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Dissertation

Abstract

Traumatic events are prevalent in the general population. The possible psychological consequences of trauma are complex as they include both negative, even pathological, outcomes and positive outcomes, such as posttraumatic growth (PTG). Past research has established a link between expressive writing (EW) and PTG. The current study explored two possible mediational models to explain the relation between EW and PTG. Both assessed the role of event centrality (EC) and core belief disruption (CBD) and the link between EW and PTG in a sample of 133 college students. Model 1 hypothesized that EW would lead to increased PTG and that this relation would be mediated by absolute levels of EC and CBD post-intervention; Model 2 hypothesized that EW would lead to increased PTG and this relation would mediated by the degree of increase in EC and CBD over the course of the intervention. Contrary to expectations, results indicated that EW was not related to PTG; however, Model 2 was partially supported, as tests of indirect effects revealed increased EC mediated the relation between EW and PTG. Analyses of the model paths revealed both absolute CBD and changes in CBD were related to PTG. Results confirm the importance of EC and CBD when attempting to facilitate PTG.
Understanding the Mechanisms that Promote Posttraumatic Growth Through Expressive Writing

The prevalence of traumatic events is surprisingly high in the general population. A recent worldwide survey of 68,894 adults, found that over 70% reported having experienced a traumatic event (Benjet et al., 2015). Further, research suggests that between 55.8% and 84.5% of college students have experienced at least one traumatic event (Smyth, Hockemeyer, Heron, Wonderlich & Pennebaker, 2008). One possible outcome from exposure to trauma is the development of a formal trauma-related anxiety disorder, such as post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2013); even when diagnosable conditions do not emerge, negative outcomes including feelings of sadness, anger, guilt, general irritability (Tedeschi & Calhoun, 2004), depressive symptoms (Tedeschi & Calhoun, 2004; Vrana & Lauterbach, 1994), and increased general anxiety and psychological distress (Vrana & Lauterbach, 1994) are common.

Negative outcomes, although present, are not the only possible consequence of trauma. In fact, although counter to intuitive conceptualizations of the impact of trauma, research has shown that trauma can facilitate the development of favorable outcomes, such as personal growth (Bray, 2013; Glad, Jensen, Holt, & Ormhaug, 2013; Linley & Joseph, 2003; Park & Ai, 2006; Shigemoto & Poyrazli, 2013; Tedeschi & Calhoun, 1996; Tedeschi & Calhoun, 2004; Tedeschi, Park, & Calhoun, 1998). Given the widely divergent outcomes that can result from trauma—ranging from diagnosable psychopathology to personal growth—it is key to understand what factors may be
associated with growth. The present study sought to determine possible mechanisms of personal growth following a traumatic experience in college students.

**Posttraumatic Growth**

Although trauma can lead to the development of psychiatric disorders and negative symptomology, research has shown, paradoxically, that individuals are more likely to derive beneficial effects from trauma than to develop psychopathology. In fact, Tedeschi and Calhoun (1995) suggested that between 30 to 90% of individuals who experience an extremely distressing or traumatic event also experience at least some degree of positive change. One possible positive outcome resulting from a traumatic experience is *posttraumatic growth* (PTG), a term coined by Tedeschi and Calhoun (2004) to describe the beneficial personal changes that can occur following a highly distressing experience. PTG goes beyond restoring an individual to baseline functioning; it entails important characterological changes and personal development, which enhance functioning beyond the level seen prior to the traumatic event. These changes occur primarily within five domains: increased appreciation of life, improved social relationships, feelings of increased personal strength, spiritual or existential development, and the development of novel possible life directions (Tedeschi & Calhoun, 1996). Each of these areas involves experiencing life in a deeper and richer manner as a result of the traumatic experience.

Past research has demonstrated that a variety of personally distressing and challenging events can serve as catalysts for PTG, ranging from combat exposure (Larner & Blow, 2011; Tedeschi, 2011) to sexual assault (Frazier & Berman, 2008). PTG also emerges from distressing experiences that, although highly painful to an individual, do
not meet formal DSM-5 classification of trauma, including relationship dissolution (Tashiro, Frazier, & Berman, 2006) and health problems, such as cancer and HIV diagnoses (Danhauer et al., 2013; Koutrouli, et al., 2012; Milam, 2006; Nightingale, Sher, & Hansen, 2010; Ruini, Vescovelli, & Albieri, 2012; Stanton, Bower, & Low, 2006).

Thus, past research reflects the breadth of experience and variety of populations that have been associated with PTG and underscores the likely universal nature of the association between trauma and possible PTG.

It is important to note that simply experiencing a traumatic event is not enough to result in positive personal changes. According to Tedeschi and Calhoun (2004), very few people consciously seek positive benefits following a traumatic event and do not initially experience the event as an opportunity for growth. Rather, Tedeschi and Calhoun (2004) posited that posttraumatic growth is likely the result of the individual’s attempt to psychologically survive; in effect, positive outcomes are the result of the struggle to process and integrate highly challenging life events. Within this model, the traumatic event is a necessary but not sufficient factor for PTG; experiencing the event as difficult and distressing is also required. Therefore, in order for PTG to occur, the individual must experience some degree of psychological distress following the traumatic event (Tedeschi & Calhoun, 1996). Individuals who respond to a potentially traumatic event with equanimity are spared negative outcomes but also deprived of possible growth. Among individuals who do experience psychological distress, individual difference factors, such as the degree to which the event becomes a central part of self-identity and the extent of disruption to core beliefs about the world, have been identified as important catalysts of PTG.
Event Centrality

