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When is rumination an adaptive mood repair strategy? Day-to-day rhythms of life in combat veterans with and without posttraumatic stress disorder

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A R T I C L E   I N F O

Article history:
Received 26 January 2012
Received in revised form 2 May 2012
Accepted 9 July 2012

Keywords:
Rumination
Negative emotions
Emotion regulation
Posttraumatic stress disorder

A B S T R A C T

Prior research suggests that rumination and chronic negative emotions serve to maintain emotional disorders. However, some evidence suggests that pondering the nature and meaning of negative experiences can be adaptive. To better understand the function of this dimension of rumination, we studied the use of this strategy in response to negative emotions as they unfold from day to day in veterans with (n = 27) and without (n = 27) post traumatic stress disorder (PTSD). For two weeks, veterans completed daily questions about when they experienced a bad mood and how often they used rumination to feel differently. It was hypothesized that rumination would attenuate negative emotional reactions in veterans without PTSD, but that rigid, intense negative emotions would persist in veterans with PTSD. Using multilevel modeling, we found that on the same day, rumination was positively associated with negative affect. Because covariation fails to address directionality, we also examined lagged effects from one occasion to the next. For veterans without PTSD, more frequent use of rumination predicted less intense negative affect the next day; there was no support for a model with negative affect predicting rumination the next day. For veterans with PTSD, the prior day’s intensity of negative affect was the only predictor of intensity of negative affect the next day. Results support the value of distinguishing within-day and across day effects, and the presence of PTSD, to clarify contexts when rumination is adaptive.

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People ruminate after negative events but it remains unclear whether rumination ought to be viewed as a negative or positive behavior. The prevailing literature seems to indicate that rumination is maladaptive, best characterized as a factor that creates and maintains elevated negative emotions. Yet, this is difficult to reconcile with the observation that people ruminate frequently. There must be some benefit, however transient or context-specific, that serves to reward rumination. In the current study, we adopted a functional, contextual approach to better understand the mechanisms surrounding rumination.

Rumination refers to repetitive thinking about negatively valenced thoughts, feelings, and situations (Martin & Tesser, 1996; Nolen-Hoeksema, 1991; Smith & Alloy, 2009) that could involve neurotic brooding or self-focused, pondering and reflection (Trapnell & Campbell, 1999; Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Theoretically, rumination has the capacity to be either maladaptive or adaptive. Yet, it is the maladaptive nature of rumination that has received the vast amount of attention in the literature. There are good reasons for this asymmetry of attention. Rumination appears to be a transdiagnostic vulnerability factor relevant to various forms of psychopathology including major depressive disorder (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Mor & Winquist, 2002; Rood, Bogels, Nolen-Hoeksema, & Schouten, 2009; Watkins, 2008), anxiety disorders (Ehlers & Clark, 2000), substance use disorders and eating disorders (Aldao et al., 2010; Caselli, Bortolai, Leoni, Rovetto, & Spada, 2008; Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Researchers have shown that the tendency to ruminate has been linked to greater concurrent and prospective negative affect in both depressed and nonclinical samples (Butler & Nolen-Hoeksema, 1994; Just & Alloy, 1997; Kuehner & Weber, 1999; Moberly & Watkins, 2008; Nolen-Hoeksema, 1991; Nolen-Hoeksema & Morrow, 1993; Roberts, Gilboa, & Gotlib, 1998).

The above findings indicate that rumination is a transdiagnostic factor involved in the development and maintenance of negative affect associated with various emotional disorders. However, these empirical studies have narrowly defined and operationalized rumination as passive engagement in brooding and neurotic worry.

