctuate within an individual, we also examined whether state-based measures of ER at baseline predicted affective response to

the worry and rumination inductions. Similar to the trait ER measures, state-based ER at baseline did not predict negative or depressed affect in response to the worry and rumination inductions (see Table 5).

Discussion

We examined whether prolonged periods of worry and rumination negatively impacted state-based emotion regulation. We found that state-based ER *strategies* worsened in the context of negative repetitive thinking, whereas *management*, *clarity*, and *understanding* of emotions did not change in response to negative repetitive thinking. These results are consistent with evidence suggesting that worry is not associated with deficits in the management or understanding of emotions compared to neutral and relaxation inductions (McLaughlin et al., 2007b). These results are also consistent with evidence that ER strategies are more state-dependent compared to the other ER domains (McLaughlin et al., 2007b). This indicates that the ability to recognize and interpret emotions (i.e., emotional clarity) may be trait-based and stable in the context of NA. In contrast, domains of ER that relate to perceived access to ER strategies may be relatively state-based and thus more likely to change in the context of NA.

Interestingly, worry and rumination did not differ in their effects on ER strategies. This finding is consistent with past research demonstrating substantial cross-sectional overlap between worry and rumination (Fresco et al., 2002). Moreover, given that our worry and rumination inductions were highly similar except for the content of the idiographic stimuli, our findings may suggest that the content of negative repetitive thinking is less important in determining the deleterious effects compared to other characteristics, such as the degree of associated negative affectivity. One aspect of content that differed across our worry and rumination inductions was the temporal orientation of thought. Thus, temporal orientation may

be one aspect of content that is unimportant in determining the degree of distress that is associated with a given period of negative repetitive thinking. This hypothesis is consistent with previous research that found that worry and rumination, despite differing in content and temporal orientation, produced similar levels of NA (McLaughlin et al., 2007a).

The finding that worry and rumination did not differ in their effects on ER strategies may also suggest that ER theories of GAD (e.g., Mennin et al., 2007; Roemer et al., 2009) are applicable to other forms of psychopathology. Indeed, emotion dysregulation has been identified across a variety of forms of psychopathology, and likely represents a cross-diagnostic process (Aldao et al., 2010). Similarly, negative repetitive thinking may also represent a cross-diagnostic process (Ehring & Watkins, 2008; McEvoy, Mahoney, Moulds, 2010). Thus, theories that explicate the specific role of the worry process (as opposed to overall levels of GAD symptoms) in emotion dysregulation may also apply to other forms of negative repetitive thinking (e.g., rumination). For example, one explanation for the relationship between worry and emotion dysregulation in GAD is that the worry process interferes with the mindful acceptance of negative emotional experiences (Salters-Pednault et al., 2006), which in turn has been defined as one component of ER (Gratz & Roemer, 2004). Our findings indicate that other forms of negative repetitive thinking (e.g., rumination) may be similarly disruptive to ER processes.

Importantly, after controlling for NA, the effect of negative repetitive thinking on ER was no longer significant. A subsequent mediation analysis indicated that negative and depressed affect mediated the relationship between worry/rumination and state-based ER strategies. One interpretation of this finding is that worry and rumination lead to decreased mood, which in turn leads to emotion dysregulation. Given that the mediation model is unable to temporally distinguish negative and depressed affect from ER strategies, an alternative interpretation is that

worry and rumination lead to emotion dysregulation, which in turn leads to negative and depressed affect. Yet another interpretation is that the DERS-S-ST subscale overlaps with NA to such a degree that they do not represent distinct constructs. Indeed, the Pearson correlation coefficient between baseline measures of ER strategies and NA was extremely high ($r = .76$). This interpretation is consistent with previous concerns raised over the measurement and conceptualization of ER in the psychopathology literature. In particular, some theorists have argued that emotion *regulation* is not sufficiently distinguished from emotional *reactivity* (Lewis, Zinbarg, & Durban, 2010). In other words, the initial emotional response is confounded with processes that subsequently modulate that emotional response. Future investigations should seek to more clearly distinguish between the emotional responses to the experimental manipulation from the regulation of that emotional response. Methodologically, this may be achieved by including separate negative repetitive thinking and emotion inductions (e.g., a worry induction followed by a distinct emotional stimulus).