Event centrality (EC) has been defined as the degree to which a highly distressing event is central to one’s identity and colors attributions about subsequent experiences (Bernsten & Rubin, 2006). Individuals who view a distressing event as central to their identity consider the event to be a key turning point in their life stories and use the traumatic event as a reference point to interpret daily events and to develop expectations about the future. EC has shown to be a complex construct as it is associated with both positive and negative outcomes. Numerous research studies have shown that EC has significant associations with multiple negative outcomes including depression (Berntsen & Rubin, 2006; Boals, 2014; Robinaugh & McNally, 2011), PTSD symptomology (Berntsen & Rubin, 2006; Berntsen & Rubin, 2007; Boals & Schuettler, 2011; Robinaugh & McNally, 2011), intrusive memories (Newby & Moulds, 2011), decreased physical health (Boals, 2010) and low self-esteem (Robinaugh & McNally, 2011). At the same time, however, EC has also emerged as a predictor of PTG (Barton, Boals, & Knowles, 2013; Bernard, Whittles, Kertz, & Burke, 2015; Blix, Birkeland, Hansen, & Heir, 2015; Boals & Schuettler, 2011; Groleau et al., 2013; Johnson & Boals, 2015; Lancaster, Klein, Nadia, Szabo, & Mogerman, 2015; Wolfe & Ray, 2015) and appears to be an important factor to consider when exploring an event’s capacity to elicit PTG. Investigations into the relation between EC and trauma outcome have concluded that EC is positively associated with both PTG and PTSD symptoms and in the aftermath of a traumatic experience may be best understood as a “double-edge sword” (Boals & Schuettler, 2011, p. 818).
One hypothesis about EC’s role in both positive and negative outcomes involves the overall experiential valence of the event and if the individual codes their struggle with the event as generally positive—self as “victor”—or generally negative—self as “victim” (Groleau, Calhoun, Cann & Tedeschi, 2013). Others have argued that what is most important is the overall degree to which an individual understands his or her struggle with the event as central to their identity. For example, when examining the relations between PTG and various psychological factors, such as anxiety, somatic symptoms, global distress, and quality of life, significant relations in the expected direction emerged only when the analysis included events high in EC (Boals, Steward, & Shuettler, 2010); in contrast, the correlations were nonsignificant when examining traumatic events low in EC and not seen as pivotal by the individual. Similar results have been obtained when exploring measures of positive emotional and psychological functioning, such as gratitude, positive relations, life satisfaction, and meaning in life: positive relations emerge between PTG and such factors, but only when considering events high in EC (Johnson & Boals, 2015). Taken together, these results demonstrate that the degree to which an event is central to an individual’s identity plays an important role in fostering growth following a traumatic event.

The assumptive world/meaning-making

A traumatic experience has the capacity to shatter an individual’s view of the world by challenging preexisting notions of safety and justice and creating discrepancy between the occurrence of the event and one’s previous construction of the world. Tedeschi and Calhoun (2004) likened this occurrence to an earthquake, suggesting that a traumatic experience may have a “seismic effect” (p. 5) on the individual’s functioning.
Within this conceptualization, in order for PTG to occur, the traumatic event must be perceived by the individual as incompatible with his or her assumptive world. The *assumptive world* is a construct first advanced by Janoff-Bulman (1989), who defined it as a set of core beliefs involving preexisting schemas of the self, others, reality, and views of the world. Such core beliefs have been shown to guide how an individual interprets and understands people and events in his or her life, in addition to being the basis on which people form basic predictions of future events (Cann et al., 2010). In order for PTG to occur following a traumatic event, Tedeschi and Calhoun (2004) have shown that it is necessary for the event to cause a significant degree of disruption to one’s core beliefs. In fact, research has shown a positive correlation between disruption to the assumptive world and PTG (Cann, Calhoun, Tedeschi, & Solomon, 2010; Danhauer et al., 2013; Lindstrom, Cann, Calhoun, & Tedeschi, 2013; Tripplet, Tedeschi, Cann, Calhoun, & Reeve, 2012). The positive association between disruption to the assumptive world and PTG has been posited as due to the process of rebuilding, or making sense of the core belief disruption, following the disruption.

Highly distressing events challenge an individual’s assumptive world, creating a discrepancy between previously held beliefs and the traumatic event. The discrepancy between belief and outcome prompts a state of dissonance that is experienced as uncomfortable and prompts the individual to seek resolution. In an attempt to resolve the discrepancy between belief and experience, the individual may engage in a process called *meaning-making* (Park, 2010; Park & Ai, 2006). Meaning-making can occur in one of two ways: 1) by altering one’s appraisal of the traumatic experience to make it consistent with one’s worldview, a process known as *assimilation*; or 2) by changing one’s appraisal
of the world to make it consistent with the traumatic experience, a process known as *accommodation* (Park & Ai, 2006; Park & Blumberg, 2002; Steger & Park, 2012). It is posited that the meaning-making process has occurred when one of these cognitive processes is successfully completed. In effect, the meaning-making process functions by helping to reduce the discrepancy between situational and global beliefs, while, simultaneously, restoring an individual’s sense of meaning in the world (Park & Folkman, 1997). Tests of the meaning-making hypothesis have supported the association between altered or changed belief systems and improved psychological functioning, as well as decreased intrusive ideation and avoidance behaviors (Boals, 2012; Park & Blumberg, 2002).

The process of meaning-making, as it relates to PTG, is consistent with Tedeschi and Calhoun’s (2004) conceptualization of the key elements of PTG development, which postulates that the extent to which an individual cognitively processes the traumatic event becomes a central factor in the development of PTG. They label this process *adaptive rumination*—which can be understood as mirroring meaning-making—and it is how an individual cognitively makes sense of the event (Calhoun & Tedeschi, 2006). Adaptive rumination has a future-oriented stance, is focused on one’s identity and purpose, and seeks to find meaning in the event (Tedeschi & Calhoun, 2003). This type of deliberate rumination involves purposeful attempts to think about the positive effects of the event and has been associated with increased PTG (Morris & Shakespeare-Finch, 2011; Stockton, Hunt, & Joseph, 2011; Taku, Kilmer, Cann, Calhoun, & Tedeschi, 2012). In contrast, intrusive, negative rumination about the event involves undesired, unprovoked thoughts about the event and when compared to purposeful rumination, is less related to
PTG (Lindstrom et al., 2013). However, it is important to note that although intrusive rumination is less related to PTG, it is still more beneficial in promoting positive outcomes following trauma than deliberate avoidance of event-related thoughts (Park & Fenster, 2004; Shigemoto & Poyrazli, 2013). These results underscore the importance of promoting cognitive processing following a highly distressing event, even among individuals who report the content and valence of their thoughts are negative. These findings also suggest that finding ways to channel rumination into the more adaptive forms should lead to the most beneficial outcomes and promote PTG.

**Expressive Writing**

Because it is theorized that intentional, positive cognitive processing following a traumatic event is related to the development PTG (Tedeschi & Calhoun, 2004), it is important to establish, or better understand, interventions that might promote or facilitate these cognitive processes; one such intervention is expressive writing (EW). As a whole, research has supported EW as a robust and efficacious intervention to promote improved psychological functioning. Successful outcomes have been found for a variety of concerns including breast cancer (Henry, Schlegel, Talley, Molix, & Bettencourt, 2010), negative body image (O’Connor, et al., 2011), myocardial infarction (Willmott, Harris, Gellaitry, Cooper, & Horne, 2011), employee self-efficacy (Kirk, Schutte, & Hine, 2011), issues related to sexual orientation (Lewis et al., 2005; Pachankis & Goldfried, 2010), PTSD symptoms (Hoyt & Yeater, 2011), depression (Krpan et al., 2013), childhood sexual abuse (Meston, Lorenz, & Stephenson, 2013), job loss (Spera, Buhrfeind, & Pennebaker, 1994), and relationship dissolution (Lewandowski, 2009). Across these issues, beneficial outcomes have included decreased depressive symptoms (Gortner,
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Rude, & Pennebaker, 2006; Krpan et al., 2013; Meston et al., 2013), decreased PTSD symptoms (Meston et al., 2013), decreased intrusive thoughts (Boals, 2012), decreased anger (Barclay & Skarlicki, 2009; Smyth, Hockemeyer, & Tulloch, 2008), increased marital satisfaction (Baddeley & Pennebaker, 2011), increased likelihood of finding employment (Spera et al., 1994), increased working memory capacity (Klein & Boals, 2001), decreased tension (Smyth et al., 2008), improved physical health benefits (Pennebaker & Beall, 1986; Pennebaker, Mayne, & Francis, 1997), improved grades (Pennebaker et al., 1997), and PTG (Ullrich & Lutgendorf, 2002), among others.