1. Evidence for an adaptive dimension of rumination

Therapists have described the existence of multiple forms of rumination. This can be seen in a popular two-factor model of depressive rumination, involving “brooding” and
“pondering” (Treynor et al., 2003). Brooding reflects passive repetitive thought about one’s problems and their consequences; in contrast, pondering is an active repetitive thought process focused on understanding and solving problems. Passive rumination (brooding) has been linked to increased depressive symptoms, both concurrently and longitudinally, as well as impaired problem solving. In contrast, active rumination (pondering) has been linked to decreased depressive symptoms in concurrent and prospective designs (Armey et al., 2009; Siegle, Moore, & Thase, 2004; Treynor et al., 2003). Ciarocco, Vohs, and Baumeister (2010) conducted three studies in which participants received negative feedback following a task. Participants then either took part in a rumination induction or were allowed to freely ruminate before attempting another version of the task. The content of rumination was measured using either a thought-listing task or recorded verbalizations. Results of all three studies indicated that rumination in response to perceived failure on the first task, when active and goal-oriented, led to improved performance on the second task compared to task-irrelevant rumination or brooding about the implications of failing. These results suggest that rumination can be beneficial when the aim is error correction and goal attainment.

The above examples emphasize the importance of attentional focus in determining the function of rumination: passive fixation on problems vs. active reflection on what can be learned. Teasdale (1999) uses different terminology to capture a similar two-dimensional model suggesting that how people think about negative thoughts, moods, and experiences, alter the function of conscious rumination. The first dimension, labeled conceptual-evaluative, consists of thoughts about the causes and consequences of negative events. The second dimension, labeled experiential, involves the non-evaluative and direct experiencing of negative thoughts and affect following an undesired event (Watkins, 2004). Research has shown that conceptual-evaluative rumination is linked to the recall of vague, abstract memories that inhibit the effective processing of stressful situations (Watkins & Teasdale, 2004). Akin to brooding, conceptual-evaluative rumination is related to greater concurrent and prospective depressive and PTSD outcomes (Mackinger, Loschin, & Leibetseder, 2000; McNally, Lasko, Macklin, & Pitman, 1995; Peeters, Wessel, Merckelbach, & Boon-veermeeren, 2002). Experiential rumination, in contrast, has been linked to specific, concrete, autobiographical memories, that promote awareness and tolerance of intense emotional events (Watkins & Teasdale, 2001). Laboratory research has further supported the distinction of these two types of rumination. When participants were asked to write about a recent failure in a conceptual-evaluative or brooding manner (“Why did you feel this way?”) they experienced greater negative emotions over the next 12 h compared to an experiential or pondering manner (“How did you feel moment-by-moment?”) (Watkins, 2004). Similarly, a recent study found that the frequency of conceptual-evaluative or brooding questions of “Why?” and “What if?” predicted PTSD severity better than the mere presence of ruminative thinking (Michael, Halligan, Clark, & Ehlers, 2007).

These findings provide evidence for a functional contextual approach to rumination. Psychological benefits often occur following the use of ruminative pondering and reflection, and failing to address this dimension might lead to erroneous conclusions about the nature and consequences of rumination. For this reason, we explored this neglected dimension of rumination in the context of veterans with and without post-traumatic stress disorder (PTSD).

Rumination has been integrated into conceptual models of PTSD (Ehlers & Clark, 2000; Elwood, Hahn, Olatunji, & Williams, 2009; Michael et al., 2007). Nolen-Hoeksema and Morrow (1991) found that rumination (brooding) 14 days prior to the Loma Prieta earthquake predicted greater depression and PTSD stress symptoms in the days and months following this natural disaster. Additionally, use of rumination (brooding) during the first 10 days following the earthquake predicted subsequent PTSD symptoms. Brooding has also been shown to predict the persistence of PTSD up to three years following severe traffic accidents (Ehlers, Mayou, & Bryant, 1998, 2003; Holeva, Tarrier, & Wells, 2001; Mayou, Bryant, & Ehlers, 2001; Mayou, Ehlers, & Bryant, 2002; Murray, Ehlers, & Mayou, 2002) and these symptoms were positively related to PTSD treatment failure (Echiverri, Jaeger, Chen, Moore, & Zoellner, 2011). These results support the possibility that rumination, when narrowly defined as brooding, serves as a vulnerability factor in the development and maintenance of PTSD.

