The Interactive Effect of Event Centrality and Maladaptive Metacognitive Beliefs on Posttraumatic Stress Symptoms and Posttraumatic Growth

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Abstract

Objective: Event centrality, the extent to which a traumatic event becomes a reference point for understanding the world and one’s role in it, is related to both posttraumatic stress (PTS) symptoms and posttraumatic growth (PTG). Given that higher event centrality is associated with both of these seemingly disparate post-event trajectories, research on potential moderators of these relationships is needed to better understand the conditions under which event centrality relates to one or both outcomes. Maladaptive metacognitive beliefs (i.e., beliefs about thinking, Wells & Mathews, 1994; 1996) might be one individual difference factor that influences the degree to which event centrality is related to PTS symptoms and PTG. Method: In a laboratory session, undergraduate students ($N = 149$) completed self-report measures of event centrality, maladaptive metacognitive beliefs (negative and positive), PTS symptoms, and PTG. Analyses were conducted using structural equation modeling in order to account for shared variance between PTS symptoms and PTG. Results: As predicted, the positive relationship between event centrality and PTS symptoms became increasingly stronger as maladaptive metacognitive beliefs increased (i.e., both positive and negative metacognitive beliefs). The positive relationship between event centrality and PTG was stronger as maldaptive negative, but not positive, metacognitive beliefs decreased. Conclusions: Study findings suggest that treatments designed to reduce maladaptive metacognitive beliefs, could lead to reductions in PTS symptoms and increased opportunity for PTG among those with highly central traumatic events.

Keywords: Posttraumatic Stress Disorder, Posttraumatic Growth, Event Centrality, Metacognitive Beliefs, Trauma
Clinical Impact Statement

Study findings partially explain the seeming paradox in which event centrality predicts both posttraumatic stress (PTS) symptoms and posttraumatic growth (PTG). Specifically, among those who report high event centrality, higher levels of maladaptive metacognitive beliefs predict higher PTS symptoms and lower levels of maladaptive metacognitive beliefs predict greater PTG. As such, it may be important to assess event centrality and metacognitive beliefs following trauma exposure to identify individuals who are most at risk for prolonged PTS symptomatology. Additionally, metacognitive therapy may be a particularly good treatment choice for these individuals.
The Interactive Effect of Event Centrality and Maladaptive Metacognitive Beliefs on Posttraumatic Stress Symptoms and Posttraumatic Growth

Event centrality is the extent to which a traumatic event is viewed as a reference point for understanding new experiences, a turning point in an individual’s autobiographical story, and a key component of an individual’s identity (Berntsen & Rubin, 2006). Events that are perceived as being integral to one’s identity influence post-trauma adjustment (Park, 2013). Those who report that their traumatic experience is highly central are more likely than those who report lower event centrality to experience prolonged emotional distress (Boals & Scheuttler, 2011). For example, event centrality has been shown to predict posttraumatic (PTS) symptoms (a) in a wide variety of populations (Berntsen & Rubin, 2006; Brown, Antonius, Kramer, Root & Hirst, 2010; Robinaugh, & McNally, 2011), (b) above and beyond the effects of coping strategies and depressive symptoms (Boals & Schuettler, 2011), and up to 1-month after an initial assessment of symptoms (Boals & Ruggero, 2016).

Although seemingly paradoxical, higher event centrality also predicts higher levels of posttraumatic growth (PTG; i.e., a perceived positive change following a traumatic event in the areas of personal strength, interpersonal functioning, spiritual change, new possibilities, and appreciation of life; Tedeschi & Calhoun, 1996). As with the PTS literature, event centrality has been shown to relate to PTG after controlling for important predictor variables, such as event-related changes in beliefs about the world and one’s role in it, rumination, and the meaning or understanding that one takes away from the traumatic event (Groleau et al., 2013). The seeming paradox, in which centrality contributes to both distress and positive growth, might be better understood by examining moderator variables that account for these seemingly disparate post-event trajectories. Metacognitive beliefs (i.e., beliefs about thinking, Wells & Mathews, 1994;
Event Centrality, Metacognitive Beliefs, PTS symptoms and PTG

1996) are one such individual difference factor that might shed light on the conditions under which high event centrality contributes to PTS symptoms versus PTG.