Boals (2012) proposed the effectiveness of EW to promote PTG may be attributed to the process of meaning-making; through EW individuals are able to cognitively process and make sense of their experience and ultimately develop a new, more integrated, conception of themselves and the world. Tedeschi and Calhoun (2004) suggested that it is through this cognitive process that beneficial outcomes, such as PTG, emerge. Stockton, Joseph and Hunt (2014) supported this notion; writing that stimulates cognitive processing over time was more associated with the development of PTG than writing that did not reflect such cognitive processing. Therefore, EW that promotes cognitive processing appears to be an effective strategy to promote growth following a distressing experience.

The present study

Traumatic events are common among the college population and are associated with a variety of negative outcomes. Although it is important to continue to explore the detrimental outcomes associated with trauma, it is also worthwhile to explore the beneficial outcomes, such as PTG, that may result from a highly distressing experience.
It is important to gain an increased understanding of what processes may promote a positive outcome following a traumatic event and explore possible avenues to foster the development of such outcomes. EW has consistently been shown to promote positive outcomes, namely PTG, through processes such as adaptive rumination and meaning-making (Boals, 2012; Park & Blumberg, 2002). However, the individual difference factors that may mediate the efficacy of EW—or influence the degree of meaning making that occurs via writing—are not well known. This study will explore two possible mechanisms: event centrality and core belief disruption and assess their importance in promoting the effects of EW on PTG. Specifically, the present study will test two hypothesized models to better understand the relations between PTG, EW, event centrality and core belief disruption. The first model proposes that EW will promote PTG and this relationship will be mediated by event centrality and core belief disruption. Specifically, individuals who report higher event centrality and greater core belief disruption will experience increased growth. The second model also proposes the EW will promote PTG; however, this model posits that it is not the absolute level of core disruption and the event centrality that will promote PTG but rather it is changes in event centrality and core belief disruption that account for—or mediate—the relation between expressive writing and PTG.

**Method**

**Participants**

Participants were recruited through a School of Psychology participant pool at a mid-size, private, Liberal Arts university in the Midwest. A total of 210 participants signed up for the study; 58 did not initiate study procedures; 152 participants completed the
study. Of these, 133 participants provided complete and useable data: 1 was removed due to being an outlier; 18 did not provide complete data on at least one of the primary measures and were removed from all analyses. Thus, the final sample consisted of 133 undergraduate students. The participants received research credit in exchange for their time and were given the opportunity to submit their name in a drawing for a $50.00 gift card.

The majority (70.7%) of the sample was female, 25.6% was male and 3.8% did not report their gender. The majority of participants (50.4%) identified their ages as 20-21 years old. The majority of participants identified as “White” (71.4%). Prior to beginning the study, participants were randomly assigned to one of two conditions: the expressive writing condition or the control condition. See Table 1 for a full description of the sample.

Measures

**Target Event and Demographic Questionnaire (TEDQ).** The TEDQ was created for this study, consisting of two parts: Part I collected information about the stressful target event that served as the focus of the narrative writing; Part II collected demographic information.

**Part I: Target Event.** Participants identified a stressful target event using the methodology outlined by Lindstrom, Cann, Calhoun, and Tedeschi (2013). Participants were asked to identify an event, hereafter referred to as Target Event (TE), they experienced within the past 2 years that was personally distressing, to describe the TE and to rate the TE using the following two questions: “How stressful was the event for you at the time it happened?” and “How stressful is the event for you now?” on a 7-point
Likert scale (1 = not distressing at all; 7 = extremely distressing). The two item scores were added to create a total score that ranges from 2 to 14, with higher scores indicating greater event-related distress. Participants were instructed to refer back to the TE event when completing each of the additional study measures.

**Part 2: Demographics.** Demographic information was collected using a demographic questionnaire developed for this study. Participants were asked to report their age, sex, year in school, and racial/ethnic identity.

**Posttraumatic growth.** The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) was used to assess posttraumatic growth. The PTGI is a 21-item scale that examines the degree to which individuals experience positive changes following a traumatic experience. Participants were asked to “Please think about the TE you identified earlier and indicate how much it led to each of the possible changes listed below,” using a 6-point Likert-type scale (0 = I did not experience this change as a result of my crisis; 5 = I experienced this change to a very great degree as a result of my crisis).

The PTGI includes the following five factors: 1) Relating to Others; this factor includes 7 items. A sample question is “Knowing that I can count on people in times of trouble;” 2) New Possibilities; this factor includes 5 items. A sample question is “I established a new path for my life;” 3) Personal Strength; this factor includes 4 items. A sample question is “I discovered that I’m stronger than I thought I was;” 4) Spiritual Change; this factor includes 2 items. A sample question is “I have a stronger religious faith;” and 5) Appreciation of Life; this factor includes 3 items. A sample question is “An appreciation for the value of my own life.” The total growth score is determined by summing the scores and can range from 0 to 105. Higher scores indicate a greater degree
of posttraumatic growth. The present study used the total score in all primary analysis to assess general growth over the course of the study. The five subdomains were not the focus of the current study. The PTGI was administered at baseline (Time1) and at end of the writing intervention (Time 2). In the present study, the PTGI demonstrated a high level of internal consistency at both administrations (α = .90 at Time 1 and α = .92 at Time 2).

**Core Beliefs.** The Core Beliefs Inventory (CBI; Cann et al., 2010) was used to assess participants’ core beliefs about the world following the TE. The CBI is a 9-item scale, which measures the degree to which participants’ assumptive world is disrupted following the TE. Items focus on a variety of assumptions including spirituality, human nature, interpersonal relationships, life meaning, and individual strengths and weaknesses. A sample question is “Because of the event, I seriously examined the degree to which I believe things that happen to people are fair.” Instructions to participants were: “Reflecting on the TE you selected earlier, indicate the extent to which it led you to seriously examine each of the following core beliefs.” Participants rate each item using a 6-point Likert-type scale (0 = not at all; 5 = a very great degree). A total score is determined by calculating the mean across all questions and can range from 0 to 5. Higher scores indicate a greater degree of disruption to core beliefs. There are no subscales. The CBI was administered at baseline (Time1) and at end of the writing intervention (Time 2). In the present study, the CBI demonstrated adequate internal consistency at both administrations (α = .79 at Time 1 and α = .83 at Time 2).

