Posttraumatic Rumination: Content, Correlates, and Processes

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Objective: Trauma-related rumination (i.e., repetitive and recurrent thinking about trauma and its consequences) has shown to predict the development and maintenance of posttraumatic stress disorder symptoms, though little is known about its characteristics. The purpose of this study was to examine trauma-related ruminative content, correlates, and processes during a trauma-specific repetitive thinking interview. **Method:** A total of 63 female survivors of violence completed questionnaires assessing trauma-related pathology and participated in a trauma-specific repetitive thinking interview, which was qualitatively coded. **Results:** Most participants expressed problematic (i.e., assimilated and overaccommodated) trauma beliefs during the interview, which were associated with baseline posttraumatic sequelae. Reexperiencing symptoms mediated the relation between a brooding response style and expressed problematic trauma beliefs. State negative emotions were associated with ruminative processes during the interview and predicted negative emotions after the interview. **Conclusion:** Maladaptive trauma-related rumination is characterized by perseveration on problematic trauma beliefs. Implications for treatment are discussed. J. Clin. Psychol. 00:1–15, 2016.

Keywords: trauma rumination; ruminative content; ruminative processes; posttraumatic stress; trauma processing

Rumination is a multifaceted construct: It is described as a way of responding to distress that involves thinking repetitively and passively about symptoms of distress, thinking about the meaning of the distress, and thinking about precipitators of negative events (Nolen-Hoeksema, 1991). Rumination has been conceptualized as a transdiagnostic process that involves disorder-specific content (Ehring & Watkins, 2008) and it has been shown to predict various forms of psychopathology (Aldao, Nolen-Hoeksema, & Schweizer, 2010), especially depression.

Response Styles Theory (Nolen-Hoeksema, 1991), the most prolific theory of depressive rumination, proposes that depressive rumination dominates cognitive processing at a propositional level (i.e., specific meanings that have truth value) in ways that maintain and prolong dysphoria. Thus, this maladaptive cognitive processing style may be a vulnerability factor for the experience of depression, in general, and posttraumatic stress, in particular, after experiencing a traumatic event. It may be that individuals with posttraumatic stress disorder (PTSD) are stuck in a posttraumatic stress maintenance process similar to the depressive maintenance process Nolen-Hoeksema (1991) proposed that maintains dysphoria. Specific to PTSD, the posttraumatic stress maintenance process may be dominated by traumagenic themes and subsequent maladaptive rumination of the causes and consequences of trauma in an attempt to understand and incorporate the traumatic event into one's life narrative. The fragmented and disorganized memory described in individuals with PTSD may represent an attempt to make sense of the trauma, but avoidance of emotionally valenced trauma-related stimuli may interfere with the creation of a complete and coherent trauma memory that can aid in recovery.

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With respect to PTSD, trauma-related rumination is defined as repetitive and recurrent thinking about the trauma and its consequences (Michael, Halligan, Clark, & Ehlers, 2007). Theorists have argued to integrate rumination as a maintenance factor in models of PTSD (e.g., Elwood, Hahn, Olatunji, & Williams, 2009). In fact, results from a series of cross-sectional, prospective, and experimental studies have demonstrated that rumination is involved in both the development and maintenance of PTSD (Clohessy & Ehlers, 1999; Ehlers, Mayou, & Bryant, 2003; Ehring, Frank, & Ehlers, 2008; Michael et al., 2007; Murray, Ehlers, & Mayou, 2002). Overall, rumination has garnered considerable evidence as a maladaptive cognitive strategy to cope with posttraumatic stress, yet little is known about trauma-related ruminative content, correlates, and processes.

Rumination Content

Nolen-Hoeksema and Morrow (1991) conducted the first longitudinal study on rumination and PTSD symptoms in a sample of individuals exposed to a natural disaster. In the first 10 days after the natural disaster, participants who often thought about the moment the event occurred, their feelings around the time of the event, and the injuries caused to other people showed more PTSD symptoms 7 weeks later. Other studies have also found that the occurrence of unproductive thoughts and "why" and "what if" types of questions during rumination (Michael et al., 2007) and less concreteness of thoughts during rumination (Ehring et al., 2008) were related to PTSD symptom severity cross-sectionally and prospectively. In fact, trauma-related thoughts about permanent change (e.g., "My life is ruined"), justice (e.g., "Others have harmed me"), personal responsibility (e.g., "It is my fault"), and future danger (e.g., "It will happen again") have been shown to explain 29% of the variance in rumination among assault survivors (Steil & Ehlers, 2000).

These studies illuminate potential ruminative content in trauma survivors that is particularly maladaptive because of its association with posttraumatic stress. Thus, maladaptive trauma-related rumination may be largely characterized by problematic trauma-related beliefs that are assimilated (i.e., altering new information about the trauma to match prior beliefs; "the assault must be my fault because I failed to prevent it") and overaccommodated (i.e., altering beliefs about oneself and the world to extremes in order to feel safe and in control; "People are always trying to control me"; Sobel, Resick, & Rabalais, 2009).