In terms of predictors of emotional responses to the worry and rumination inductions, we found limited utility in the ER constructs. Although the theoretical definitions of ER would indicate that participants higher in emotion dysregulation would report greater difficulties regulating affective responses to worry and rumination—and thus experience greater negative, anxious, and depressed affect—none of the trait- or state-based ER variables predicted affective responses. These findings may highlight shortcomings in the ER measures used in the current study. Alternatively, the emotional impact of the worry and rumination inductions may have been too weak to necessitate ER. Indeed, mean levels of NA during both the worry and rumination inductions were between 2 (“a little”) and 3 (“moderate”), despite idiographic inductions and high levels of anxiety and depression symptoms. In fact, the relative lack of

distress may have also precluded the impact of worry and rumination on the *clarity* and *poor understanding* ER subscales.

In addition to the limitations discussed above, the current study utilized self-report questionnaires to assess complex constructs that involve cognitive, affective, and behavioral responses. It is possible that ER is more sensitively measured using objective assessments over subjective assessments. Nonetheless, the use of self-report allowed for an efficient assessment of a wide variety of constructs, and thus allowed us to examine relationships between multiple domains of emotion and ER.

In conclusion, we found that some domains of ER were context-dependent, whereas other domains were trait-like and relatively stable. In particular, we found that ER *strategies*, but not clarity, understanding, or maladaptive management of emotions, were similarly adversely affected by worry and rumination. However, the relationship between worry/rumination and ER strategies was no longer significant after controlling for NA. Moreover, negative and depressed affect mediated the relationship between worry/rumination and ER strategies. This may indicate that worry and rumination lead to negative and depressed affect, which in turn lead to emotion dysregulation, or that worry and rumination simultaneously lead to both negative and depressed affect and emotion dysregulation. Future studies should continue to examine the relationship between negative repetitive thinking and ER with state-based measures of ER that overlap less highly with NA. Future studies should also aim to use negative repetitive thinking inductions that result in higher levels of emotional reactivity.

CITED LITERATURE

1. American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
2. Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behavior Therapy*, 35, 205-230.
3. Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression Inventory Manual* (2nd ed.). San Antonio: The Psychological Corporation.
4. Behar, E., Zuellig, A. R., & Borkovec, T. D. (2005). Thought and imaginal activity during worry and trauma recall. *Behavior Therapy*, 36, 157-168.
5. Borkovec, T. D., Alcaine, O., & Behar, E. (2004). Avoidance theory of worry and generalized anxiety disorder. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 77-108). New York: The Guilford Press.
6. Brown, T. A., & Barlow, D. H. (1992). Comorbidity among anxiety disorders: Implications for treatment and DSM-IV. *Journal of Consulting and Clinical Psychology*, 60(6), 835-844.
7. Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among Dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, 107(2), 179-92.
8. Brown, T. A., Campbell, L. A., Lehman, C. L., Grisham, J. R., & Mancill, R. B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology*, 110(4), 585-599.
9. Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, 67(2), 319-333.
10. Catanzaro, S. J., & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment*, 54(3-4), 546-563.
11. Ehring, T. & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy*, 1, 192-205.
12. Fresco, D. M., Frankel, A. N., Mennin, D. S., Turk, C. L., & Heimberg, R. G. (2002). Distinct and overlapping features of rumination and worry: The relationship of cognitive production to negative affective states. *Cognitive Therapy and Research*, 26(2), 179-188.

13. Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54.
14. Griffith, J. W., Zinbarg, R. E., Craske, M. G., Mineka, S., Rose, R. D., Waters, A. M., & Sutton, J. M. (2010). Neuroticism as a common dimension in the internalizing disorders. *Psychological Medicine*, 40(7), 1125-1136.
15. Hettema, J. M., Neale, M. C., Myers, J. M., Prescott, C. A., & Kendler, K. S. (2006). A population-based twin study of the relationship between neuroticism and internalizing disorders. *American Journal of Psychiatry*, 163, 857-864.
16. Kendler, K. S., Prescott, C. A., Myers, J., & Neale, M. C. (2003). The structure of genetic and environmental risk factors for common psychiatric and substance use disorders in men and women. *Archives of General Psychiatry*, 60, 929-937.
17. Kessler, R. C., Chiu, W. T., Demler, O., Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey replication. *Archives of General Psychiatry*, 62, 617-627.
18. Lewis, A. R., Zinbarg, R. E., & Durbin, C. E. (2010). Advances, problems, and challenges in the study of emotion regulation: A commentary. *Journal of Psychopathology and Behavioral Assessment*, 32, 83-91.
19. McEvoy, P. M., Mahoney, A. E., & Moulds, M. L. (2010). Are worry, rumination, and post-event processing one and the same?: Development of the repetitive thinking questionnaires. *Journal of Anxiety Disorders*, 24(5), 509-519.
20. McLaughlin, K. A., Borkovec, T. D., & Sibrava, N. J. (2007a). The effects of worry and rumination on affect states and cognitive activity. *Behavior Therapy*, 38, 23-38.
21. McLaughlin, K. A., Mennin, D. S., & Farach, F. J. (2007b). The contributory role of worry in emotion generation and dysregulation in generalized anxiety disorder. *Behaviour Research and Therapy*, 45, 1735-1752.
22. Mennin, D. S., Holaway, R. M., Fresco, D. M., Moore, M. T., & Heimberg, R. G. (2007). Delineating components of emotion and its dysregulation in anxiety and mood psychopathology. *Behavior Therapy*, 38, 284 - 302.
23. Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, 28(6), 487-95.

24. Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, 49, 377-412.
25. Newman, M. G., Zuellig, A. R., Kachin, K. E., Constantino, M. J., Przeworski, A., Erickson, T., et al. (2002). Preliminary reliability and validity of the generalized anxiety disorder questionnaire-IV: A revised self-report diagnostic measure of generalized anxiety disorder. *Behavior Therapy*, 33(2), 215-233.
26. Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, 102(1), 20-28.
27. Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, 109(3), 504-511.
28. Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879-891.
29. Roemer, L., Lee, J. K., Salters-Pedneault, K., Erisman, S. M., Orsillo, S. M., & Mennin, D. S. (2009). Mindfulness and emotion regulation difficulties in generalized anxiety disorder: Preliminary evidence for independent and overlapping contributions. *Behavior Therapy*, 40, 142-154.
30. Salters-Pedneault, K., Roemer, L., Tull, M. T., Rucker, L., & Mennin, D. S. (2006). Evidence of broad deficits in emotion regulation associated with chronic worry and generalized anxiety disorder. *Cognitive Therapy and Research*, 30, 469-480.
31. Sprinkle, S. D., Lurie, D., Insko, S. L., Atkinson, G., Jones, G. L., Logan, A. R., & Bissada, N. N. (2002). Criterion validity, severity cut scores, and test-retest reliability of the Beck Depression Inventory-II in a university counseling center sample. *Journal of Counseling Psychology*, 49(3), 381-385.
32. Starcevic, V. (1995). Pathological worry in major depression: A preliminary report. *Behaviour Research and Therapy*, 33(1), 55-56.
33. Trapnell, P. D., & Campbell, J. D. (1999). Private self-consciousness and the five-factor model of personality: Distinguishing rumination from reflection. *Journal of Personality and Social Psychology*, 76(2), 284-304.
34. Watkins, E. R., Moulds, M., & Mackintosh, B. (2005). Comparisons between rumination and worry in a non-clinical population. *Behaviour Research and Therapy*, 43(12), 1577-85.
35. Watkins, E. R. (2008). Constructive and unconstructive repetitive thought. *Psychological Bulletin*, 134(2), 163-206.

36. Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063-1070.
37. Watson, D. (2005). Rethinking the mood and anxiety disorders: A quantitative hierarchical model for DSM-V. *Journal of Abnormal Psychology*, 114(4), 522-536.

Table 1

Means and Standard Deviations of Trait Measures

	Worry		Rumination		Neutral	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
DERS-T-Clarity	12.78	3.43	11.77	3.37	11.58	3.41
DERS-T-Strategies	21.37	6.74	19.73	7.36	18.96	7.67
DERS-T-Awareness	15.93	5.05	15.62	5.31	14.88	6.48
DERS-T-Nonacceptance ¹	18.22	6.05	14.81	4.75	15.08	6.27
DERS-T-Goals	18.59	4.40	17.38	4.21	18.08	5.06
DERS-T-Impulse	14.37	5.23	13.43	5.19	12.38	3.77
BDI-II ² (Baseline)	23.48	9.62	20.04	8.23	17.88	8.58
GAD-Q-IV (Baseline)	8.71	2.31	7.87	2.34	7.80	2.97
RRQ	47.26	6.97	47.62	6.82	46.79	8.02
PSWQ	61.74	8.81	58.69	10.63	60.25	11.34
BIS	22.59	3.71	23.58	2.91	22.38	3.08
<i>BDI-II (Pre-screen)</i>	19.00	4.94	19.08	5.68	25.92	7.88
<i>GAD-Q-IV (Pre-screen)</i>	9.49	.37	8.68	.26	11.20	.77

Notes. ¹ = Worry > Rumination, $p = .082$; ² = Worry > Neutral, $p = .068$. DERS-T = Difficulties with Emotion Regulation Scale – Trait Version; BDI = Beck Depression Inventory – II; GAD-Q-IV = Generalized Anxiety Disorder Questionnaire for DSM-IV; RRQ = Rumination and Reflection Questionnaire; PSWQ = Penn State Worry Questionnaire; BIS = Behavioral Inhibition Scale. Higher values indicate greater emotion dysregulation/symptom severity.