Military veterans with combat exposure are at particularly high risk for the development of PTSD. Among American veterans of the Vietnam War, the lifetime prevalence rate for combat-related PTSD has been placed at 18.7% (Dohrenwend et al., 2006). This rate is demonstrably higher than the prevalence of PTSD in the general population, which are approximately 3.6% for men and 9.7% for women (Kessler et al., 2005). With a greater prevalence rate of PTSD in combat veterans, there is a pressing need to understand vulnerability and protective factors for trauma-related distress. Our aim in this study was to examine the role of the active pondering and reflective dimension of rumination in this context.

2. For rumination, is timing essential?

For adaptive forms of rumination (pondering or experiential), an incubation period might be necessary to show evidence of any improvement in negative affect or distress (Thomsen, 2006; Treynor et al., 2003). Unfortunately, the majority of studies on rumination have been either cross-sectional or reliant on trait measures of rumination (e.g., Aldao et al., 2010; McLaughlin & Nolen-Hoeksema, 2011; Thomsen, 2006). By definition, rumination involves the acknowledgement of failures, negative thoughts and mood. Thus, concurrent, cross-sectional associations between rumination and negative affect are both expected and obvious. Prospective studies are required to test a functional contextual approach.

When researchers study people that differ in trait rumination there is evidence that high trait rumination is associated with more frequent, enduring rumination, and more frequent, intense negative affect (Watkins, 2008). The use of state measures of rumination might avoid some of the circular reasoning in these studies: rumination being defined by a focus on negative states. Similar to other theorists (Smith & Aloy, 2009; Thomsen, 2006), we hypothesized that a state measure of the active, pondering dimension of rumination might be initially associated with negative affect, but lead to reductions in negative affect as time elapses. In the present study, we attempt to address the potential adaptive nature of rumination by measuring within-person associations with negative affect in day-to-day living.

3. Clinical disorder as a moderator

Joormann, Dkane, and Gotlib (2006) found that a diagnosis of major depressive disorder (MDD) was related to greater brooding and reflective pondering compared to a healthy, comparison group, and when MDD was present, both brooding and pondering were related to depressive symptoms and cognitive biases; a relationship that was not observed in the control group. That is, an adaptive form of rumination was found only in the non-clinical group (see Whitmer & Gotlib, 2011 for similar findings).

A diagnosis of PTSD was also expected to moderate the relationship between rumination and negative affect. As theoretical support, consider the cognitive model of PTSD by Ehlers and Clark (2000) where rumination arguably triggers re-experiencing
symptoms, and amplifies negative appraisals of the trauma, self, and future. Studies have found that individuals with PTSD tend to ruminate on the long-term consequences of the traumatic event: what life would be like if the event had not happened, and what else might have happened (Ehlers & Clark, 2000; Ehlers et al., 1998; Michael et al., 2007; Murray et al., 2002). Presumably, repetitive thoughts on the negative details surrounding the trauma and their consequences sustain distress in the present.

4. The present study

Despite a large empirical basis for the maladaptive nature of rumination, a growing body of research has provided evidence that the adaptiveness of rumination varies depending on what dimension of it is measured. In the present study, we investigated how the pondering, active dimension of rumination functions as a self-regulatory strategy within the context of PTSD. We used a daily diary methodology to assess the relationship between (state) active rumination and negative affect, concurrently and lagged from one day to the next, among veterans with and without PTSD. By using a daily diary methodology to assess fluctuations in day-to-day active rumination and negative affect, we tested whether the distress associated with rumination might be context-dependent. Of particular interest was time elapsed (concurrent vs. lagged model) and disorder (presence of PTSD) as moderators of the relationship between rumination and negative affect.

We hypothesized that active rumination would be positively correlated with concurrent negative affect in both veterans with and without PTSD diagnosis. Compared to veterans with PTSD, for veterans without PTSD, active rumination on one day was expected to predict less negative affect on the subsequent day.