These observations are consistent with the cognitive model of PTSD (Ehlers & Clark, 2000), which proposes that PTSD symptoms can persist if one processes the traumatic event or its sequelae in a way that produces a sense of current threat. They suggest that erroneous beliefs about the causes and consequences of the trauma(s) can lead to the perception that trauma is happening in the present rather than the past. That is, such problematic beliefs can have negative implications for the future (e.g., the world and others are perceived as entirely dangerous) and the trauma can subsequently be seen as a time-unlimited event. This feature of posttraumatic sequelae can maintain PTSD symptoms by directly producing negative emotions and motivating a series of avoidant cognitive responses intended to reconcile such beliefs and reduce distress (Ehlers & Clark, 2000). However, coping strategies aimed at avoiding trauma-related stimuli prevent emotional processing and have the paradoxical effect of increasing symptoms and maintaining the disorder over time (Shipherd & Beck, 2005). Notably, rumination mediates the relation between both cognitive (Meiser-Stedman, 2014) and emotional (Ehring & Ehlers, 2014) coping and increased PTSD symptoms.

Rumination Correlates

With regard to correlates of trauma-related rumination, Nolen-Hoeksema and Morrow (1991) found that participants who had a ruminative response style before a natural disaster showed higher levels of PTSD symptoms in the 10 days postdisaster, compared to those with a less ruminative response style. Another study found that rumination was evident in up to 94% of participants with PTSD (Michael et al., 2007). In fact, participants with PTSD spent significantly more time ruminating than trauma survivors who did not have a PTSD diagnosis (Michael

et al., 2007). Taken together, these studies suggest that a ruminative response style may be a vulnerability factor for experiencing posttraumatic stress after a traumatic event, and that focusing on the negative beliefs about trauma may be a way to cope with posttraumatic stress and understand the trauma and its sequelae, but this cognitive coping strategy may ultimately maintain posttraumatic stress symptoms.

Studies have differentiated between types of ruminative response styles. Rumination may comprise two opposing factors: "reflection" (i.e., introspective evaluation and problem-solving to alleviate distress) and "brooding" (i.e., passive comparison of one's current situation with some unachieved standard), which have been associated with less and more depression over time, respectively (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). This observation suggests that effective (i.e., reflection) and ineffective (i.e., brooding) components of rumination exist. Yet it is unclear which ruminative response style is predictive of the experience of trauma-related rumination. It is also unknown what other posttraumatic sequelae play a role in trauma-related rumination, including depressive symptoms and posttraumatic cognitions.

Given that up to 77% of those with PTSD qualify for an additional diagnosis of major depressive disorder (Brown, Campbell, Lehman, Grisham, & Mancill, 2001), it may be important to examine whether depressive symptoms play a role in trauma-related rumination. Also, one may surmise that the more posttraumatic cognitions one holds, the more trauma-related rumination they may engage in, perhaps as a way to reconcile and accommodate such problematic beliefs.

Rumination Processes

Last, few studies have examined trauma-related ruminative *processes*. In general, studies have found that increases in negative emotions have predicted rumination (Johnston & Davey, 1997; Startup & Davey, 2001) and rumination produces negation emotions (McLaughlin, Borkovec, & Sibrava, 2007). Findings are similar in regard to rumination in trauma survivors; negative mood predicts and results from rumination (Conway, Mendelson, Giannopoulos, Csank, & Holm, 2004). Negative mood before and after ruminating may be maladaptive because negative feelings before and after ruminating are associated with increased PTSD symptom severity cross-sectionally and longitudinally (Michael et al., 2007). Further, although not a negative emotion, fatigue can precipitate negative emotional states and less cognitive control, which may lead to and result from rumination (McDonald, Cope, & David, 1993; Pennebaker & Beall, 1986).

Until relatively recently, little research has been conducted on rumination in the context of trauma and PTSD, and therefore little is known about trauma-related ruminative content or the mechanisms by which rumination prevents recovery. The purpose of this study was to have a sample of interpersonal trauma survivors participate in a trauma-specific repetitive thinking interview to examine (a) content expressed during the interview, (b) correlates associated with the expressed content, and (c) the process by which the expressed content may maintain posttraumatic stress in a mixed methods approach. It is hypothesized that the content expressed during the trauma-specific repetitive thinking interview will be dominated by assimilated and overaccommodated problematic trauma beliefs, and that baseline posttraumatic sequelae (i.e., PTSD and depressive symptoms, negative posttraumatic cognitions, and a brooding response style) will be associated with the expressed problematic trauma beliefs.

It is further hypothesized that a brooding response style will predict expressed problematic beliefs, and that this relation will be mediated by posttraumatic stress symptoms because focusing on negative beliefs may be a way to cope with and understand the trauma and its sequelae. It is also hypothesized that negative emotions and fatigue before the interview will be positively associated with ruminative processes (perseveration, expressed concerns, and expressed problematic beliefs). Finally, it is hypothesized that, after controlling for fatigue, negative emotions before the interview will interact with ruminative processes during the interview to predict negative emotions after the interview.