Table 2

Mean Percentages of Time Engaged in the Task

	Worry		Rumination		Neutral	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Phase 1 ¹	74.26	13.28	84.46	12.57	77.08	22.45
Phase 2	72.85	20.18	71.83	19.15	62.27	31.84
Phase 3	61.54	22.39	71.00	25.76	55.91	35.15
Phase 4	59.38	28.68	71.32	29.25	53.83	36.44

Notes. ¹ = Rumination > Worry, $p = .069$.

Table 3

Pearson Correlations Coefficients for State Measures Administered During the Inductions

	1	2	3	4	5	6	7
1. DERS-S-Strategies	-	.65**	.33*	.49**	.76**	.74**	.44**
2. Maladaptive Mgmt.	-	-	.31*	.25	.45**	.40**	.29*
3. DERS-S-Clarity	-	-	-	.78**	.33*	.19	.27
4. Poor Understanding	-	-	-	-	.51**	.34*	.40*
5. Negative Affect	-	-	-	-	-	.81**	.54*
6. Depressed Affect	-	-	-	-	-	-	.32*
7. Anxious Affect	-	-	-	-	-	-	-

Notes. * = $p < .05$; ** = $p < .01$. DERS-S = Difficulties with Emotion Regulation Scale – State Version. Higher values indicate greater emotion dysregulation/affect intensity.

Table 4

Regression Analyses of Trait-Based Emotion Regulation Variables as Predictors of Negative and Depressed Affect During the Worry and Rumination Inductions

		Negative Affect	Depressed Affect
(1)	BIS	$\beta = .10, t(50) = .68, ns$	$\beta = .23, t(50) = 1.51, ns$
	DERS-T-Clarity	$\beta = .21, t(50) = 1.40, ns$	$\beta = -.11, t(50) = -.71, ns$
(2)	BIS	$\beta = .24, t(50) = .24, ns$	$\beta = .22, t(50) = 1.41, ns$
	DERS-T-Strategies	$\beta = -.10, t(50) = -.64, ns$	$\beta = -.08, t(50) = -.50, ns$
(3)	BIS	$\beta = .19, t(50) = 1.36, ns$	$\beta = .19, t(50) = 1.33, ns$
	DERS-T-Awareness	$\beta = .02, t(50) = .15, ns$	$\beta = -.01, t(50) = -.09, ns$
(4)	BIS	$\beta = .07, t(50) = .43, ns$	$\beta = .18, t(50) = 1.13, ns$
	DERS-T-Nonacceptance	$\beta = .25, t(50) = 1.57, ns$	$\beta = .01, t(50) = .04, ns$
(5)	BIS	$\beta = .23, t(50) = 1.54, ns$	$\beta = .26, t(50) = 1.81, ns$
	DERS-T-Goals	$\beta = -.11, t(50) = -.72, ns$	$\beta = -.22, t(50) = -1.54, ns$
(6)	BIS	$\beta = .21, t(50) = 1.49, ns$	$\beta = .20, t(50) = 1.47, ns$
	DERS-T-Impulse	$\beta = -.13, t(50) = -.96, ns$	$\beta = -.15, t(50) = -1.06, ns$

Notes. Behavioral Inhibition System scale (i.e., neuroticism); DERS-T = Difficulties with Emotion Regulation – Trait Version.