**Centrality of Event.** The Centrality of Event Scale (CES; Berntsen & Rubin, 2006) was used to measure the extent to which participants’ believe their TE is a core
attribute of who they are. The CES is a 20-item scale that measures the extent to which the TE has become part of the participant’s identity and generates attributions about future events. Specifically, participants were asked to rate how much their TE is: 1) a reference point for daily occurrences; a sample item is “This event has become a reference point for the way I understand myself and the world”; 2) a turning point in one’s life story; a sample item is “This event permanently changed my life”; and 3) a core component of one’s identity; a sample item is “I feel that this event has become part of my identity.” Participants respond using a 5-point Likert-type scale (1 = totally disagree; 5 = totally agree). A total score is calculated by summing all items and can range from 20 to 100. Higher scores indicate that the event has become a significant part of one’s identity and plays a large role in the interpretation of past and future events (Boals et al., 2010). Although the scale is organized into three conceptual areas, no sub-scores are calculated. The CES was administered at baseline (Time1) and at end of the writing intervention (Time 2). In the present study, the CES demonstrated high internal consistency at both administrations time (α = .93 at Time 1 and α = .95 at Time 2).

**Affect.** The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) was used to measure participants’ subjective emotionality. The present-moment version of the PANAS was used. The PANAS is a 20-item adjective checklist, which consists of two, 10-item, subscales assessing positive (sample adjective: “excited”) and negative (sample adjective: “upset”) affect. Participants were instructed to reflect on how they felt at that moment and rate each adjective using a 5-point Likert-type scale (1 = very slightly or not at all; 5 = extremely). Separate Positive and Negative affect scores are determined by summing items within each subscale. Each subscale has a
potential range of 10 to 50, with higher scores indicating more intense affect. The PANAS was administered upon study initiation (PANAS-1a) and after watching a comedy clip subsequent to identifying their TE (PANAS-1b). In the present study, the PANAS-1a showed good internal consistency for both the positive ($\alpha = .85$) and negative ($\alpha = .81$) subscales; the PANAS-1b showed similar good consistency for the positive ($\alpha = .89$) and negative ($\alpha = .86$) subscales.

**Meaning-making.** Following the methodology used by Park, Edmondson, Fenster, and Blank (2008), meaning-making was determined using scores from the positive reframing subscale from the Brief COPE (BC-PRS; Carver, 1997). The subscale includes two items assessing how participants coped with their TE (“Tried to see it in a different light to make it seem more positive” and “Looked for something good in what was happening”). Participants rated each item using an 11-point Likert-type scale (0 = not at all; 10 = extremely). The BC-PRS was administered at baseline (Time1) and at end of the writing intervention (Time 2). In the present study, the BC-PRS demonstrated adequate internal consistency at both administration times ($\alpha = .78$ at Time 1 and $\alpha = .84$ at Time 2).

**Comedy Clip.** In order to counteract any negative affect generated by reflecting on their TE, participants watched a brief video clip. The clip was an excerpt from Season 3, Episode 10 “The Gorilla Experiment,” of *The Big Bang Theory*. The excerpt was played through Youtube.com; it is 6 min and 58 sec in length. The clip depicts one of the show’s main characters’ attempt to teach another main character the basics of physics. It was chosen for both its comedic and academic material.

([http://www.youtube.com/watch?v=AEIn3T6nDAo](http://www.youtube.com/watch?v=AEIn3T6nDAo)).
Study Overview

The study was described as a study of changes in cognitive processes through writing and alerted all potential participants that they would be asked to identify a distressing personal experience. Participants were recruited through a psychology participant pool. The study included a total of four active study sessions. Participants were randomly assigned to one of two writing conditions: expressive-writing or control condition. Participants in the expressive-writing condition wrote in detail about their target distressing experience (TE); participants in the control condition wrote about assigned, emotionally neutral topics. All four sessions occurred within a 2-week time frame. Sessions 1 and 4 lasted approximately 1 hour and included writing a narrative on either the traumatic event or the neutral topic for 20 minutes and completing the full complement of study measures. Sessions 2 and 3 consisted of writing about their designated topic and lasted approximately 20 minutes.

Procedure

Prior to data collection, human subjects approval was obtained for the study (Appendix A). All participants underwent an informed consent process. All responses and writing narratives were kept confidential and were linked by a study number. Following each session, all participants in both conditions received a list of emergency contact numbers in the event they felt the need for emotional support.

Active Study Procedure

Session 1. After providing informed consent, participants in both conditions completed the N-PANAS-1a to assess their baseline affect. They then completed the Demographics and Target Event Questionnaire (DTEQ) and the packet of study
questionnaires (PTGI-1, CBI-1, and CES-1); the order of the questionnaires was counterbalanced across packets. After completing the questionnaires, all participants watched a brief comedy clip to neutralize any negative affect generated by reflecting on their distressing event and to ensure the control condition was not contaminated by reflecting on the distressing event. Following the clip, participants’ affect was measured again using the N-PANAS-1b to assess if they had returned to baseline.

Participants randomized to the expressive writing condition received the following instructions (adapted from Park & Blumberg, 2002):

“During each of the four writing sessions, I want you to write about the traumatic and upsetting experience that you identified and described earlier. The important thing is that you write your deepest thoughts and feelings. Ideally, the thoughts and feelings you share should be ones that you have not talked about with others in detail. It is important for you to know that your essays will be regarded with strict confidentiality. You will be asked to write for 20 minutes, and I will let you know when time is up.”

Participants randomized to the control condition received the following instructions (adapted from Park & Blumberg, 2002):

“During each of the four writing sessions, I will be asking you to write about a specific topic. It is important for you to know your essays will be regarded with strict confidentiality. Today’s topic for you to write about is: What is inside the closet where you keep most of your belongings? It is important for you to know that your essays will be regarded with strict confidentiality. You will be asked to write for 20 minutes, and I will let you know when time is up.”
After participants completed the writing task, they were given the list of emergency contact numbers and confirmed their Session 2 date and time.

**Session 2.** Session 2 required the participants in each condition to write for 20 minutes. Participants in the expressive writing condition received the same writing instructions they received in Session 1. The control condition was instructed: “Describe the outfit you are wearing today in detail. It is important for you to know that your essays will be regarded with strict confidentiality. You will be asked to write for 20 minutes and I will let you know when time is up.” Upon completion of the writing task, participants were given the list of emergency contact numbers and confirmed their Session 3 date and time.

**Session 3.** Upon arrival, participants wrote for 20 minutes. Participants in the expressive writing condition received the same writing instructions they received in Session 1. The control condition was instructed: “Describe the things you do before class on a typical Monday. It is important for you to know that your essays will be regarded with strict confidentiality. You will write for 20 minutes and I will let you know when time is up.” After participants completed the writing task, they were given the list of emergency numbers and confirmed their Session 4 date and time.