Method

Participants

Interpersonal trauma survivors were recruited from the Psychology Department student subject pool ($n = 7$) at a large Midwestern university and from the community ($n = 56$) through local advertisements. The average age of participants was 31.48 ($SD = 12.76$), ranging from 18 to 67 years. Thirteen participants were Hispanic or Latino (20.6%). Approximately half were Caucasian/White (50.8%, $n = 32$), 30.2% were African American/Black ($n = 19$), 1.6% were American Indian or Alaskan Native ($n = 1$), 1.6% were Asian ($n = 1$), 6.3% were biracial ($n = 4$), 1.6% reported Unknown ($n = 1$), and 6.3% declined to answer ($n = 4$). Most participants were heterosexual (85.7%, $n = 54$) and 39.7% were single (i.e., never married, $n = 24$). The majority of participants had some college or vocational school training (54%, $n = 34$), and the greatest proportion of participants reported a household income of $15,000 or less (33.3%, $n = 21$).

Measures

Trauma history. Traumatic experiences and an index interpersonal traumatic event were identified using the Traumatic Life Events Questionnaire (TLEQ; Kubany et al., 2000), a 23-item broad-spectrum measure of trauma exposure. Items ask respondents to identify how many times they have experienced a particular event using the following rating scale: *never, once, twice, 3 times, 4 times, 5 times,* and *more than 5 times*. In one study using a clinical sample, when compared with the single-item traumatic event assessment in the Structured Clinical Interview for *DSM-IV* (First, Spitzer, Gibbon, & Williams, 1998), the TLEQ produced a ninefold higher rate of traumatic event identification (Peirce, Burke, Stoller, Neufeld, & Brooner, 2009). For the purposes of this study, only intentionally caused traumas (i.e., an event in which another human being inflicts physical or psychological injury on another human being) were used to prescreen participants for inclusion criteria. Intentionally caused traumas were selected from the TLEQ using the same procedure as Frazier and colleagues (2009), with the exception of abortion, which is not conceptualized in this study as an intentionally caused trauma.

PTSD symptoms. The PTSD Checklist-Civilian Version (PCL-C; Weathers, Litz, Huska, & Keane, 1994) was used to assess PTSD symptoms. The PCL-C is a 17-item self-report scale for posttraumatic stress based on *DSM-IV* criteria. Items are rated from 1 (*not at all*) to 5 (*extremely*). A total severity score is obtained by summing the scores from each of the 17 items. Additionally, items can be summed to create subscales for the reexperiencing ("repeated, disturbing memories, thoughts, or images of a stressful experience from the past"), avoidance ("avoiding activities or situations because they remind you of a stressful experience from the past"), and hyperarousal ("feeling jumpy or easily startled") symptom clusters. A score of 44 is recommended as a cutpoint for PTSD-positive participants in community samples (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The PCL-C demonstrates adequate internal consistency, ranging from .92 to .96 in community samples, and has shown convergent validity with other measures of posttraumatic stress and discriminant validity with measures of separate psychological constructs (Wilkins, Lang, & Norman, 2011). Internal consistency in this sample was $\alpha = .95$.

Depressive symptoms. The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) assessed depressive symptoms. The BDI-II is a 21-item self-report measure for assessing the severity of depression. Items are scored on a scale from 0 to 3, with different anchors for each item (e.g., 1 = *I do not feel sad* to 3 = *I am so sad or unhappy that I can't stand it*), and higher scores indicating more severe depressive symptoms. Raw scores of 0 to 13 indicate minimal depression, 14 to 19 indicate mild depression, 20 to 28 indicate moderate depression, and 29 to 63 indicate severe depression. The average test-retest reliability is $r = .93$ and the average internal consistency is $\alpha = .92$ (Beck et al., 1996). In this sample, internal consistency was $\alpha = .95$.

Posttraumatic cognitions. The Posttraumatic Cognitions Inventory (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999) is a 36-item self-report measure of trauma-related beliefs. It contains

three subscales: Negative Cognitions about Self ("I am a weak person"); Negative Cognitions about the World ("The world is a dangerous place"); and Self-Blame ("The event happened to me because of the sort of person I am"). Items are rated from 1 (*totally disagree*) to 7 (*totally agree*). Higher scores indicate greater negative trauma-related beliefs. Internal consistency in this sample was similar to those from the development study (Foa et al., 1999): total ($\alpha = .97$), Self ($\alpha = .96$), World ($\alpha = .93$), Self-Blame ($\alpha = .85$).

Rumination style. The Ruminative Response Scale (RRS; Treynor et al., 2003) is a 10-item self-report questionnaire of ruminative style. Items are rated from 1 (*almost never*) to 4 (*almost always*) and summed to create a total score. Higher scores indicate more rumination. A principal components analysis on the RRS has demonstrated that two factors exist, which characterize "reflection" ("analyze recent events to try to understand why you are depressed") and "brooding" ("think about a recent situation, wishing it had gone better"). Both reflection and brooding are measured by five items each. The reflection factor has been associated with less depression over time, whereas the brooding factor has been associated with more depression over time, suggesting effective and ineffective components of ruminative processes, respectively (Treynor et al., 2003). The RRS demonstrates adequate internal consistency for the reflection ($\alpha = .72$) and brooding ($\alpha = .77$) subscales (Treynor et al., 2003). Internal consistency for the reflection and brooding subscales in this sample was $\alpha = .88$ and $\alpha = .77$, respectively.