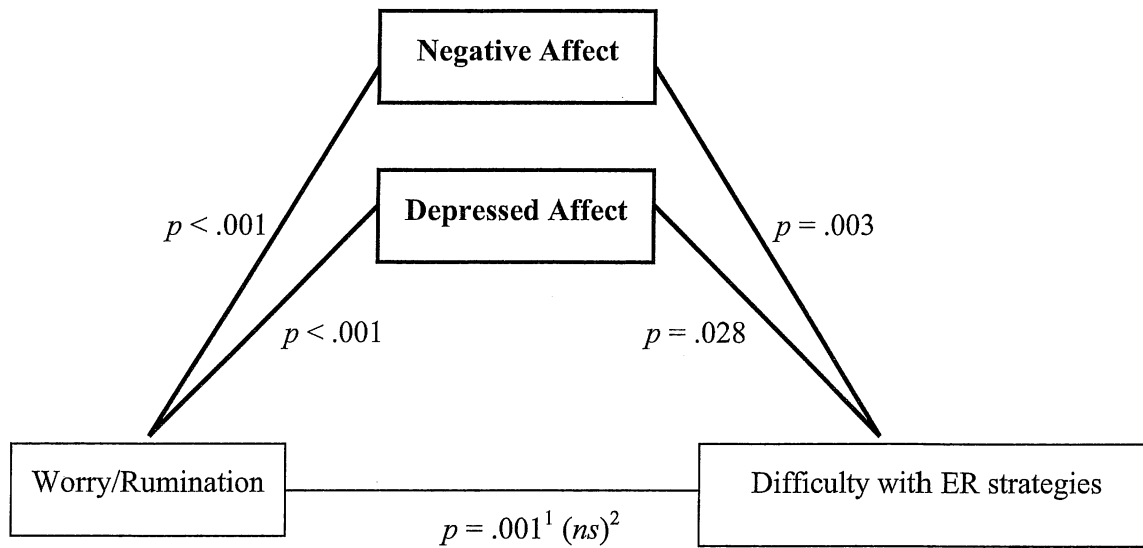
Table 5

Regression Analyses of State-Based Emotion Regulation Variables at Baseline as Predictors of Negative and Depressed Affect During the Worry and Rumination Inductions

		Negative Affect	Depressed Affect
(1)	BIS	$\beta = .15, t(50) = 1.01, ns$	$\beta = .18, t(50) = 1.20, ns$
	DERS-S-Clarity	$\beta = .11, t(50) = .75, ns$	$\beta = .02, t(50) = .12, ns$
(2)	BIS	$\beta = .16, t(50) = .24, ns$	$\beta = .17, t(50) = 1.20, ns$
	Poor Understanding	$\beta = .21, t(50) = 1.16, ns$	$\beta = .12, t(50) = .82, ns$
(3)	BIS	$\beta = .23, t(50) = 1.50, ns$	$\beta = .19, t(50) = 1.33, ns$
	DERS-S-Strategies	$\beta = -.15, t(50) = -1.05, ns$	$\beta = -.03, t(50) = -.22, ns$
(4)	BIS	$\beta = .14, t(50) = .91, ns$	$\beta = .13, t(50) = .88, ns$
	Maladaptive Management	$\beta = .14, t(50) = .95, ns$	$\beta = .14, t(50) = .93, ns$

Notes. Participants in the neutral condition are not included in the above analyses. Behavioral Inhibition System scale (i.e., neuroticism); DERS-S = Difficulties with Emotion Regulation – State Version.

Figure 1. Multiple mediator model representing the relationships between Worry/Rumination, negative and depressed affect, and state-based ER strategies.



Notes. Boldface indicates significant mediation path. ¹ = Total effect of Worry/Rumination on ER strategies; ² = Direct effect of worry/rumination on ER strategies.

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

**Approval Notice
Initial Review (Response To Modifications)**

August 30, 2010

Daniel Conybeare, BS
Psychology
1007 W Harrison
Psychology, M/C 285
Chicago, IL 60612
Phone: (319) 270-5380

RE: **Protocol # 2010-0616**
"Emotional experiences during worry and rumination"

Dear Mr. Conybeare:

Your Initial Review application (Response To Modifications) was reviewed and approved by the Expedited review process on August 30, 2010. You may now begin your research.

Please note the following information about your approved research protocol:

Protocol Approval Period: August 30, 2010 - August 29, 2011
Approved Subject Enrollment #: 120
Additional Determinations for Research Involving Minors: These determinations have not been made for this study since it has not been approved for enrollment of minors.
Performance Site: UIC
Sponsor: None
Research Protocol:
a) Emotional Experiences during Worry and Rumination; Version 1; 06/12/2010
Recruitment Materials:
a) Recruitment Letter; Version 3; 08/30/2010
b) UIC Psychology Student Subject Pool procedures will be followed for this research
Informed Consent:
a) Emotional Experiences during Worry and Rumination; Version 2; 08/15/2010

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category:

Phone: 312-996-1711

<http://www.uic.edu/depts/ovcr/oprs/>

FAX: 312-413-2929

2010-0616

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8/30/2010

(7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
07/12/2010	Initial Review	Expedited	07/29/2010	Modifications Required
08/18/2010	Response To Modifications	Expedited	08/19/2010	Modifications Required
08/30/2010	Response To Modifications	Expedited	08/30/2010	Approved

Please remember to:

→ Use your **research protocol number** (2010-0616) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the enclosure, **"UIC Investigator Responsibilities, Protection of Human Research Subjects"**