**Session 4.** Participants began the fourth, and final, session by engaging in the writing task for 20 minutes. Participants in the expressive writing condition received the same instructions they received in Session 1. The control condition was instructed: “Describe in detail the setting of your first class of the week. It is important for you to know that your essays will be regarded with strict confidentiality. You will be asked to write for 20 minutes, and I will let you know when time is up.”
Following the writing task, all participants completed the packet of study questionnaires (PTGI-2, BC-PRS-2, CBI-2 and CES-2). The order of the measures was counterbalanced across participants. Once completed, participants underwent a debriefing process, which involved study personnel explaining the full nature of the study, the variables under study, and what the researchers expect to find. Participants were asked to not share the specifics of the study with others in order to protect the integrity of continuing data collection. Finally, participants were thanked for their participation and received confirmation of their participation for research credit. Those participants who wished to be entered in a drawing for a $50.00 gift card wrote their name on a piece of paper, sealed it in an unmarked envelope, and placed it into a secured box that was not opened until completion of the study.

**Results**

The purpose of the present study was to examine the effects of expressive writing on posttraumatic growth. Specifically, the study explored whether two hypothesized underlying mechanisms—disruption of core beliefs and event centrality—promote posttraumatic growth following an expressive writing intervention.

Prior to formal analyses, the data were examined for normality and the presence of outliers through visual inspection and calculation of the Mahalanobis distance, Cook’s distance and centered leverage values (Tabachnick & Fidell, 2001). Results indicated one case did not meet retention criteria and was removed.

**Descriptive Statistics of Target Trauma and Trauma Severity**

Participants identified a wide variety of distressing events as their TE. The most commonly reported distressing experiences were academic difficulties (16.2%) and
death of a loved one (16.2%). Participants’ rated their TE event as highly stressful at the time of occurrence, $M = 6.34$. In contrast, participants reported their TE was moderately distressing at the point of study initiation, $M = 3.52$. The samples’ summary distress score reflected considerable stress associated with the TE ($M = 9.95$). Table 2 contains information about categories of TE.

A series of tests were conducted to assess if randomization was effective. First, a series of Chi-square tests for independence indicated no significant association between condition assignment and sex, $\chi^2 (1) = 0.06, p = .81$, year in school $\chi^2 (3) = .54, p = .91$, ethnicity $\chi^2 (6) = 4.30, p = .64$, or age group, $\chi^2 (3) = 2.41, p = .49$. Second, an independent samples $t$-test was conducted to assess whether trauma severity ratings were similar in the two conditions. There was no significant difference in scores for the participants in the expressive writing condition ($M = 9.89, SD = 2.03$) and the control condition ($M = 10.02, SD = 2.03$); $t(126) = .37, p = .72$. The magnitude of the difference in the means (mean difference = .13, 95% CI: -.58 to .85) was very small ($\eta^2 = .001$).

Next, a one-way between groups multivariate analysis of variance (MANOVA) was performed to assess whether participants in both conditions reported comparable affective tones, assumptive world disruption, centrality of the identified traumatic event to identity, trauma-related PTG, and meaning-making at study onset (Time 1). No statistically significant differences between participants in the expressive writing condition and the control condition in relation to Time 1 dependent variables emerged,
F (5, 125) = 1.83, p = .11; Wilks’ Lamba = .932; partial \( \eta^2 = .07 \). These results suggest that the groups were comparable at baseline and randomization was effective. Table 3 contains information about the target study variables at baseline.

**Preliminary Results**

An independent-samples \( t \)-test was conducted as a manipulation check to assess whether expressive writing fostered meaning-making by comparing meaning-making scores across condition. Results indicated that expressive writing did not foster meaning making. No significance difference emerged, \( t(130) = -1.49, p = .14 \). The magnitude of the difference in the means (-1.31, 95% CI: -3.05 to .43) was very small ( \( \eta^2 = .017 \)).

Next, effectiveness of using a comedy clip to return participants to their baseline affect following their identification and description of a TE was assessed using a paired-samples \( t \)-test. Results showed a significant decrease in N-PANAS scores from Time 1a (\( M = 16.05, SD = 5.44 \)) to Time 1b (\( M = 14.32, SD = 5.47 \)), \( t(128) = 4.53, p < .001 \). The mean decrease in N-PANAS scores was 1.73 with a 95% confidence interval ranging from .97 to 2.49. The eta squared statistic (.14) indicated a large effect size. These results indicate that participants’ affect improved from Time 1a to Time 1b. Thus, the comedy clip, which was implemented to neutralize any negative affect participants’ experienced after identifying and rating a traumatic event, was successful; participants reported less negative affect after watching the clip than when they first entered the study.

A series of simple regressions was used to assess the relations between demographic variables—including sex, age, ethnicity, and class—and the outcome variable, PTG. No significant relations between PTG and age, ethnicity, and class
emerged. However, results revealed that sex was significantly related to PTG, $b = -9.94$, $t(127) = -2.43$, $p < .05$; sex accounted for 3.7% of the variance in PTG, with women reporting more PTG. As such, sex was used as a control variable in secondary tests of the hypothesized mediational models.

**Primary Hypotheses**

CBI and CES were tested for mediation of the relationship between expressive writing and PTG using Preacher and Hayes’ (2008) technique for multiple mediators. The bootstrap estimates were based on a 1,000 bootstrap sample. After investigating the relations of the predictor variables to PTG in isolation, secondary meditational analyses using the same strategy were conducted controlling for sex.

**Hypothesis 1 (H1):** It was hypothesized that individuals who engaged in expressive writing would experience increased PTG compared to individuals randomized to a control writing condition and that this relationship would be reduced or eliminated once event centrality and core belief disruption were incorporated into the model. Specifically, it was hypothesized that higher levels of event centrality and core belief disruption would account for a significant portion of the relationship between expressive writing and PTG-2.

H1 was not supported. The total effect (path c) of expressive writing on PTG was not significant ($b = -1.77$, $p = .62$). However, there was a significant relation between expressive writing and PTG (path $c'$), after accounting for CES and CBI ($b = -5.71$, $p < .05$), which was opposite in direction to expected results. No significant relations emerged between expressive writing and CES ($b = 5.29$, $p = .09$) or CBI ($b = .24$, $p = .15$).
as such, neither $a$ path was significant. The relation between CBI and PTG ($b_{path-1}$) was significant ($b = 13.27, p < .001$) but the relation CES and PTG ($b = .13, p = .17$) was not ($b_{path-2}$). All tests of combined indirect effects (e.g., $ab$ paths) were not significant and there was no evidence of mediation. The total bootstrapped unstandardized indirect effect was 3.95 and the 95% confidence interval ranged from -1.2592 to 8.9064, reflecting no significant effect. The specific pathway values (e.g., $a, b, c, c'$) are shown in Figure 1.