Rumination process and content. An adapted version of the Catastrophizing Interview (CI; Davey & Levy, 1998; Vasey & Borkovec, 1992) was used to generate the material for ratings of problematic (assimilated and overaccommodated) trauma beliefs. The interview involves asking participants to identify their main current concern related to an event, in this case their index trauma ("*What is it that concerns you most about the [index trauma*]?"). When the participant had named their concern *X*, the interview started with the question, "*What is it that concerns you most about X?*" The answer *Y* was followed by the question, "*What is it that concerns you most about Y?*" and so forth in an iterative fashion until the participant indicated that they wanted to end the interview. Participants were instructed at the beginning of the task that they could stop the interview when they had explored their concern, but they were also reminded after 7, 14, and 21 answers or "steps" (if the participant reached that many steps) that they could end the interview when they had reached their goal of sufficiently exploring their concern. During the interview, participants were asked to make each response no longer than a sentence to prevent the participant from providing overelaborated responses that might cover more than one concern.

The CI has been used to assess the process and content of repetitive thought by analyzing the number of steps that a participant goes through (i.e., perseverative thinking) and the level of concreteness in answers provided during the interview, respectively (Ehring et al., 2008; Stöber & Borkovec, 2002). For example, increases in negative affectivity, including greater anxiety and sadness, have predicted a greater number of steps completed during the CI (Johnston & Davey, 1997; Startup & Davey, 2001). Other studies have found that answers in the interview are characterized by physical, financial, and social threats (Vasey & Borkovec, 1992), as well as problem-specific pessimism, personal inadequacy/incompetence, personal despair/hopelessness, and the need to analyze a problem, which are correlated with measures of anxiety, depression, and poor problem-solving confidence (Davey & Levy, 1999). In fact, abstract, or less concrete, content during the interview is associated with both general anxiety symptoms (Stöber & Borkovec, 2002) and posttraumatic stress symptoms (Ehring et al., 2008).

Positive and negative affect. The Positive and Negative Affect Schedule-Expanded Form (PANAS-X; Watson & Clark, 1999) assesses affective states with 13 subscales: two broad, general factors of Negative Affect (NA) and Positive Affect (PA), as well as Basic Negative Emotions (Fear, Sadness, Guilt, and Hostility), Basic Positive Emotions (Joviality, Self-Assurance, and Attentiveness), and Other Affective States (Shyness, Fatigue, Surprise, and Serenity). Each item is rated on a 5-point scale from 1 (*very slightly or not at all*) to 5 (*extremely*). A total mean score is created by summing all items corresponding to that scale and then dividing

by the number of scale items, with higher scores indicating higher degrees of affectivity on that dimension. Subscales have been shown to be reliable and valid across a variety of study populations (student, community samples, psychiatric patients) and time frames used to generate mood ratings (moment, today, past few days, past few weeks, past year, general; Watson & Clark, 1999).

The PANAS-X scales are sensitive to changing internal and external circumstances and can be used validly to assess short-term state affect and fluctuations in mood (Watson & Clark, 1999). For the purposes of this study, only the Basic Negative Emotions of Fear ("Frightened"), Sadness ("Downhearted"), Guilt ("Blameworthy"), Hostility ("Scornful"), and Fatigue ("Drowsy") subscales were utilized. The median internal consistency across 11 samples has consistently shown adequate reliabilities, ranging from $\alpha = .85$ (Hostility) to $\alpha = .88$ (Fatigue and Fear). Internal consistencies for T1 ranged from $\alpha = .77$ (Fear) to $\alpha = .86$ (Hostility) and for T2 ranged from $\alpha = .83$ (Sadness) to $\alpha = .92$ (Guilt).

Procedure

Community and student participants were prescreened through telephone and undergraduate classroom mass testing, respectively, to determine eligibility. Women age 18 and above who endorsed being the victim of assaultive violence (i.e., sexual and/or physical assault) were recruited. Only women were included to avoid introducing into the study gender influences on posttraumatic stress symptomatology (e.g., Tolin & Foa, 2006) and ruminative processes (Nolen-Hoeksema, 2008). There is a longstanding literature demonstrating gender disparities in regard to psychopathology (Kessler et al., 1994), rumination quantity (Tamres, Janicki, & Helgeson, 2002), and rumination quality (e.g., Nolen-Hoeksema & Jackson, 2001). Participants were excluded from participation if (a) the last incident of the identified trauma occurred before the age of 16, to reduce the potential of introducing developmental trauma effects into the study; and (b) the trauma occurred within the last 3 months, as this group of individuals could have been coping with a high degree of acute stress symptoms (Rothbaum, Foa, Riggs, Murdock, & Walsh, 1992).

Participants who met inclusion criteria at the prescreening were asked to complete self-report questionnaires online to obtain information on demographics and trauma history, as well as baseline posttraumatic sequelae characteristics of posttraumatic cognitions, posttraumatic stress symptoms, depressive symptoms, and ruminative response style at least one week prior to a lab session. Participants provided consent online, and participants who did not have access to a computer or the Internet completed the online questionnaire in the research lab. The questionnaire took approximately 30 minutes to complete. Community participants were paid $10 for their time, and student participants were given course credit. Both student and community participants were contacted via phone or e-mail to schedule a lab session at least one week after they had completed the online questionnaire. .