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 996-2014. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Sandra R. Costello

Sandra Costello
Assistant Director, IRB # 2
Office for the Protection of Research Subjects

Enclosures:

1. **UIC Investigator Responsibilities, Protection of Human Research Subjects**
2. **Informed Consent Document:**
 - a) Emotional Experiences during Worry and Rumination; Version 2; 08/15/2010
3. **Recruiting Material:**
 - a) Recruitment Letter; Version 3; 08/30/2010
 - b) UIC Psychology Student Subject Pool procedures will be followed for this research

cc: Gary E. Raney, Psychology, M/C 285
Evelyn Behar, Psychology, M/C 285

DANIEL CONYBEARE, B.S.
Curriculum Vitae

Graduate Student
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University of Illinois at Chicago
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EDUCATION

2009 – Present

Ph.D., Clinical Psychology (expected 2014)

University of Illinois at Chicago

Advisor: Evelyn Behar, Ph.D.

2009 – Present

M.A., Clinical Psychology (expected January, 2012)

University of Illinois at Chicago

Thesis: The effects of repetitive worry and rumination on state-based emotion regulation

Committee: Evelyn Behar, Ph.D. (Chair); Stewart A. Shankman, Ph.D., Douglas S. Mennin, Ph.D.

2001 – 2005

B.S., Psychology

University of Iowa, Iowa City, IA

Dean's List: Fall 2004, Spring 2005

CLINICAL EXPERIENCE

2010 – Present

Practicum in Psychotherapy

Office of Applied Psychological Services, University of Illinois at Chicago

Conduct individual and couples psychotherapy with socio-economically and racially diverse clientele. Address a variety of psychological problems including major depressive disorder, dysthymia, panic disorder, erectile dysfunction, and relationship discord.

Supervisors: Nancy Dassooff, Ph.D., Larry Grimm, Ph.D., Gloria Balague, Ph.D.

2010 – Present

Practicum in Psychological Assessment

Office of Applied Psychological Services, University of Illinois at Chicago

Conduct psychological assessments (including neuropsychological and psychodiagnostic testing) for clients with a variety of psychiatric disorders, such as obsessive-compulsive disorder, social anxiety disorder, learning disorders, and ADHD.
Supervisor: Audrey Ruderman, Ph.D.

2010 – Present

Graduate Research Assistant

Institute for Health Research and Policy, University of Illinois at Chicago

Supervise post-baccalaureate health counselors to ensure the quality of individual counseling sessions in a clinical trial of motivational interviewing and behavioral interventions for smoking cessation.

Supervisors: Kathleen Diviak, Ph.D., Robin Mermelstein, Ph.D.

2008 – 2009

Research Interviewer

Veterans Affairs Puget Sound Health Care System, Seattle, WA

Conducted structured diagnostic screening interviews and PTSD symptom assessments with veterans enrolled in a clinical trial of behavioral activation for PTSD.
Supervisor: Matthew Jakupcak, Ph.D.

2007 – 2009

Psychometry Technician

Alzheimer's Disease Research Center, University of Washington, Seattle, WA

Administered neuropsychological test batteries to patients with dementia and healthy older adults. Conducted symptom interviews with participant caregivers.
Supervisor: Elaine Peskind, M.D.

2005

Day Program Counselor

Mayor's Youth Empowerment Program, Iowa City, IA

Managed individual and group activities for youth with developmental disabilities during a summer recreation program designed to promote independence and social bonding.
Supervisor: Chris Bushman, M.S.W.

2004

Residential Technician

Midwestern Council on Chemical Abuse, Iowa City, IA

Supervised daily activities and monitored the behavior of clients in a residential substance abuse treatment program.

Supervisor: Julia Huffman

CONTINUING EDUCATION

Beck Institute for Cognitive Behavior Therapy (2010)

Two-day workshop on cognitive behavior therapy.

Pearson WAIS-IV Workshop (2010)

Lecture on the administration and interpretation of the WAIS-IV.

Pearson MMPI-2-RF Workshop (2009)

Lecture on the administration and interpretation of the MMPI-2-RF.

TEACHING EXPERIENCE

2009 – Present

Teaching Assistant

University of Illinois at Chicago

- Field Work in Applied Psychology (Fall 2011, Spring 2012)
- Sport Psychology (Summer 2011)
- Abnormal Psychology (Fall 2010, Spring 2011)
- Introduction to Psychology (Fall 2009, Spring 2010)

Guest Lectures

- *Writing the introduction and methods sections for a psychological research paper.* Lecture addressed to an undergraduate course in applied psychology at the University of Illinois at Chicago (2011).
- *Sensate-focused treatment for psychogenic erectile dysfunction.* Lecture addressed to a graduate-level seminar in psychological interventions at the University of Illinois at Chicago (2011).