5. Method

5.1. Participants

Our clinical sample included veterans suffering from combat-related PTSD seeking treatment at a northeast VA Medical Center (n = 33). Of the consecutive patients invited to participate, only three declined. All treatment seeking veterans were diagnosed with PTSD based on (a) clinical interviews with treatment program staff psychologists, psychiatrists, and/or clinical social workers, (b) scores greater than 107 on the Mississippi Scale for combat-related PTSD (a normed clinical cutoff) (Keane, Caddell, & Taylor, 1988; King, King, Fairbank, Slenger, & Surface, 1993), and (c) verification of combat exposure with DD-214’s (i.e., military transcript). Except for two people, who were gulf war veterans, the rest of our PTSD seeking sample were Vietnam War veterans. All veterans in the PTSD group had combat exposure and received service related PTSD disability compensation.

Our non-clinical sample (n = 28) was selected from a list of patients in the United States Department of Veterans Affairs (VA) system. A random number generator was used to select and contact veterans by telephone. Each veteran had no history of PTSD and lived in the same city where we obtained our sample of veterans with PTSD. Using similar assessment procedures as the clinical sample, archived hospital records were used to obtain psychiatric diagnoses.

Based on Mississippi Scale scores that did not meet our selection criteria (total scores of 107), we excluded three treatment seeking veterans (scores < 107) and one veteran from the non-clinical group whose score exceeded the cutoff (score > 107). Three additional treatment seeking veterans were removed (i.e., listwise deleted) for completing no more than two of the 14 possible daily report entries. The reason for excluding the sparse data was due to the fact that our hypotheses required lagged effects and participants who completed fewer than two daily reports would provide exact estimates (i.e., no error) and potentially bias our results.

The final sample with complete data for analyses included 27 veterans with PTSD and 27 veterans without any history of Axis I disorders. The groups did not statistically differ in age (PTSD group mean = 53.96, SD = 5.45; comparison group mean = 55.93, SD = 7.69) or education (33.3% of the PTSD group and 29.6% of the comparison group graduated college). The groups did differ in racial composition (PTSD group: 86% Caucasian and 14% African-American; comparison group: 59.3% Caucasian and 40.7% African-American) and marital status (PTSD group: 80% married, 5% divorced, and 15% single or dating; comparison group: 45% married, 16% divorced, and 36% single or dating).

5.2. Procedures

All participants completed demographic and PTSD related questionnaires, and a minimum of 9 of 14 possible daily entries (mean = 12.04). Consenting participants completed demographic and self-report questionnaires in group sessions. Upon completion, participants were trained on how to complete consecutive daily record entries before going to sleep (after 6 pm). Each item was discussed to ensure participants understood the instructions and definitions. Participants were given self-addressed stamped envelopes to mail daily records after every few days. This study was approved by the IRB at the Buffalo VA Hospital. Data collection occurred between 2001 and 2003.

5.3. Trait self-report measures

5.3.1. PTSD

Using the Mississippi Scale for Combat-Related PTSD, we assessed re-experiencing, avoidance, hyperarousal, and emotional numbing symptoms (Keane et al., 1988) (α = 0.84). This 35-item self-report questionnaire has been shown to possess excellent psychometric properties in distinguishing the presence or absence of PTSD diagnoses derived by expert clinicians using structured clinical interviews (Keane et al., 1988; King et al., 1993). Our cutoff score of 107 was more conservative than scores used in prior research studies (e.g., Zatzick et al., 1997).

5.4. Daily diary scales

5.4.1. Active rumination

Each day, participants received the following stem question: For today, for those periods when you were in a bad mood, please indicate the ways you tried to reduce or change them. On a 5-point scale, participants completed five items modified from the Responses to Depression questionnaire (Nolen-Hoeksema & Morrow, 1991) to reflect daily use of active, pondering aspects of rumination. Items included “Think about my feelings of distress, fatigue or pain”; “Think about how passive and uninvolved I feel”; “Go away by myself and think about why I feel this way”; “Think about a recent situation, wishing it had gone better”; and “Think about how angry I was with myself” (1 = not at all; 3 = moderately frequently; 5 = extremely frequently). A factor analysis with oblimin rotation supported the presence of a single factor that explained 67.05% of the variance, with an eigenvalue of 3.35 (the next factor had an eigenvalue of 0.63). Factor loadings for individual items ranged from 0.70 to 0.84. The Cronbach alpha coefficient across persons and administrations was acceptable at 0.89.