The mean number of days between the online questionnaire and research session was 15.14, which ranged from 7 to 61. The lab session took approximately one and a half hours to complete. Community participants received an additional $30 for their time, and student participants received additional course credit. The lab session began by having participants complete the PANAS-X (Watson & Clark, 1999) to obtain preinterview state affect (T1). Then, the first author administered a trauma-specific repetitive thinking/rumination interview (adapted version of the CI; Davey & Levy, 1998; Vasey & Borkovec, 1992) on their identified interpersonal trauma. The CI assesses perseverative thinking about a worrisome topic, in this case the index trauma, in an iterative fashion by asking interviewees to elaborate their concerns repeatedly until they adequately address their concern. After, participants completed the PANAS-X to obtain a postinterview assessment of state affect (T2).

The study concluded with having participants read an uplifting short story to remove potential negative residual effects from revisiting trauma memories. The uplifting story was taken from actual stories compiled by a division of NBC News rated as the most uplifting stories. The story described how a 76-year old grandmother received her college degree after delaying her education for 42 years to raise a family. Participants were explicitly instructed to enter the

positive mood state before reading the story because demand characteristics intensify mood induction (Westermann, Spies, Stahl, & Hesse, 1996). Following the completion of the study, participants were thanked for their participation and given a debriefing form. The debriefing form included a brief rationale for the study, the researchers contact information to report questions and concerns, and a list of community mental health agencies to address any mental health concerns. No adverse events were reported as a result of this study.

Data Analysis Plan

Coding of problematic trauma beliefs. To examine content expressed during the CI, three coders were trained by the authors to code problematic trauma beliefs and informational statements using a coding manual created by Sobel et al. (2009). The coding manual was used to measure and operationally define accommodated and problematic (assimilated and overaccommodated) trauma beliefs. For example, accommodated statements are balanced, accurate evaluations of oneself, others, and the world (e.g., "Even though I've made mistakes in the past, that doesn't make me a bad person"). Overgeneralizations about oneself, others, and the world are coded as overaccommodated thoughts. Statements that suggest self-blame, denial, or attempts to change the event after the fact are indicative of assimilation. Statements that do not fall into any of the aforementioned categories were classified as informational statements (e.g., descriptions of the trauma, descriptions of emotional reactions, non-evaluative or ambiguous statements).

Independently, the first and second authors divided all sentences, or steps, in the CI into "thought concerns," using the same strategy across subjects–primarily using each clause as an individual thought concern. All thought concerns were consensus coded by three research assistants, which was supervised by the first author, as (a) problematic (assimilated or overaccommodated) trauma beliefs, (b) accommodated trauma beliefs, or (c) informational statements. Coders were provided with summaries of each participant's trauma experience to generate accurate codes. For the purposes of this study, coders generated one frequency score for each participant; the frequency of problematic trauma beliefs. Coders completed several rounds of practice CI interviews before coding the participants' CI.

Coders agreed 87.61% of the time when coding clauses as problematic beliefs. When a discrepancy arose, coders discussed the discrepancy and came to a consensus on how to code the clause. Coders were blind to study hypotheses. Individual variability in the number of concerns expressed across participants was controlled by calculating the frequency of problematic trauma beliefs relative to the total number of thought concerns reported by each participant. This percentage score was used as the problematic trauma beliefs variable.

Analytic strategy. Statistical analyses were conducted with SPSS (version 22.0). Correlation analyses were conducted to examine the relations between baseline posttraumatic sequelae (i.e., PTSD and depressive symptoms, negative posttraumatic cognitions, and a brooding response style) and problematic trauma beliefs expressed during the CI.

To test whether posttraumatic stress symptoms mediate the relation between a brooding response style and expressed problematic trauma beliefs during the CI, we used a multiple mediation procedure based on nonparametric resampling known as *bias–corrected bootstrapping* (Shrout & Bolger, 2002). The bootstrapping procedure is a statistically powerful alternative to mediation using causal steps variations (MacKinnon, Lockwood, & Williams, 2004) by gathering many alternative versions of a single statistic ordinarily only calculated from one sample. Bias-corrected bootstrap data resampling procedures for mediation establish confidence intervals for testing the statistical significance of the total indirect effect and each specific indirect effect associated with each mediator variable (Shrout & Bolger, 2002), though a significant total indirect effect is not a prerequisite for investigating specific indirect effects (Preacher & Hayes, 2008). The SPSS Macro that accompanies Preacher and Hayes (2004) was downloaded from http://www.quantpsy.org to conduct indirect effects using the bootstrapping procedure. The analysis was based on 10,000 bootstrap iterations and the confidence interval was set to 95% as recommended by Mallinckrodt, Abraham, Wei, and Russell (2006).

Correlation analyses were also conducted to examine the relations between negative emotions and fatigue before the interview with ruminative processes during the interview. Finally, linear regressions were used to examine whether, after controlling for fatigue, negative emotions before the interview interact with ruminative processes during the interview to predict negative emotions after the interview. To test this moderation model, the steps outlined in Frazier, Tix, and Barron (2004) were followed. First, independent variables were standardized (i.e., z scored) to reduce multicollinearity between the moderator variables and product term. Next, a product term representing the interaction between standardized independent variables was created. Finally, negative emotions after the interview were regressed on fatigue, negative emotions before the interview, ruminative processes before the interview, and the product term.