Given the significant univariate relation between sex and PTG, the model was retested controlling for sex. Results indicated the pattern of results did not change when including sex in the model. The total effect (path $c$) was not significant ($b = -1.32, p = .72$), nor was the direct effect (path $c'$) significant ($b = -5.23, p = .06$). The $a$ paths were not significant and no significant relations emerged between expressive writing and CES ($b = 6.01, p = .06$) or CBI ($b = .24, p = .15$). Similar to the first model, a significant relation between CBI and PTG ($b = 12.90, p < .001$) emerged ($b_{path-1}$) but no significant relation between CES and PTG ($b = .14, p = .17$) was seen ($b_{path-2}$). The total indirect effect (i.e., $ab$) was not significant and there was no evidence of mediation; the total bootstrapped unstandardized indirect effect was 3.91 and the 95% confidence interval ranged from -.9979 to 9.2235, reflecting no significant effects.

**Hypothesis 2 (H2):** It was hypothesized that expressive writing would be significantly and positively associated with PTG but that this relationship would be mediated by increases in event centrality and increases in core belief disruption over the writing episodes. In keeping with the recommendations of MacKinnon (2008), residualized change scores were used rather than simple gain scores. These were created
by predicting Time 2 scores using Time 1 scores (i.e., regressing Time 2 scores on Time
1 scores) and then subtracting the predicted Time 2 score from the actual Time 2 score.

The total effect (c path) of expressive writing on PTG was not significant ($b = .84,
p = .66$). One $a$ path was significant, as a positive relation emerged between CES-res and
EW ($b = 3.91, p < .05$); however, the other $a$ path was not and no significant relation
between CBI-res and EW was observed ($b = .04, p = .71$). Increased levels of event
centrality ($b = .19, p < .02$) and core belief disruption ($b = 7.09, p < .001$) were
significantly and positively associated with PTG, after accounting for the influence of
expressive writing ($b$ paths). The total indirect effect (i.e., all $ab$ paths) of expressive
writing on PTG was not significant, $1.069$, 95% BCA confidence interval of -1.174 to
3.2102. However, the indirect effect of CES-res was significant, yielding a total
unstandardized bootstrapped indirect effect of .76 and a 95% BCA confidence interval of .0175 to 1.946. The specific pathway values (e.g., $a$, $b$, $c$, and $c'$) are shown in Figure 2.

Given the significant univariate relation between sex and PTG, the model was
retested controlling for sex. The pattern of results did not change after controlling for sex.
The total effect (path $c$) was not significant ($b = 1.14, p = .57$) nor was the direct effect
(path $c'$) significant ($b = .11, p = .95$). The relation between CES-res and EW (path $a-1$)
remained significant ($b = 4.31, p < .05$) and the relation between CBI-res and EW (path
$a-2$) remained non-significant ($b = .03, p = .80$). Both $b$ paths, CES-res ($b = .19, p < .05$)
and CBI-res ($b = 7.26, p < .001$), remained significant. The total indirect effect (i.e., all
$ab$ paths) remained non-significant and the total indirect effect of CES-res remained
significant after controlling for sex, with a point estimate of .81 and a 95% BCA
confidence interval of .0628 to 2.458.
Due to only partial support for Model 2, moderation analyses were conducted. These results are contained in Appendix B.

**Discussion**

The purpose of this study was to examine the effectiveness of a theoretically grounded strategy for promoting posttraumatic growth following a distressing event. Specifically, the present study explored the effectiveness of expressive writing (EW) in promoting post-traumatic growth (PTG) when compared to a control condition. Further, this study sought to add to the existing literature by examining two potential underlying mechanisms that may be responsible for the growth observed through EW: core belief disruption (CBD) and event centrality (EC).

The notion that positive outcomes, such as PTG, can emerge following a distressing experience is supported by a growing literature on the possible benefits of distressing events (Tedeschi & Calhoun, 2004). Previous research has demonstrated that one way to promote PTG is through EW (Boals, 2012; Park & Blumberg, 2002; Smyth et al., 2008). The current study examined two distinct models of why EW might promote PTG: the first model hypothesized that EW would be associated with PTG, and that this relationship might be mediated by absolute levels of CBD and EC. The second model hypothesized that EW would be associated with PTG and that this relationship might be mediated by increases in CBD and EC over the course of the study.

Prior to testing the models, a manipulation check assessing the general effectiveness of EW was conducted by examining post-intervention mean-making scores. Results revealed a null finding between EW and meaning-making, which was unexpected and suggests that the EW condition may have been largely inert. Meaning-making was
chosen as a manipulation check, as in addition to cognitive and emotional processing, it has been posited to play a central role in the effectiveness of EW (Park, 2010). Within this paradigm, following a traumatic event, individuals experience core belief disruption and their understanding of how the world is structured and operates is challenged (Tedeschi & Calhoun, 2004). This, in turn, necessitates that individuals engage in one of two cognitive processes: assimilation, altering the event to make it consistent with previous held beliefs, or accommodation, altering world views to accommodate the event. Boals (2012) posited that EW is effective because through it individuals are able to stimulate one of these two processes to make sense of their experience, thereby reducing the discrepancy between their beliefs and the event and, in turn, the amount of distress experienced. However, results in the present study revealed no significant difference in meaning-making between the EW and control condition, indicating that EW did not promote meaning-making.

**Model Results:**

In contrast to the literature demonstrating the effectiveness of promoting growth through EW paradigms (Smyth et al., 2008; Ullrich & Lutgendorf, 2002), the present study did not find a significant direct relation between EW and PTG in either proposed model. Specifically, individuals who engaged in EW did not experience significantly more growth compared to individuals in the control condition. In fact, participants in both conditions reported no significant changes in growth over the course of the study. These results may shed light on why the manipulation check did not support the efficacy of EW on MM. Although unexpected, this study is not the first to find that EW does not always promote growth (Rivkin, Gustafson, Weingarten, & Chin, 2006; Stockton et al.,
2014). One possible explanation for EW null findings found in previous research examining the effectiveness of EW is that simply writing about an event may not be sufficient to promote positive outcomes. For instance, Pennebaker and Beall (1986) and Ullrich and Lutgendorf (2002) analyzed the writing narratives for content and found that narratives including both emotional and cognitive processing demonstrated significantly more positive benefits, including PTG, than narratives focused solely on emotional processing or cognitive processing. It is possible that individuals in the present study did not engage in the joint cognitive and emotional processing necessary to foster the development of personal growth. Although the EW instructions were modeled after previous studies (Park & Blumberg, 2002), participants may have benefited from more specific, direct writing instructions to stimulate deeper emotional and cognitive processing.