5.4.2. Daily negative affect

End-of-day negative affect items included anxious, angry, depressed, frustrated, irritable, and afraid. Each night, participants
were instructed to indicate to what extent they felt this way during the day (1 = very slightly or not at all; 3 = moderately; 5 = extremely). The Cronbach alpha coefficient across persons and administrations was acceptable at 0.93.

6. Results

6.1. Overview of analytic techniques

The data were hierarchically structured with 650 days within 54 people. Thus, the data were analyzed with a series of multilevel random coefficient models using the program HLM (version 6.0; Raudenbush, Bryk, Cheong, & Congdon, 2000). Coefficients representing daily variables were estimated for each person (Level-1) and individual differences in these coefficients were estimated (Level-2). Level-1 variables were person-centered and Level-2 variables were grand-mean centered, with the exception that binary variables were entered uncentered into analyses.

6.2. Preliminary analyses

Our initial analyses focused on the reliability of the daily measures for rumination and negative affect. We followed procedures recommended by Nezlek (2007; 2011) for assessing scale reliability with nested data. Using a three-level unconditional model with items (Level 1) nested within days (Level 2) and days nested within people (Level 3) (see Raudenbush & Bryk, 2002 for formal rationale), analyses showed that the five items for daily frequency of rumination and the six items for daily negative affect had adequate reliability (0.53 and 0.70, respectively). The intraclass correlation coefficient (ICC) for daily rumination was 0.76, suggesting that 24% of the variability in rumination was within-person. The ICC for daily negative affect was 0.73, suggesting that 27% of the variability in negative affect was within-person. These results suggest that both daily rumination and negative affect are relatively consistent across situations within people’s lives.

Prior research has shown that age has a strong, inverse correlation with negative affect (Charles & Carstensen, 2010). We found the same effect in our sample with age being inversely correlated with negative affect, $B = -0.32, t = -2.90, p = 0.006$. Thus, age was used as a covariate in subsequent analyses. In contrast, although our groups differed in marital status, this variable failed to significantly predict daily negative affect ($p = 0.47$) or rumination ($p = 0.35$). For this reason, we did not include marital status as a covariate in our models.

6.3. Concurrent rumination and negative affect

We examined whether daily use of rumination was concurrently associated with daily negative affect. To test this model, we constructed multilevel models with rumination predicting negative affect reported on the same day. We also explored whether the association between rumination and negative affect was moderated by the presence of PTSD, otherwise known as a cross-level interaction. The only covariate in our model was age, at Level-2. Age, $B = -0.27, t = -2.90, p = 0.006$, the presence of PTSD, $B = 3.09, t = 5.06, p < 0.001$, and daily rumination, $B = 0.53, t = 7.49, p < 0.001$, separately predicted mean levels of daily negative affect. We failed to find evidence for a cross-level interaction between PTSD and rumination ($p = 0.69$).

6.4. Lagged analyses

The static, same day relationships we have discussed so far do not address issues of directionality. To provide further insight into the relationship between rumination and negative affect, we conducted a series of analyses examining lagged relationships (e.g., Nezlek, 2011). In one set of analyses, negative affect for a day was predicted by frequency of rumination on the previous day (controlling for previous day negative affect). In another set of analyses, frequency of rumination for a day was predicted by negative affect on the previous day (controlling for previous day rumination). If the previous day’s rumination predicted present day negative affect controlling for previous day’s negative affect, this would suggest that frequency of rumination leads to changes in negative affect. In contrast, if the previous day’s negative affect predicted present day rumination controlling for previous day’s rumination, this would suggest that negative affect leads to changes in the frequency of rumination.