Undergraduate Students Mentored

- Gretchen Kemner (Research Assistant, 2010 – present)
- Aaron Weisbrod (Research Assistant, 2010 – present)
- Julia Deggendorf (Research Assistant, 2009 – 2010)
- Ian Jorgensen (Research Assistant, 2009 – 2010)

RESEARCH EXPERIENCE

2009 – Present

Graduate Research Assistant

Laboratory for Anxiety and Research on Emotions, University of Illinois at Chicago

Design and conduct experimental protocols to examine the emotional and cognitive characteristics of worry and rumination. Maintain study datasets, supervise undergraduate research assistants, and manage IRB protocols.

Supervisor: Evelyn Behar, Ph.D.

2009 – Present**Graduate Research Assistant****Institute for Health Research and Policy, University of Illinois at Chicago**

Code smoking cessation counseling sessions and manage a team of coders to examine session content in a clinical trial for smoking cessation. Implemented a motivational interviewing coding system and designed a behavioral intervention coding system.

Supervisors: Robin Mermelstein, Ph.D., Kathleen Diviak, Ph.D.

2008 – 2009**Research Study Coordinator****Veterans Affairs Puget Sound Health Care System, Seattle, WA**

Managed recruitment, scheduling, data, personnel files, and IRB correspondence for the local site of a two-site clinical trial of behavioral activation for PTSD in OIF/OEF veterans.

Supervisor: Matthew Jakupcak, Ph.D.

2006 – 2008**Research Study Coordinator****Veterans Affairs Puget Sound Health Care System, Seattle, WA**

Conducted study visits and coordinated multi-disciplinary teams of study staff for clinical trials of prazosin for nightmares in PTSD. Served as the first-line of contact for civilian, veteran, and active duty research participants.

Supervisor: Elaine Peskind, M.D.

2005 – 2006**Research Assistant****Veterans Affairs Puget Sound Health Care System, Seattle, WA**

Managed data and assisted the study coordinator for clinical trials of prazosin for nightmares in PTSD. Provided the director of the Deployment Health Clinic with research and clinical data on the symptom patterns and demographics of clinic patients.

Supervisors: Elaine Peskind, M.D., Stephen Hunt, M.D.

2004 – 2005**Undergraduate Research Assistant****Cognitive Psychology Laboratory, University of Iowa, Iowa City, IA**

Designed and conducted an independent research project that examined the durability of the contents of visual working memory.

Supervisors: Steven Luck, Ph.D.

2004**Undergraduate Research Assistant****Social Psychology Laboratory, University of Iowa, Iowa City, IA**

Conducted research protocols investigating biases in the perceptions of in- and out-group members of polarized social groups.

Supervisor: Robert Baron, Ph.D.

2003 – 2005**Undergraduate Research Assistant****Cognitive Psychology Lab**

Helped to design, program, and conduct a multi-study investigation of above- and below-average effects in comparative judgments. Also served as the lab coordinator from 2004 to 2005 and supervised a team of undergraduate research assistants.

Supervisor: Paul Windschitl, Ph.D.

PEER-REVIEWED PUBLICATIONS

1. **Conybeare, D.**, Behar, E., Solomon, A., Newman, M. G., & Borkovec, T. D. (in press). The PTSD Checklist – Civilian Version: Reliability, validity and factor structure in a non-clinical sample. *Journal of Clinical Psychology*.
2. Windschitl, P., **Conybeare, D.**, & Krizan, Z. (2008). Direct-comparison judgments: When and why above- and below-average effects reverse. *Journal of Experimental Psychology: General*, 137, 182–200.
3. Jakupcak, M., Luterek, J., Hunt, S., **Conybeare, D.**, & McFall, M. (2008). Posttraumatic stress and its relationship to physical health functioning in a sample of Iraq and Afghanistan War veterans seeking postdeployment VA health care. *Journal of Nervous and Mental Disease*, 196, 425–428.
4. Jakupcak, M., **Conybeare, D.**, Phelps, L., Hunt, S., Felker, B., Klevens, M., Holmes, H., & McFall, M. (2007). Anger, hostility, and aggression in Iraq and Afghanistan War veterans reporting PTSD and subthreshold PTSD. *Journal of Traumatic Stress*, 20, 945–954.