Within Wells’s metacognitive model of PTS disorder (PTSD), having increased negative beliefs about the self, others, and the world following a traumatic experience is a common part of the recovery process. According to Wells’s model, the difference between those who fully recover and those who go on to develop PTSD is that the latter group hold certain metacognitive beliefs that increase the likelihood that they will respond to inner experiences (e.g., intrusive images, memories) with heightened self-focused attention, threat monitoring, worry, rumination, or other avoidant coping strategies. This response style is called the cognitive attentional syndrome (CAS). The maladaptive metacognitive beliefs that are proposed to trigger the CAS are primarily of two types: negative metacognitive beliefs about the danger and uncontrollability of thoughts (e.g., “It’s not normal to keep thinking about the trauma”) and positive metacognitive beliefs (e.g., “Thinking about threats in the future will help me cope”).

Maladaptive metacognitive beliefs are positively associated with PTS symptoms (e.g., Fergus & Bardeen, 2017; Roussis & Wells, 2006) and predict symptom maintenance over time (Takarangi et al., 2017). Moreover, Fergus and Bardeen (2017) found that maladaptive metacognitive beliefs provide incremental utility in predicting PTS symptoms beyond the variance accounted for by content-specific beliefs. These results suggest that metacognitive beliefs may be more important for understanding the pathogenesis of PTSD than trauma-related thought content.

High centrality events are easier to access in memory causing them to be recalled with greater frequency (Rubin, Boals, & Berntsen, 2008). As described, maladaptive metacognitive beliefs promote threat monitoring and self-focused attention. Because highly central events are
recalled more frequently, those who hold maladaptive metacognitive beliefs, which further exacerbate self-focused attention and lead to avoidant coping, may be at particularly high risk of developing PTSD following trauma exposure. For example, someone who frequently thinks about a traumatic experience (i.e., those with a highly central event) and also holds negative metacognitive beliefs such as “I could lose my mind if I continue to think this way,” may be more distressed by the constant recall of the event, believing that it is proof that he or she is not in control of his or her thoughts. The individual may then engage in attempts to suppress such thoughts to alleviate his or her distress, which paradoxically increases thought intrusions and PTS symptoms (Davies & Clark, 1998; Salkovskis & Campbell, 1994). Thus, negative metacognitive beliefs may exacerbate the positive relationship between event centrality and PTS symptoms. Positive metacognitive beliefs, such as “I must go over events to make sense of them,” are likely reinforced every time the individual is not confronted with the feared outcome (e.g., going “crazy” or experiencing another traumatic event; Fergus & Bardeen, 2017). This reinforcement should strengthen positive metacognitive beliefs and CAS coping, and lead to the development and maintenance of PTS symptomatology, while simultaneously reducing the likelihood that the individual will experience PTG (Fergus & Bardeen, 2017; Roussis & Wells, 2006). Those who endorse lower maladaptive metacognitive beliefs, however, may be more likely to approach, rather than avoid, trauma-related thoughts and memories in an introspective manner that promotes meaning making (e.g., deliberative rumination rather than intrusive rumination; Cann et al., 2011). In fact, although cross-sectional in nature, some evidence suggests that when high centrality events are met with deliberate rumination, PTG is more likely to occur (Kramer, Whiteman, Witte, Silverstein, & Weathers, 2019). Therefore, lower metacognitive beliefs might allow for the development of PTG.
Following from the logic above and guided by theory (Wells & Mathews, 1994; 1996), we hypothesized that maladaptive metacognitive beliefs (positive and negative) would moderate the relationship between event centrality and both PTS symptoms and PTG. More specifically, we predicted that the strength of the positive association between event centrality and PTS symptoms would become significantly stronger as maladaptive metacognitive beliefs increased. Conversely, we expected that the strength of the positive association between event centrality and PTG would become significantly weaker as maladaptive metacognitive beliefs increased. As noted by Schuettler and Boals (2011), a limitation in this area of research is a failure to simultaneously examine PTS symptoms and PTG. We addressed this limitation by using structural equation modeling to evaluate the proposed interactions on both outcomes simultaneously.