The models that tested these lagged day effects are presented below. The critical coefficients are the $\beta_3$ (Rumination day $n - 1$) coefficient in the first model, representing the lagged relationship from rumination to negative affect, and the $\beta_2$ (Negative Affect day $n - 1$) coefficient in the second model, representing the opposite lag, from negative affect to frequency of rumination. Of primary interest was the inclusion of PTSD diagnoses as a moderator of these within-person effects (known as a cross-level interaction). For instance, does yesterday’s use of rumination today predict less negative affect tomorrow and is this effect only present for veterans without PTSD? Thus, we included PTSD diagnosis in the level-2 (person level) equations to predict $\beta_0$ (intercept as outcome) and $\beta_3$ (slope as outcome). Age was also included as a covariate. The equations at Level-1 (within-person) to test these lagged day effects are presented below, with intercept and slopes treated as random effects:

$$\text{Negative Affect(day n)}_{ij} = \beta_0 + \beta_1 \text{ (Negative Affect day n - 1)} + \beta_2 \text{ (Rumination day n - 1)} + r_{ij}.$$

$$\text{Rumination(day n)}_{ij} = \beta_0 + \beta_1 \text{ (Rumination day n - 1)} + \beta_2 \text{ (Negative Affect day n - 1)} + r_{ij}.$$

Each of these models had the same Level-2 equation, with the primary cross-level interaction ($\gamma_{12}$), presented below:

Level 2 (between-person):

$$\beta_0 = \gamma_{00} + \gamma_{01} \text{(PTSD diagnosis)} + \gamma_{02} \text{(age)} + u_0$$

$$\beta_1 = \gamma_{10} + u_1.$$

$$\beta_2 = \gamma_{20} + \gamma_{21} \text{(PTSD diagnosis)} + \gamma_{22} \text{(age)} + u_2.$$

In our analyses, we found that yesterday’s negative affect was positively related to the next day’s negative affect, $B = 0.11, t = 1.97, p = 0.05$, and age was inversely related to negative affect, $B = -0.27, t = -3.59, p < 0.001$. In addition, the effect of yesterday’s rumination on negative affect the next day was moderated by PTSD diagnosis, $B = 0.11, t = 2.23, p = 0.03$. The nature of this moderation effect was decomposed by estimating predicted scores for individuals with and without PTSD diagnoses, respectively (Bauer & Curran, 2005; Preacher, Curran, & Bauer, 2006). As shown in Fig. 1, for a combat veteran without PTSD, greater rumination the prior day predicted less negative affect the next day, $B = -0.21, t = -2.50, p = 0.02$; for veterans with PTSD, rumination failed to significantly predict changes in negative affect from one day to the day.

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1 Upon adding marital status as an additional covariate in our models, the effect of yesterday’s rumination on negative affect the next day was still moderated by PTSD diagnosis, $B = 0.11, t = 2.08, p = 0.043$. [765]
bars presence 2007) next, Fig. 766 the B = 0.03, t = 0.30, p = 0.77. For veterans with PTSD, greater negative affect the prior day predicted greater persistence in negative affect into the next day, B = 0.11, t = 1.96, p = 0.05. Upon testing the reverse direction, both the prior day’s negative affect and the cross-level interaction with PTSD diagnosis failed to significantly predict the next day’s use of rumination (p = 0.704 and 0.519, respectively).

In summary, we found evidence to suggest that on the same day, frequent use of rumination was positively related to negative affect. When the timing shifted to change over a relatively short time interval, for combat veterans without PTSD, frequency of predicted less negative affect the next day, even after controlling for the prior day’s negative affect. We failed to find support for the reverse direction: negative affect failed to significantly predict the use of rumination the next day. For combat veterans with PTSD, negative affect persisted from one day to the next, and rumination failed to offer any additional predictive utility.