BOOK CHAPTERS

1. **Conybeare, D.**, & Behar, E. (2012). Generalized anxiety disorder, posttraumatic stress disorder, and obsessive-compulsive disorder. In M. Hersen & D. Beidel (Eds.), *Adult Psychopathology and Diagnosis, 6th Edition* (pp. 433-469). Hoboken, NJ: John Wiley & Sons.

MANUSCRIPTS IN PREPARATION

1. **Conybeare, D.**, & Behar, E. The effects of repetitive worry and rumination on state-based emotion regulation.
2. **Conybeare, D.**, & Behar, E. Worry and the perception of interpersonal problems: Over- and under-estimations compared to peer report.
3. Grant, D., **Conybeare, D.**, Behar, E., Goldwin, M., Mills, A., Davidson, C., & Judah, M. Cognitive and emotional effects of worry and social anxiety.

CONFERENCE PRESENTATIONS AND INVITED TALKS

1. **Conybeare, D.** (2012, March). *The effects of repetitive worry and rumination on self-reported emotion regulation*. Invited talk to be delivered at the University of Illinois at Chicago.
2. **Conybeare, D.**, Davidson, C., Goldwin, M., Mills, A., Judah, M., Grant, D., & Behar, E. (2011, November). *The effects of worry on a subsequent period of social anxiety in individuals high in worry and/or social anxiety*. Poster session presented at the Annual Meeting of the Association for Behavioral and Cognitive Therapies, Toronto, Canada.
2. **Conybeare, D.**, Jorgensen, I., & Behar, E. (2011, November). *An experimental examination of worry and rumination: the effects of negative repetitive thinking on self-reported emotion regulation*. Poster session presented at the Annual Meeting of the Association for Behavioral and Cognitive Therapies, Toronto, Canada.
3. Goldwin, M., **Conybeare, D.**, Olsen, E., Jorgensen, I., Sibrava, N., & Behar, E. (2011, November). *Concreteness of idiographic periods of trauma-related and depressive rumination*. Poster session presented at the Annual Meeting of the Association for Behavioral and Cognitive Therapies, Toronto, Canada.
4. **Conybeare, D.** (2011, May). *Emotional control: A moderator of the harmfulness of worry*. Poster session presented at the Annual Meeting of the Midwestern Psychological Association, Chicago, IL.
5. **Conybeare, D.**, Davidson, C., Behar, E., Grant, D., Goldwin, M. (2010, November). *The effects of worry on a subsequent period of social anxiety*. Poster session presented at the Annual Meeting of the Association for Behavioral and Cognitive Therapies, San Francisco, CA.
6. Goldwin, M., **Conybeare, D.**, Kearns, G., Stanfill, S., Behar, E. (2010, November). *The effects of relaxation on the abstractness of worry: can we make worry more concrete?* Poster session presented at the Annual Meeting of the Association for Behavioral and Cognitive Therapies, San Francisco, CA.
7. Felker, B., Jakupcak, M., Stecker, T., Hedeon, A., Staves, P., **Conybeare, D.**, Li, E. (2008, February). *Providing care for OIF and OEF veteran with mental disorders: site manager survey results from 12 different VA medical centers*. Poster session presented at the Department of Veterans Affairs Health Services Research and Development Annual Meeting, Baltimore, MD.
8. Gross, C., Vitiello, M., Peskind, E., **Conybeare, D.**, Raskind, M. (2007, June). *Sleep disruption in combat veterans with chronic PTSD on and off prazosin*. Poster

session presented at the Associated Professional Sleep Societies Annual Meeting, Minneapolis, MN.

9. **Conybeare, D.** (2006, December). *Differential patterns of psychiatric and physical symptom in OIF/OEF and Gulf War veterans*. Invited talk delivered at the Veterans Affairs Puget Sound Health Care System.
10. **Conybeare, D.**, Jakupcak, M., Hunt, S., Klevens, M., Holmes, H. (2006, November). *Rates and symptoms of psychiatric illness in veterans of OIF and OEF*. Poster session presented at the Annual Meeting of the International Society for Traumatic Stress Studies, Los Angeles, CA.

EDITORIAL EXPERIENCE

Ad Hoc Reviewer

- *Behavior Therapy* (supervised by Evelyn Behar, Ph.D. and Kathleen Diviak, Ph.D.)
- *Journal of Anxiety Disorders* (supervised by Dr. Evelyn Behar)

AWARDS

Student Travel Award (\$500)

College of Liberal Arts and Sciences, University of Illinois at Chicago (2010 & 2011)

Merit-based travel award to support conference presentation of research.