**Method**

**Participants and Procedure**

Participants were 149 students recruited from an undergraduate research pool at a Southeastern university. Students were deemed eligible to participate in this study if they were between the ages of 18-65, had normal or corrected vision, and were fluent in English. Participants also had to report experiencing at least one traumatic event to be eligible for this study (consistent with Criterion A for a diagnosis of PTSD as per the *DSM-5*; APA, 2013). In total, nine participants (6%) did not report a Criterion A event, and thus, were removed from study analyses. An examination of multivariate outliers suggested that one case exhibited undue influence on the estimates within the regression models (defined as > 1 DFFITS; Cohen, Cohen, West, & Aiken, 2003), thus resulting in removal of this case from further analysis.
The final sample \(N = 139\); 73.4% female) reported an average age of 19.39 years (\(SD = 1.69\), \textit{range} = 18-27). The majority of the sample identified their race as White (87.8%), followed by Asian (5.8%), Black or African-American (3.6%), and “other” (2.9%). One participant identified their ethnicity as Hispanic or Latino (0.7%).

All study procedures were approved by the local institutional review board. The study was conducted in a laboratory setting. When participants arrived they provided informed consent before continuing with study procedures. As part of a larger study, participants completed a battery of self-report measures administered on a desktop computer via Qualtrics (http://www.qualtrics.com/). At the end of the study, participants were debriefed and provided with a list of local mental healthcare resources. Participants were awarded 2.5 hours of research credit for their participation.

\textbf{Self-Report Measures}

\textit{Life Events Checklist for DSM-5 (LEC-5; Weathers, Blake, Schnurr, Kaloupek, Marx, & Keane 2013a).} The LEC-5 is a self-report measure of lifetime exposure to traumatic events. Participants indicated whether they experienced each of 17 potentially traumatic events through direct exposure, witnessing the event, learning about the event, or experiencing the event as part of their job. This study utilized the extended version of the measure, in which participants were asked to briefly describe the events they endorsed and identify the worst event. Participants were included in the final sample if they endorsed any event that met Criterion A for a diagnosis of PTSD per \textit{DSM-5} (APA, 2013).

\textit{PTSD Checklist (PCL-5; Weathers, Litz, Keane, Palmieri, Marx, & Schnurr, 2013b).} The PCL-5 is a 20-item measure of PTS symptoms. Participants rated how much they were bothered by each symptom in the past month on a five-point scale from 0 (not at all) to 4
The PCL-5 has demonstrated acceptable test-retest reliability and convergent validity with other measures of PTS symptoms (Blevins, Weathers, Davis, Witte, & Domino, 2015). In the present study, PCL-5 scores demonstrated excellent reliability ($\alpha = .93$).

**Centrality of Events Scale Short Form (CES-SF; Berntsen & Rubin, 2006).** The CES-SF measures the extent to which a traumatic event has become a core component of one’s personal identity and a reference point that the individual uses to understand everyday experiences (Bernsten & Rubin, 2006). Participants were asked to respond to items based on “the most stressful or traumatic event in your life.” The CES-SF is rated on a five-point scale from 1 (totally disagree) to 5 (totally agree), with higher scores indicating greater event centrality. Example items from the CES-SF are presented in Table 1. The CES-SF has demonstrated excellent internal consistency and criterion-related and discriminant validity (Bernsten & Rubin, 2006; Gehrt, Berntsen, Hoyle, & Rubin, 2018). In this study, the CES-SF exhibited excellent internal consistency ($\alpha = .92$).

**Metacognitions Questionnaire-PTSD (MCQ-PTSD; Wells, 2009).** The MCQ-PTSD is a subset of 12 items that are part of Wells’ (2009) Posttraumatic Stress Disorder Scale (PTSD-S), which was designed to monitor treatment progress. Items are rated on a 0 to 100 scale in increments of 10, with higher scores indicating more strongly held metacognitive beliefs. Factor analytic results show that the MCQ-PTSD consists of two factors, with five items loading on a positive metacognitive beliefs factor and seven items loading on a negative metacognitive beliefs factor. Example items from the MCQ-PTSD are presented in Table 1. The MCQ-PTSD has demonstrated acceptable internal consistency and construct validity in previous research (Fergus & Bardeen, 2017). In this study, PTSD-S Positive and PTSD-S Negative scores exhibited acceptable internal consistency ($\alpha = .72$ and $.77$, respectively).
Post-Traumatic Growth Inventory Short Form (PTGI-SF; Cann et al., 2010). The PTGI-SF is a 10-item version of the longer 20-item measure (Tedeschi & Calhoun, 1996). It was designed to assess positive change following a traumatic experience in the areas of personal strength, improved interpersonal functioning, spiritual change, perceiving new possibilities, and an increased appreciation of life. Items were rated in reference to the event that the participant identified as the worst. Items are rated on a six-point scale from 0 (*I did not experience this change as a result of my crisis*) to 5 (*I experienced this change to a very great degree as a result of my crisis*). Items are summed to create a total score with higher scores indicating greater posttraumatic growth. PTGI-SF scores have exhibited internal consistency and construct validity (Cann et al., 2010; Kaler, Erbes, Tedeschi, Arbisi, & Polusny, 2011). Internal consistency was adequate in the present study (α = .90).