7. Discussion

Although there is extensive evidence that trait rumination is related to trait measures of distress (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Smith & Alloy, 2009; Thomesen, 2006; Watkins, 2008), less attention has been given to how rumination operates in daily life. A growing body of research indicates that constructs that have traditionally been conceptualized and studied as stable traits often vary meaningfully within individuals (Fleeson, 2001; Nezlek, 2007) and these findings informed the present study. Supporting the value of a daily process approach, we found that 24% and 27% of the variance in rumination and negative affect was within-person, respectively. With evidence of meaningful within-person variation in rumination and negative affect, we were able to examine associations between rumination and negative affect. We found evidence for a large positive relationship between rumination and negative affect on the same day, for veterans with and without PTSD. Upon moving to lagged analyses, we examined whether today’s negative affect was predicted by yesterday’s rumination, whether today’s rumination was predicted by yesterday’s negative affect, or whether there was evidence for bi-directionality. We found that the presence of PTSD served to alter the nature of this association. For veterans with PTSD, negative affect intensity on one day persisted, predicting negative affect the subsequent day; frequency of rumination failed to explain any additional variance in this model. For veterans without PTSD, rumination predicted less negative affect on the subsequent day, suggesting that this strategy had a small adaptive function. Taken together, these results contribute to small bodies of literature on rumination in trauma survivors, how rumination operates in daily life, and contexts when rumination leads to less distress.

To our knowledge, this is only the second study to examine the relationship between rumination and negative affect in daily life (Moerberly & Watkins, 2008), and the first to use a non-college student sample. There are numerous studies to support rumination as a vulnerability and maintenance factor of depression (Nolen-Hoeksema et al., 2008; Smith & Alloy, 2009; Thomesen, 2006), and a set of studies detailing the relevance of rumination to distress in trauma survivors (Ehlers et al., 1998; Ehring, Ehlers, & Glucksman, 2008; Ehring, Frank, & Ehlers, 2008; Michael et al., 2007; Murray et al., 2002; Nolen-Hoeksema & Morrow, 1991). By comparing concurrent and prospective models, we were able to show that although daily rumination was positively correlated with negative affect, there was no evidence to support rumination as an antecedent or consequence to negative affect in veterans with PTSD. These within-person, daily process findings provide an intermediary examination of rumination among studies that have either focused on ruminative reactions over the course of a few minutes in laboratory experiments or prospective changes in rumination and negative affect over 6-month and 1-year intervals following traumatic events (e.g., Ehring et al., 2008a, 2008b; Michael et al., 2007). The present results showed that the time period under study, and presence of PTSD diagnoses, influenced whether and how rumination was associated with negative affect intensity in daily life.

A particular benefit of a daily process approach is that results are less vulnerable to the bias and distortion found in the trait based approaches to rumination that dominate the literature. Instead of asking participants how they respond to negative moods across time and situational context (Nolen-Hoeksema & Morrow, 1991), we examined momentary ruminative reactions and negative affect intensity each day over the course of a two-week assessment period. With a daily process approach, we were able to test whether any heterogeneity in predicting the persistence of negative affect over time can be accounted for by the presence of PTSD diagnoses. For veterans without PTSD, we found that rumination predicted greater negative affect on the subsequent day, and there was no evidence to support the reverse direction with negative affect as predictor of prospective rumination. These results provided initial evidence that in this circumstances context, rumination operated as an adaptive self-regulatory strategy in terms of triggering mood repair function.

These findings are consistent with theory and research separating two types of rumination, with pondering being adaptive, and brooding being maladaptive (Ciaramico et al., 2010; Teasdale, 1999; Teynor et al., 2003; Watkins, 2008). The majority of items used to measure daily rumination in the present study reflected pondering or an experiential mode of thinking following the presence of unwanted emotions over the course of a day. Unfortunately, we did not have data on both types of rumination in the present study which prevented us from comparing their differential correlates, consequences, and sensitivity to PTSD diagnoses. Although we cannot draw causal conclusions, our findings offer preliminary evidence for theoretical frameworks suggesting that in the absence of psychological disorders, active rumination might possess a mood repair function in daily life.