Results

Descriptive Statistics

Participants reported experiencing numerous and severe interpersonal traumas with the modal trauma reported to be intimate partner violence by 82.54% of the sample ($n = 52$). Intimate partner violence also was the most frequently reported index violent assault identified on the CI, reported by 44.44% of participants ($n = 28$). Adult sexual assault was the second most frequently reported index violent trauma (19.05%, $n = 12$), followed by adolescent (after age 15) sexual assault (13.70%, $n = 8$), adolescent (after age 15) physical abuse by caregivers (9.52%, $n = 6$), being robbed with a weapon (6.35%, $n = 4$), witnessing family violence (3.17%, $n = 2$), and being stalked (1.59%, $n = 1$). Two participants reported other types of violent assault that fell into a different category: One reported being kidnapped with a weapon and held hostage by a romantic partner for several days; the other reported being the victim of attempted murder by a coworker.

There were no significant differences found between the variables of interest in this study (i.e., PTSD symptoms, depressive symptoms, posttraumatic cognitions, rumination style, negative emotions, fatigue, CI steps, CI thought concerns, and problematic cognitions expressed during the CI) and the different trauma types identified during the CI ($ps > .05$). The last time the index violent event occurred averaged approximately 9.61 (standard deviation [SD] = 9.81) years prior to the interview, ranging from 3 months to 38 years prior. Many participants ($n = 17$, 27%) reported that the index assault occurred within the last year, and the majority ($n = 33$, 52.4%) reported that the index assault occurred within the last five years.

Posttraumatic stress symptom severity on the PCL had a mean score of 38.11 ($SD = 16.26$), ranging from 17 to 85. Using a cutoff score of 44 (Blanchard et al., 1996), 32.3% of participants would be classified as PTSD positive. This percentage is in the range of the conditional risk of PTSD given exposure to assaultive violence (i.e., 26%; Resnick, Kilpatrick, Dansky, Saunders, & Best 1993). Depressive symptom severity on the BDI-II was a mean of 16.26 ($SD = 12.78$), ranging from 0 to 51, and suggests "mild depression." The majority of the sample (54.3%) reported "minimal depression," 15.1% reported "mild depression," 14.5% reported "moderate depression," and 16.1% reported "severe depression." The mean score on reflection and brooding rumination was 9.78 ($SD = 3.45$) and 11.70 ($SD = 4.13$), respectively. These estimates are similar to mean scores (reflection mean [M] = 10, $SD = 3.19$; brooding $M = 9.66$, $SD = 3.09$) reported in another sample of women (Treynor et al., 2003).

Rumination Content

With regard to the content expressed during the CI, consistent with the first hypothesis, it was observed that the majority (54%, $n = 34$; see Table 1) of participants expressed problematic trauma beliefs. Of the women who reported problematic trauma beliefs, the frequency of problematic trauma beliefs relative to other thoughts expressed during the CI ranged from 2.27% to 83.33%, with the average interview comprising 24.42% ($SD = 19.32$) problematic trauma beliefs. Problematic trauma beliefs expressed by this sample of participants replicated categories

Table 1
Sample Trauma Beliefs Expressed During the Catastrophizing Interview (N = 63)

Assault	Catastrophizing Interview responses
IPV	"I'm not going to be in a normal relationship after all of this."
IPV	"I should've realized he wasn't going to change from the first time."
SA	"It couldn't have went on for so long, if I would've confronted it sooner."
PA	"I still feel like everything's my fault."
SA	"The people you think you trust are the ones you have to worry about."
IPV	"I think that any guy I date is going to hit me when he's mad."
SA	"Will I ever be able to trust anybody?"
IPV	"I don't think I'm good enough to get anyone else."
SA	"I don't think I fought back hard enough."
SA	"It means that I'm not worth anything; I'm a loser, trouble, you know, too much trouble."
IPV	"Never trusting anyone, ever again."
SA	"I'm not independent, I'm weak, I can't take care of myself."

Note. IPV = intimate partner violence; SA = sexual assault; APA = physical assault.

identified by Steil and Ehlers (2000); namely, trauma-related beliefs of personal change ("I'm not independent, I'm weak, I can't take care of myself"), justice ("I feel that I'm trustworthy so everyone should be, uh, have some values about themselves and care, care about the next person"), personal responsibility ("I feel like everything's my fault"), and future danger ("I'm terrified it's going to happen again").

Rumination Correlates

Consistent with the second hypothesis, almost all baseline posttraumatic sequelae were positively associated with the frequency of problematic trauma beliefs expressed during the CI. Specifically, negative posttraumatic cognitions about the world, PTSD symptom clusters of reexperiencing and avoidance, and depressive symptoms were associated with more problematic trauma beliefs (see Table 2). Additionally, brooding rumination, but not reflection rumination, was associated with more problematic trauma beliefs (Table 2).

Given that only posttraumatic stress symptoms of reexperiencing and avoidance were associated with expressed problematic trauma beliefs, only those two variables were included as mediators in the mediation model examining the relation between a brooding response style and expressed problematic beliefs. The total indirect effect using bias-corrected bootstrapping was not significant (0.47, 95% bias-corrected bootstrap confidence interval = −0.31 to 1.39). Partially consistent with our hypothesis, only posttraumatic stress symptoms of reexperiencing were a significant and unique mediator of the relation between brooding rumination and expressed problematic trauma beliefs (0.65, 95% bias-corrected bootstrap confidence interval = 0.11 to 1.74) over and above avoidance PTSD symptoms (−0.19, 95% bias-corrected bootstrap confidence interval = −1.07 to 0.75).