Results

Descriptive Statistics and Zero-Order Correlations

Participants endorsed an average of 7.37 categories of potentially traumatic events (SD = 3.13). See Table 2 for descriptive statistics and bivariate correlations. Consistent with previous research, event centrality was significantly correlated with both PTS symptoms and PTG (rs = .49 and .38, respectively ps < .01). Both negative and positive metacognitive beliefs were significantly associated with PTS symptoms (r = .52 and .22, respectively, ps < .01), though neither was significantly associated with PTG.

Data Analytic Strategy

Structural equation modeling (SEM) and path analysis were used to test the hypothesized interactive effects. This approach was used instead of standard regression analysis because multiple outcome variables (i.e., PTS symptoms and PTG) can be modeled simultaneously in
SEM. For each model, event centrality, maladaptive metacognitive beliefs (i.e., positive or negative), and an interaction term served as predictor variables, while PTS symptoms and PTG served as outcome variables. Consistent with Aiken and West (1991), the predictor and moderator variables were mean centered and interaction terms were calculated as the product of the moderator and predictor variables. Each model was tested using MPlus 8.2 (Muthén & Muthén, 2015) with robust maximum likelihood estimation. All variables were modeled as manifest indicators. Fit statistics were not computed because just-identified models provide prefect fit to the data (Kline, 2016). Simple slopes analysis was used to further explore significant interactions (Aiken & West, 1991). Simple slopes analysis examines the relationship between the predictor and outcome variables at both high (+1 $SD$) and low (-1 $SD$) levels of the moderating variable (i.e., metacognitive beliefs).

**Path Models**

*Interactive Effect of Event Centrality by Negative Metacognitive Beliefs*

Event centrality ($\beta = .37, p < .001$), negative metacognitive beliefs ($\beta = .34, p < .001$), and the interaction term (event centrality by negative metacognitive beliefs; $\beta = .19, p < .01$) significantly predicted PTS symptoms ($R^2 = .43, p < .001$; see Figure 1). Event centrality ($\beta = .37, p < .001$) and the interaction term ($\beta = -.13, p = .04$) significantly predicted PTG but negative metacognitive beliefs did not ($\beta = .13, p = .14; R^2 = .17, p < .01$). Simple slopes analysis revealed the positive association between event centrality and PTS symptoms was significantly stronger at higher ($\beta = .54, p < .001$), versus lower ($\beta = .20, p = .04$), levels of negative metacognitive beliefs. In contrast, the positive association between event centrality and PTG was significantly stronger at lower ($\beta = .55, p < .001$), versus higher ($\beta = .21, p = .04$), levels of negative metacognitive beliefs.
Interactive Effect of Event Centrality by Positive Metacognitive Beliefs

Event centrality significantly predicted both PTS symptoms and PTG ($\beta = .42$ and $.40$, respectively, $p < .001$), while positive metacognitive beliefs did not significantly predict either outcome ($p > .05$; see Figure 2). The interaction between event centrality and positive metacognitive beliefs significantly predicted PTS symptoms ($\beta = .18$, $p = .03$; $R^2 = .28$, $p < .001$) but not PTG ($\beta = -.12$, $p = .11$; $R^2 = .16$, $p = .01$). Simple slopes analysis revealed that the positive association between event centrality and PTS symptoms was significant at higher ($\beta = .62$, $p < .001$), but not lower ($\beta = .22$, $p = .10$), levels of positive metacognitive beliefs.

Discussion

As predicted, the association between event centrality and PTS symptoms became stronger as both positive and negative metacognitive beliefs increased. Additionally, the positive association between event centrality and PTG became weaker as negative metacognitive beliefs increased. In contrast, the event centrality-PTG relationship was not moderated by positive metacognitive beliefs. Thus, maladaptive metacognitive beliefs appear to amplify the deleterious relationship between event centrality and PTS symptoms, whereas lower levels of maladaptive metacognitive beliefs (specifically negative metacognitive beliefs) may provide the foundation for event centrality to facilitate PTG.