While we believe this study offers novel contributions to how active rumination can be adaptive depending on the time duration of repetitive thinking (concurrent vs. cross-lagged models), and presence of disorder, several limitations are warranted. First, our 5-item measure of rumination did not capture the full complexity of this construct. Our focus was on the frequency of rumination and future consideration should be given to intensity and duration over a broader range of mental content beyond “bad moods” (e.g., daily hassles, past and anticipated stressors). Estimates of internal
consistency (see Section 5 above) were relatively high, thus our effects might be limited to a specific aspect of rumination, however, those effects were probably not attenuated greatly by that narrow focus. Second, our PTSD and non-PTSD groups were relatively small. This small sample constrained the generalizability of our findings and reduced our statistical power. Nonetheless, by using a non-college student sample, our findings are likely to be more generalizable than a large number of prior studies on college students. Third, despite the benefits of contextualized daily measures over single occasion trait questionnaires, both are self-report assessment approaches subject to relevant caveats. Fourth, we assessed people over the course of a random two-week time interval. The use of a random two-week interval might account for why veterans with PTSD, rumination failed to predict changes in negative affect in daily life. A more focused sampling plan before, during and after stress periods might help us better understand and detect the relationships among rumination, affect, and symptoms of PTSD (and other psychological disorders in VA hospital patients; e.g., Kashdan, Frueh, Knapp, Hebert, & Magruder, 2006). Fifth, beyond the presence of PTSD, our two samples also differed on the presence of combat exposure and psychological treatment within the VA system. These differences affect the equivalence of our groups but those differences may actually have counter-acted one another and resulted in less biased results. Specifically, group differences on combat exposure would likely increase the differences and VA treatment would decrease those differences between groups. Sixth, our measure of rumination was broadly focused on reactions to distress and was not tied to traumatic memories. However, if we did design a daily measure taking rumination to traumatic memories, we would not have been able to compare veterans with and without PTSD, and would have missed daily distress that was less explicitly tied to trauma cues (and often trauma survivors are unaware of the origins of their distress).

With an eye toward subsequent research, perhaps the adaptive role of rumination with non-disordered people leads to protection from the development of anxiety disorders. Yet, prior research seems to indicate that rumination predicts future diagnoses of major depressive disorder and PTSD. One explanation for these contradictory findings is that links between rumination and the development of future disorders reflected earlier, uni-dimensional models of models (e.g., Nolen-Hoeksema et al., 2008), ignoring the separation of pondering/experiential self-focus from brooding/conceptual-evaluative self-focus. Brooding and conceptual-evaluative rumination might be linked to the development of future disorders within subclinical populations, while pondering and experiential rumination offer psychological protection – facilitating effective emotion processing and problem solving. Yet, even this two-dimensional model of rumination might be too crude. The pondering dimension of rumination might be further separated into the (1) non-judgmental, curious exploration of new information and experiences, (2) active search for meaning following negative life events, and (3) attempts to integrate new information and experiences to create a coherent, integrated identity. Instead of using pre-existing measures to determine the definition and dimensions of rumination, there is benefit in returning to basic qualitative and descriptive studies to understand the complexity of this construct and then and only then, moving to examinations of the antecedents, correlates, and consequences (Rozin, 2001). Bonanno (2004) details heterogeneous trajectories following traumatic events, with an emphasis on the lack of scientific attention on resilient responding. The current findings offer merit to future exploration of the reflective pondering aspect of rumination as a possible contributor to resilient responding.

In summary, we found that naturally occurring ruminative thinking in the aftermath of a “bad mood” can be adaptive, depending on the context. In combat veterans with PTSD, negative moods on one given day spilled over into the next day; rumination failed to predict changes in negative affect in everyday life. In combat veterans without PTSD, we found evidence for a single directional model from frequent rumination on one occasion predicting negative mood on a subsequent occasion. Because we operationalized daily rumination by reflective pondering items, these results complement prior work suggesting that active, experiential, repetitive thinking can be helpful (Nolen-Hoeksema et al., 2008; Watkins, 2008). Besides the type of ruminative thoughts, other contextual features that appear to alter function include the timing of self-regulation and the presence of PTSD. To better understand rumination and the affective and non-affective correlates, causes, and consequences, clinical scientists are encouraged to continue sampling behavior and situations in the real-world.

Acknowledgments

Todd Kashdan was supported by a National Institute of Mental Health grant (MH-73937) and a Positive Psychology Network grant and two grants from the Veterans Integrated Service Network 2 (VISN 2), as well as funding from the Center for Consciousness and Transformation at George Mason University. We are grateful to Terri Julian and Gittendre Uswatte for their assistance in study design and data collection.

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