Another possible reason for the lack of observed relation between EW and PTG may be the nature of the selected distressing events. Specifically, Boals (2012) found that expressive writing leads to positive benefits, but only when individuals wrote about highly distressing events, arguing that “individuals who are not distressed by a negative event are not likely to benefit from expressive writing and may water down results in expressive writing studies” (p. 404). Although an appealing explanation, the sample rated their target events as highly stressful at the time of occurrence and moderately distressing at the point of study initiation. In addition, review of the nature of the events indicate that the most commonly reported events included academic difficulties, death of a loved one, interpersonal conflict, and personal health issues, which reveal that the
selected events were adverse in nature and mirror distressing events selected in similar studies (Park & Blumberg, 2002; Ullrich & Lutgendorf, 2002).

As no direct effect between EW and PTG emerged (e.g., $c$ path) in either model, classical mediation analyses and models—such as proposed by Baron and Kenny (1986)—would dictate no further analyses. However, as Preacher and Hayes’ (2008) approach, which does not require a significant direct effect, was used, the mediational models were tested and all relations investigated.

**Model 1.** Model 1 hypothesized that individuals who engage in EW will experience increased PTG compared to individuals randomized to a control writing condition and that this relation will be reduced or eliminated once EC and CBD are incorporated into the model. Specifically, it was hypothesized that higher levels of EC and CBD would account for a significant portion of the relation between EW and PTG-2. Contrary to the hypothesis, however, this model was not supported.

In testing this model, as noted, there was no direct effect between EW and PTG. However, a significant relation between EW and PTG emerged when controlling for CBI and CES ($c'$ path), which was different from expected results in several ways. First, in keeping with proposed mediation, it was anticipated that the relation between EW and PTG would be present in isolation and then diminish, not strengthen, when the mediators were included ($c'$ path); second, the anticipated direction between EW and PTG was hypothesized to be positive and that EW would facilitate PTG. As such, it was surprising that individuals in the EW condition experienced less growth than the control condition once the variance accounted for by CBI and EC was removed. Although Boals (2012) argued that EW exercises should be discouraged for individuals who have already
completed the meaning-making process as they are not likely to derive added benefits, there is no research to date exploring the contexts in which EW may lead to a decrease in PTG. One possible explanation for this finding is related to the idea, proposed by Frazier et al. (2009), that PTG can be understood as a coping strategy. Specifically, Frazier et al. differentiated perceived growth and actual growth, proposing that perceived growth, or self-reported growth, is a self-protective strategy and unrelated to actual growth. In relation to the present study, it is possible that individuals in the control condition experienced perceived, and not actual, growth simply as a result of nominating and answering questions about a distressing event and that perceived growth is what remains in PTG once the active variance associated with CBD and EC is removed. Within this conceptualization, engaging in EW erodes or strips away this self-protective strategy due to the focal processing required.

The hypotheses that engaging in EW will be significantly and positively associated with absolute levels of EC and CBD at the end of the writing sequence was not supported \((a\text{ paths})\). Specifically, no significant differences emerged between the two conditions in regards to absolute levels of CBD \((a\text{ path})\); contrary to hypothesis, participants in the EW condition did not experience more CBD compared to the control condition, which could account for the null meaning-making results. Although unexpected, one possible reason for the null findings is that individuals had already completed the meaning-making process prior to enrolling in the study. Participants selected events that occurred within the prior 2 years; thus, it is impossible to know what processes they engaged in from the time of the event to beginning the study and how such processes affected their ability to benefit from a structured meaning-making process. It is
highly probable that most participants engaged in some adaptive cognitive processing shortly after experiencing their distressing event; as cognitive discrepancy between the event and previously held beliefs is strongly associated with experienced distress (Park, 2013; Steger & Park, 2012), individuals are likely to spontaneously engage in strategies to reduce such discrepancy and this process occurs almost universally (Davis, Wortman, Lehman, & Silver, 2000). For example, rumination, including intrusive rumination, occurs automatically and has been linked to discrepancy reduction (Greenberg, 1995) and meaning-making (Park, 2010). Therefore, it is likely that participants, whether intentionally or not, engaged in some degree of cognitive processing soon after the distressing event, which may have impeded their ability to benefit from EW. Similar to the null findings between EW and CBD, no significant relation emerged between EW and EC (a path).

In contrast, the present study found that PTG was significantly associated with absolute CBD scores (b path), which is consistent with previous research that has revealed a significant, positive correlation between CBD and PTG (Cann et al., 2010; Danhauer et al., 2013; Lindstrom et al., 2013; Tripplet et al., 2012). This positive association has been posited as due to the process of rebuilding, or making sense of the core belief disruption, following the disruption. In addition, research shows that the more an individual reexamines his or her core beliefs following a traumatic event, the greater amount of PTG will be experienced (Cann et al., 2010). Of note, this relationship between CBD and PTG was independent of EW. However, this is not surprising given that no significant relation emerged between EW and CBD (as described above).
No significant relations emerged between PTG and absolute EC scores (b path). This null finding is consistent with some past findings, such as those of Boals et al. (2010), which demonstrated that only events high in initial EC showed a significant relation with PTG; when events both high and low in EC were included in the analyses, this relation was no longer significant. Therefore, it may be that not all participants selected events that were high in EC, which diluted the hypothesized relationship.

Model 2. Model 2 differed from Model 1 in that it hypothesized that EW would be significantly and positively associated with changes in PTG but that this relationship would be mediated by increased levels of EC and CBD over the writing episodes. This model was partially supported, as significant mediation emerged between EW and PTG via the indirect effect of changes in EC. However, the model did not fully support predictions.

First, no significant direct relation emerged between EW and changes in PTG (c path). Second, no significant relation emerged between EW and changes in CBD over the course of the study (a path). As noted earlier, this null finding may be due to the fact that participants had already engaged in, and completed, a process that reduced cognitive discrepancy prior to entering the study and had no more movement to make. However, a significant finding emerged for the other a path assessing the relation between EW and changes in EC. Specifically, individuals in the EW condition experienced significantly greater changes in the degree to which they considered their selected distressing event central to their identity compared to the control condition. This suggests that individuals who wrote about a distressing event increasingly incorporated that event into their identity over the course of the study as compared to individuals who did not write about
their event. Thus, the results suggest that EW prompted individuals to reevaluate the degree to which the event defines their life story and subsequently, incorporate it into their sense of self. This finding is consistent with past research suggesting that this process, known as identity reconstruction (Gillies & Neimeyer, 2006), is one potential outcome of EW (Park, 2010).