Our results in relation to PTS symptomatology are consistent with the metacognitive model which suggests that negative metacognitive beliefs promote threat monitoring and self-focused attention that lead to the use of avoidant coping behaviors and the development of PTSD. As described, this effect is likely amplified by the fact that highly central events are recalled more frequently, thus garnering even more attention than they would otherwise. On the other hand, an individual who holds positive metacognitive beliefs, such as “I must go over
events to make sense of them,” experiences reinforcement of such beliefs every time they are not confronted with the feared outcome (e.g., going “crazy” or experiencing another traumatic event; Fergus & Bardeen, 2017). The positive metacognitive belief is thus confirmed and strengthened over time. If an event is recalled frequently (i.e., a highly central event), the reinforcing effect of the positive metacognitive belief is amplified. Thus, the CAS is strengthened, leading to PTS symptoms (Fergus & Bardeen, 2017; Roussis & Wells, 2006).

Regarding the relationship between metacognitive beliefs and PTG, our hypotheses were partially supported. The relationship between event centrality and PTG was stronger at lower levels of negative, but not positive, metacognitive beliefs. Individuals who report fewer negative metacognitive beliefs might be more likely to approach and deliberately engage with trauma-related thoughts and memories (Cann et al., 2011). Doing so may set the stage to engage in deliberate meaning making by intentionally thinking about the central event in an introspective manner that may facilitate PTG (Cann et al., 2011). Regarding the hypothesized interaction between event centrality and positive metacognitive beliefs on PTG, it may be that this study, with its relatively small sample, was underpowered to detect this effect. The interaction term approached significance ($\beta = -.12, p = .11$). Had the sample size been larger, the hypothesized effect may have been observed. Although the interaction term did not significantly predict PTG, the pattern of the nonsignificant interaction was consistent with that which was observed for the interaction between event centrality and negative metacognitive beliefs on PTG. We determined this by conducting a post-hoc simple slopes analysis which indicated that the positive association between event centrality was stronger at lower versus higher levels of positive metacognitive beliefs. Higher levels of metacognitive beliefs, particularly about the danger and uncontrollability of thoughts may prompt attempts to avoid or suppress thinking about the
trauma. This in turn may prevent the kind of deliberate introspective engagement with these thoughts that could lead to growth. Thus, among those with highly central events, higher maladaptive metacognitive beliefs might also prevent the individual from experiencing the meaning making necessary for growth. This hypothesis will need to be tested in a larger sample with sufficient power to detect a small interaction effect.

Results from the present study suggest that those who view a traumatic event as integral to their identity in the acute aftermath of such an event may be at greater risk of developing PTS symptoms if they also hold maladaptive metacognitive beliefs. As such, it may be important to assess event centrality and metacognitive beliefs following trauma exposure. By doing so, individuals who are most at risk of prolonged PTS symptomatology can be identified. These individuals may benefit from preemptive efforts to reduce maladaptive metacognitive beliefs to reduce the likelihood that acute emotional distress in the aftermath of a traumatic event will lead to the development of PTSD. Metacognitive therapy (Wells, 2009), which aims to systematically decrease negative and positive metacognitive beliefs, may therefore be particularly well-suited for decreasing PTS symptoms in those who have experienced a highly central traumatic event and endorse maladaptive metacognitive beliefs. Furthermore, results from this study suggest that such a reduction, specifically in negative metacognitive beliefs, may provide the foundation for experiencing PTG.

In addition to garnering support for study hypotheses, the results of the current study add to the growing literature base on several fronts. First, our results converge with the literature that cites event centrality as an important predictor of both PTS symptoms and PTG (e.g., Boals & Schuettler, 2011; Boykin et al., 2019; Kramer et al., 2019; Schuettler & Boals, 2011). Additionally, there has been relatively little research on the role of metacognitive beliefs on
PTG. Though Nalipay and Mordeno (2018) found that adaptive metacognitive beliefs were associated with PTG, they did not assess the positive and negative facets of metacognitive beliefs traditionally associated with the metacognitive model. Examination of bivariate correlations (Table 2) indicates that neither positive or negative metacognitive beliefs alone are associated with PTG. Thus, without consideration of event centrality, maladaptive metacognitive beliefs may not be influential in the development of PTG.