Rumination Processes

On average, the interviews lasted 547.63 seconds (SD = 280.27), ranging from 292 seconds to 1231 seconds. Participants went through 15.13 (SD = 11.25) "steps" on the CI, ranging from 0 to 63. The number of thought concerns participants reported ranged from 0 to 82 (M = 20.46, SD = 16.87). Neither the number of steps nor concerns were associated with baseline posttraumatic sequelae variables (ps > .05). However, before the CI, affective states of fear and fatigue were positively associated with the number of CI steps; only fatigue was positively associated with the number of CI thought concerns. Both fatigue and sadness were associated with expressed problematic trauma beliefs, whereas problematic trauma beliefs were associated only with sadness after the CI (see Table 3).

Table 2
Correlations of Posttraumatic Sequelae Characteristics With Problematic Trauma Beliefs and Ruminative Processes (CI Steps, CI Thought Concerns) During Trauma-Related Repetitive Thinking (N = 63)

	Ruminative content and processes			Affective states represented by the PANAS-X				
	Problematic beliefs	CI Steps	CI concerns	Time 2 hostility	Time 2 guilt	Time 2 sadness	Time 2 fear	Time 2 fatigue
Posttraumatic Cognitions	.25	.10	.01	.32*	.55***	.41**	.42**	.30*
Negative self cognitions	.21	.09	.10	.29*	.57***	.40**	.37**	.27*
Negative world cognitions	.34**	.16	.08	.29*	.30*	.39**	.43**	.29*
Self-blame cognitions	.09	.01	−.11	.24	.54***	.24	.32*	.21
Posttraumatic stress symptoms	.31*	.10	.03	.37**	.63***	.45***	.45***	.53***
Reexperiencing symptoms	.36**	.19	.17	.35*	.59***	.37**	.41**	.41**
Avoidance symptoms	.26*	.03	−.03	.32*	.60***	.44***	.39**	.25*
Hyperarousal symptoms	.20	.08	−.10	.34**	.49***	.36**	.41**	.31**
Depressive symptom total	.31*	.02	−.08	.32*	.56***	.38**	.35**	.35**
Brooding rumination	.30*	−.06	−.15	.19	.50***	.26*	.31*	.33**
Reflection rumination	.14	.09	.00	.05	.28*	.12	.15	.19

Note. CI = Catastrophizing Interview; Time 2 = post-CI state affect; PANAS-X = Positive and Negative Affect Schedule-Expanded Version.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3
Correlations of Affective States With Ruminative Processes (CI Steps, CI Thought Concerns, and Problematic Beliefs; N = 63)

	CI steps		CI Concerns		Problematic beliefs	
	T1	T2	T1	T2	T1	T2
PANAS-X Affective States						
Fear	.28*	.24	.19	.25	.21	.13
Hostility	.10	.23	.01	.25*	.10	.08
Guilt	.23	.14	.14	.08	.17	.18
Sadness	.06	.30*	.01	.27*	.34**	.25*
Fatigue	.45***	.27*	.37**	.15	.25*	.28*

Note. CI = Catastrophizing Interview; T1 = pre-CI; Time 2 = post-CI; PANAS-X = Positive and Negative Affect Schedule-Expanded Version.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4
Hierarchical Linear Regression Analysis Testing Expressed Problematic Trauma Beliefs as a Moderator of the Relation Between Sadness Before and After Rumination (N = 63)

	Adj.R^2	B	SE B
Regression 1			
Outcome: T2 sadness	.43***		
Control: T1 fatigue		1.49**	0.41
Predictor: T1 sadness		1.80***	0.42
Predictor: Trauma beliefs		0.02	0.41
Regression 2			
Outcome: T2 sadness	.49***		
Control: T1 fatigue		1.49***	0.40
Predictor: T1 sadness		1.87***	0.41
Predictor: Trauma beliefs		−0.44	0.47
Predictor: T1 sadness X trauma beliefs		0.80†	0.42

Note. SE = standard error; CI = Catastrophizing Interview; T1 = pre-CI; Time 2 = post-CI; Sadness and Fatigue Affective States represented by the PANAS-X = Positive and Negative Affect Schedule-Expanded Version.
†$p < .06$. *$p < .05$. **$p < .01$. ***$p < .001$.

Given that only the affective state of sadness was associated with expressed problematic beliefs before and after the CI, sadness was the only negative emotional state included in the moderation analysis. On step one, fatigue before the CI, sadness before the CI, and expressed problematic trauma beliefs were simultaneously entered as predictors of sadness after the CI (Table 4). Results revealed that only fatigue and sadness before the CI significantly predicted sadness after the CI. On step two, the product term of sadness before the CI X expressed problematic trauma beliefs were included in the model as an additional predictor of sadness after the CI. Results revealed that the product term approached significance, suggesting that expressed problematic trauma beliefs may interact with a sad affective state to further increase sadness after repetitive thinking/rumination, even after controlling for fatigue.