Our results contribute to a small, but growing literature clarifying the role that event centrality plays in the development of two disparate posttrauma outcomes. Some have suggested that high event centrality may be more likely to result in (1) PTS symptomatology among those who use avoidant coping (i.e., distraction, physical avoidance, substance use), and (2) PTG among those who use approach coping (i.e., discussing the trauma with others, using the experience to inspire creative work: Boals & Schuettler, 2011; Schuettler & Boals, 2010). Our findings are consistent with this perspective because higher maladaptive metacognitive beliefs, which active the CAS, a response style characterized by maladaptive avoidant coping, predicted greater PTS symptoms in the present study. In contrast, lower maladaptive metacognitive beliefs allow for deliberate engagement, or approach-based coping, that is more likely to result in PTG. Thus, it may be the case that considering individual differences in metacognitive beliefs could help predict coping styles that would be more likely to lead to either PTS symptoms or PTG. Experimental and longitudinal research is needed to properly examine this larger model.

Another variable that might elucidate the path from high event centrality to PTS symptoms versus PTG is repetitive thought. Allbuagh et al. (2016) examined main effects of repetitive thought on post-trauma outcomes. They found that where brooding predicted greater PTS symptoms, deliberate repetitive negative thought predicted PTG. In a further examination of
this hypothesis, Kramer et al. (2019) conducted a cross-sectional study and examined study hypotheses using a serial mediation model. They found that higher event centrality predicted greater PTS symptoms, which when coupled with deliberate rumination, predicted greater PTG. Some have suggested that emotional distress in the acute aftermath of a traumatic event might prompt deliberate engagement with memories of the trauma that are necessary for PTG. However, use of longitudinal and experimental research designs would be needed to fully explore this sequence of events.

An additional strength of the current study was our simultaneous modeling of both PTG and PTS symptoms as outcomes in the moderation analysis. Given the co-occurrence of PTG and PTS symptoms, and research suggesting that event centrality is linked to both outcomes, modeling the covariance between PTG and PTS symptoms allowed us to assess the contribution of the interactions (event centrality by positive or negative metacognitive beliefs) on each outcome, after accounting for its shared variance with the other outcome. This extends existing literature which has modeled these outcomes in separate analyses (e.g., Allbaugh, Wright, & Folger, 2016; Boykin et al., 2019), and provides further support that event centrality is indeed associated with PTG above and beyond its shared relationship with PTS symptoms, and vice versa.

Finally, the use of the MCQ-PTSD is a notable strength of this study. As discussed by Ferguson and Bardeen (2017), most prior research on metacognitive beliefs and PTS symptoms has focused on general, versus PTSD-specific, metacognitive beliefs. The current study utilized a measure that assesses metacognitive beliefs that are tied to traumatic events (e.g., “I must stop thinking about what happened”; Wells, 2009), and thus, taps into the types of metacognitive beliefs that are more relevant to the outcomes that were assessed (i.e., PTS symptoms and PTG).
In spite of the noted strengths of this study, findings should be interpreted in light of study limitations. First, the cross-sectional study design precludes the examination of causal relationships among event centrality, metacognitive beliefs, PTG, and PTS symptoms. Previous research has suggested that event centrality predicts later PTS symptoms (Boals & Ruggero, 2016). However, a full temporal account of the relationships among event centrality, metacognitive beliefs, and both PTS symptoms and PTG has not been examined. The metacognitive model would support a temporal chain where the interaction of event centrality and metacognitive beliefs precedes PTS symptoms. However, longitudinal research is needed to confirm this causal hypothesis. There has been a call to utilize prospective designs that obtain numerous measurements of these variables in order to better track the emergence of growth over time (Infurna & Jayawickreme, 2019). Additionally, as noted above, a non-clinical sample was used in the present study. Thus, confirmation of study findings in a clinical sample may be of value in future research.

The present study is the first, to our knowledge, to examine the interactive effect of event centrality and metacognitive beliefs on both PTS symptoms and PTG. Results from this study suggest that negative metacognitive beliefs, which promote avoidant coping, may be an important factor driving trauma-related outcomes for events that are highly central to one’s identity. Positive metacognitive beliefs, which promote rumination, may be similarly important for PTS symptoms, though their impact on PTG is less clear. As such, metacognitive therapy may be a fruitful treatment for those presenting with PTS symptomatology who report higher levels of maladaptive metacognitive beliefs and a highly central trauma.
References


Table 1. Example items used to assess of maladaptive metacognitive beliefs and event centrality.