Discussion

It was found in this study that the majority (54%) of participants expressed problematic (i.e., assimilated or overaccommodated) trauma beliefs during the interview. In those who expressed problematic trauma beliefs, the average interview was comprised of approximately one-quarter

problematic trauma beliefs, but ranged up to approximately 83%. The observation that approximately a quarter of the interview consisted of problematic trauma beliefs is consistent with a study by Steil and Ehlers (2000), who found that 29% of the variance in rumination among trauma survivors was represented by problematic trauma beliefs of personal change, justice, personal responsibility, and future danger. Thus, it appears that the perseverative content in trauma-related rumination consists of inaccurate and overgeneralized trauma beliefs.

Inaccurate and overgeneralized trauma beliefs are associated with PTSD and depressive symptoms (Foa et al., 1999), which was also found in this study. Problematic trauma beliefs expressed in the trauma-specific interview were associated with greater PTSD symptoms of reexperiencing and avoidance, greater depressive symptoms, negative posttraumatic cognitions about the world, and a brooding response style. It is unsurprising that problematic trauma beliefs expressed during the interview were associated with negative posttraumatic cognitions because maladaptive rumination may strengthen problematic trauma beliefs. It may also be that those who hold more posttraumatic cognitions perseverate more on them as a way to accommodate and make sense of the trauma, but, unfortunately, unsuccessful attempts at accommodation may strengthen problematic trauma beliefs.

Interestingly, a brooding rumination style, but not a reflection rumination style, was associated with problematic trauma beliefs, suggesting that those who engage in reflection rumination (i.e., purposeful self-focused attention that allows one to engage in cognitive problem solving to alleviate distress) may be able to disengage from negative cycles of thinking. Those who tend to process their experiences passively and judgmentally may be more prone to getting "stuck" in their thinking and perseverate on problematic trauma beliefs during trauma-related rumination. Passively thinking about the causes and consequences of trauma can provide internal retrieval cues for intrusive trauma memories that can elicit further rumination, which may be why reexperiencing symptoms mediated the relation between a brooding response style and expressed problematic trauma beliefs during the interview. Brooding rumination may be a transdiagnostic process by which depression and PTSD are highly associated, and why depressive symptoms were associated with trauma-related rumination in this study

When examining ruminative processes, it was observed that a fatigued state was a robust predictor in several outcomes; fatigue was associated with the number of steps participants completed on the CI (i.e., perseveration), the number of concerns participants expressed, and a greater proportion of problematic trauma beliefs. A fearful and sad state, in particular, predicted perseveration and problematic trauma beliefs, respectively. Thus, it may be that those who were more fatigued before the CI had less cognitive control and initiated a negative cycle of thinking that prolonged ruminative processes. It also appears that participants may have used the CI to resolve their fearful affect by perseverating more during the interview. Additionally, those who reported more sadness before the CI may have used the CI to ruminate on their sadness (symptoms, consequences, and negative inferences) and consequently expressed more problematic trauma beliefs because their cognitive processing was dominated by traumagenic themes at a propositional level, as suggested in the response styles theory.

After the CI, expressed concerns were associated with hostility after the CI, suggesting that expressing one's concerns related to a traumatic assault may increase feelings of anger, hate, and contempt. Interestingly, sadness and fatigue were either maintained or increased for those who perseverated more, expressed more thought concerns, and expressed more problematic trauma beliefs. In fact, the interaction of sadness before the CI with expressed problematic trauma beliefs during the CI approached significance in predicting sadness after the CI, even after controlling for fatigue. These results suggest that sadness may increase the likelihood of perseverating on problematic trauma beliefs when triggered, which may maintain and/or increase sadness.

The results of this study support and extend previous research on trauma-related rumination and have important clinical implications. The trauma-related repetitive thinking interview illuminated ruminative content that can be a target of intervention, specifically assimilated and overaccommodated trauma beliefs, to break the cycle of perseveration and accompanying distress. Correlates and processes of trauma-related rumination in this study identified potential vulnerability factors that may place one at risk for perseverating on problematic trauma beliefs; those with greater posttraumatic stress and depressive symptoms, more posttraumatic

cognitions, and a brooding response style as well as those experiencing affective states of fatigue and sadness may be at risk for engaging in trauma-related rumination.

Limitations

This study is one of the first of its kind to have trauma survivors engage in a trauma-specific rumination task to elucidate trauma-related ruminative content, correlates, and processes. Although this study illuminates characteristics of trauma-related rumination, there are inherent limitations. The sample size was small and nonclinical. PTSD was not formally diagnosed in this sample; therefore, it is unknown whether the results of this study are generalizable to clinical populations. Additionally, trauma-related rumination characteristics in this study were examined posttrauma. Therefore, it is unknown whether trauma-related rumination is a risk factor for posttraumatic sequelae or whether it results from distress.

Conclusion

However, this study is a first step in understanding the characteristics of trauma-related rumination in an attempt to consider mechanisms that may maintain, prolong, and prevent recovery from posttraumatic sequelae. Future studies should examine the similarities and differences of trauma-related rumination in clinical and nonclinical samples to better understand the role of rumination in these samples, and whether certain types of rumination (i.e., reflection rumination) are helpful in recovery.

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