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Example Items</th>
</tr>
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<tbody>
<tr>
<td>Event Centrality</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1. <em>I feel that this event has become part of my identity</em></td>
</tr>
<tr>
<td></td>
<td>2. <em>This event has become a reference point for how I understand myself and the world</em></td>
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<td></td>
<td>3. <em>This event permanently changed my life</em></td>
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<tr>
<td>Low</td>
<td>1. <em>This event was not a turning point in my life</em></td>
</tr>
<tr>
<td></td>
<td>2. <em>I do not think about the effects this event will have on my future</em></td>
</tr>
<tr>
<td></td>
<td>3. <em>This event has not become a central part of my life story</em></td>
</tr>
<tr>
<td>Maladaptive Metacognitive Beliefs</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>1. <em>I could lose my mind if I continue to think this way</em></td>
</tr>
<tr>
<td></td>
<td>2. <em>I must stop thinking about what happened</em></td>
</tr>
<tr>
<td></td>
<td>3. <em>My mind has been damaged by what happened</em></td>
</tr>
<tr>
<td>Positive</td>
<td>1. <em>Worrying will keep me safe</em></td>
</tr>
<tr>
<td></td>
<td>2. <em>I must go over events to make sense of them</em></td>
</tr>
<tr>
<td></td>
<td>3. <em>Thinking about threats in the future will help me cope</em></td>
</tr>
</tbody>
</table>

Note. Examples of negative and positive metacognitive beliefs are from the Metacognitions Questionnaire-PTSD (MCQ-PTSD; Wells, 2009) and examples of thoughts that reflect high event centrality are from the Centrality of Events Scale – Short Form (CES-SF; Bernsten & Rubin, 2006). Examples of thoughts that reflect low event centrality are items from the CES-SF that were reverse coded for illustrative purposes.
### Table 2. Zero-Order Correlations and Descriptive Statistics

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1. CES-SF</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>17.35</td>
<td>8.15</td>
<td>7-35</td>
</tr>
<tr>
<td>2. PTSD-S Negative</td>
<td>.27**</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>16.08</td>
<td>11.51</td>
<td>0-61</td>
</tr>
<tr>
<td>3. PTSD-S Positive</td>
<td>.23**</td>
<td>.26**</td>
<td>--</td>
<td>--</td>
<td>23.83</td>
<td>9.28</td>
<td>0-46</td>
</tr>
<tr>
<td>4. PCL-5</td>
<td>.49**</td>
<td>.52**</td>
<td>.22**</td>
<td>--</td>
<td>16.61</td>
<td>14.27</td>
<td>0-63</td>
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<tr>
<td>5. PTGI-SF</td>
<td>.38**</td>
<td>.16</td>
<td>.14</td>
<td>.19*</td>
<td>35.77</td>
<td>12.51</td>
<td>10-58</td>
</tr>
</tbody>
</table>

Note. N = 504. CES-SF = Centrality of Events Scale - Short Form; PTSD-S = Metacognitions Questionnaire – PTSD (negative and positive beliefs); PCL-5 = PTSD Checklist for DSM-5; PTGI-SF = Posttraumatic Growth Inventory – Short Form.

* p < .05, ** p < .01.
Figure 1. Path model with standardized path coefficients. Event Centrality = Centrality of Events Scale Short Form (CES-SF); Negative Metacognitive Beliefs = Metacognitions Questionnaire PTSD (MCQ-PTSD) negative metacognitive beliefs subscale; Interaction Term = CES-SF x MCQ-PTSD Negative; PTS symptoms = PTSD Checklist (PCL-5); PTG = Post-Traumatic Growth Inventory Short Form (PTGI-SF). *p < 0.05 and ***p <0.001.
Figure 2. Path model with standardized path coefficients. Event Centrality = Centrality of Events Scale Short Form (CES-SF); Positive Metacognitive Beliefs = Metacognitions Questionnaire PTSD (MCQ-PTSD) positive metacognitive beliefs subscale; Interaction Term = CES-SF x MCQ-PTSD Negative; PTS symptoms = PTSD Checklist (PCL-5); PTG = Post-Traumatic Growth Inventory Short Form (PTGI-SF). *p < 0.05 and ***p < 0.001.