Review of the b paths revealed significant relations between changes in CBD and changes in PTG over the course of the study, after accounting for the influence of EW and between changes in EC and PTG. This finding indicates that for CBD, both the static (e.g., absolute level as assessed in Model 1) and dynamic forms of the construct promote PTG. For EC, only the dynamic form was related to outcome. This finding replicates previous findings suggesting that changes in EC over the course of the study are positively associated with PTG (Boals & Schuettler, 2011; Groleau et al., 2013), after controlling for EW. This finding lends support to the idea that EC may be more of a dynamic process than an endpoint as previously assumed. For example, Berntsen and Rubin (2006) defined EC as “the integration of the trauma memory into the overall life story and self-schema of the person” (p. 222), suggesting a process of incorporation, rather than a destination. The current results support the idea that it is the process of incorporating a traumatic event into identity that leads to positive outcomes, such as PTG. As such, Model 2 demonstrates that EW did have an effect but the effect was more subtle than anticipated as it was indirect in nature; nonetheless, writing about the event prompted individuals to increasingly see the experience as central to their identity, which in turn, led to increased levels of PTG.
Limitations and Future Directions

The present study had several limitations. First, as the study was conducted at a private mid-size Midwestern liberal arts university, the findings are based not only on a college age population but on a particular type of college population. For example, the sample consisted of mostly White participants and the majority was female. As such, the results may not be generalizable to more diverse groups. The lack of diversity in the sample may also have limited the range of distressing events selected, which could have potentially influenced the findings. Future studies should implement this study in more diverse population groups.

Second, the present study measured growth at only two time points and did not assess growth at a post-study follow-up. This limits the present study’s findings, as the development and trajectory of PTG was not assessed over time. Smyth et al., (2008) and Stockton et al., (2014) found that EW was associated with an increased degree of PTG at 3-month and 8-week follow-ups, respectively, but not immediately following the EW intervention. Future studies exploring the relation between EW and PTG should measure PTG at a follow-up. Third, the present study asked participants to select an event that occurred over the past 2 years. This time frame may have limited participants’ options for selecting an event that was possibly more distressing and central to their identity, but that occurred more than 2 years ago. Future studies may wish to broaden the time frame of the distressing event to allow for more options of event selection. Lastly, participants were informed prior to signing up that they would be asked to identify and potentially write about a distressing event. Therefore, it is possible that participants who volunteered to participate in this study were more intrinsically motivated to obtain psychological
benefits compared to individuals who did not. Along these same lines, some participants may have chosen not to participate in the study due to the prospect of having to write about a distressing event; participants who avoided the study for this reason may also have avoided adaptive cognitive processing following their trauma, and thus, may have derived the most benefits from the study. Such self-selection may have contributed to the largely null findings.

Conclusions

The present study adds to the existing literature by promoting a better understanding of the underlying mechanisms associated with EW and PTG. Until this point, the individual difference factors that mediate the efficacy of expressive writing, or influence the degree of cognitive processing that occurs via writing, had not been explored. Because traumatic events are highly prevalent and are associated with a variety of negative outcomes, the present study adds to our understanding of the processes that may promote personal growth following a trauma. Although neither hypothesized model was fully supported, valuable information about how two separate cognitive processes relate to growth was found. Specifically, the results from the present study underscore the importance of considering CBD following a distressing event as it relates to growth. Regardless of the writing condition, there was a positive, significant relation between absolute levels of CBD and growth, suggesting that this process is essential in promoting positive outcomes following trauma. In addition, the present study found that EW leads to increased EC and that changes in EC over time mediate the relationship between EW and PTG. Therefore, the present study expands on existing literature emphasizing the importance of considering how central the event is to one’s identity when attempting to
understand growth. This study serves as a foundation for future research devoted to enhanced understanding of the complex processes that foster growth following a highly distressing experience.
References


### Demographic Information

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<tr>
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<th>Full Sample</th>
<th>Expressive Writing</th>
<th>Control</th>
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<tbody>
<tr>
<td>N (% of full sample)*</td>
<td>133</td>
<td>71 (53.4)</td>
<td>62 (46.6)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>34 (26.6%)</td>
<td>18 (14.1%)</td>
<td>16 (12.5%)</td>
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<tr>
<td>Female</td>
<td>94 (73.4%)</td>
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<td><strong>Race</strong></td>
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<td>52 (41.3%)</td>
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<td>Multiracial</td>
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<td>Hispanic/Latino</td>
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<td>1 (0.8%)</td>
<td>2 (1.6%)</td>
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<tr>
<td>Native</td>
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<td></td>
<td></td>
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<tr>
<td>American/American Indian</td>
<td>2 (1.6%)</td>
<td>1 (0.8%)</td>
<td>1 (0.8%)</td>
</tr>
<tr>
<td><strong>Year in School</strong></td>
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<tr>
<td>First Year</td>
<td>30 (23.8%)</td>
<td>17 (13.5%)</td>
<td>13 (10.3%)</td>
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<tr>
<td>Sophomore</td>
<td>38 (30.2%)</td>
<td>19 (15.1%)</td>
<td>19 (15.1%)</td>
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<tr>
<td>Junior</td>
<td>38 (30.2%)</td>
<td>22 (17.5%)</td>
<td>16 (12.7%)</td>
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<tr>
<td>Senior</td>
<td>20 (15.9%)</td>
<td>11 (8.7%)</td>
<td>9 (7.1%)</td>
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<td><strong>Age</strong></td>
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<td>27 (21.4%)</td>
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<td>20-21</td>
<td>67</td>
<td>40 (31.7%)</td>
<td>27 (21.4%)</td>
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<td>22 and above</td>
<td>5</td>
<td>2 (1.6%)</td>
<td>3 (2.2%)</td>
</tr>
</tbody>
</table>

Note: * An equal number of participants were randomized to each condition. However, 9 participants in the Expressive Writing condition and 10 participants in the Control condition did not produce useable data and thus, were removed from the data set.
Table 2

*Descriptive Statistics of Target Trauma and Trauma Severity*

<table>
<thead>
<tr>
<th>Target Trauma</th>
<th>n</th>
<th>%</th>
<th>Mean Total Distress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Difficulties</td>
<td>16</td>
<td>16.2</td>
<td>9.00</td>
</tr>
<tr>
<td>Death of Loved One</td>
<td>16</td>
<td>16.2</td>
<td>9.25</td>
</tr>
<tr>
<td>Interpersonal Conflict</td>
<td>15</td>
<td>15.2</td>
<td>10.87</td>
</tr>
<tr>
<td>Personal Health Issues</td>
<td>15</td>
<td>15.2</td>
<td>9.67</td>
</tr>
<tr>
<td>Romantic Break-up</td>
<td>12</td>
<td>12.0</td>
<td>8.92</td>
</tr>
<tr>
<td>Family Member’s Illness</td>
<td>8</td>
<td>8.1</td>
<td>11.13</td>
</tr>
<tr>
<td>Automobile Accident</td>
<td>6</td>
<td>6.1</td>
<td>10.50</td>
</tr>
<tr>
<td>Sexual Assault/Harassment</td>
<td>4</td>
<td>4.0</td>
<td>11.50</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>7.1</td>
<td>9.71</td>
</tr>
</tbody>
</table>
Table 3

*Mean Summary Scores of Target Variables by Condition at Baseline*

<table>
<thead>
<tr>
<th></th>
<th>Expressive Writing</th>
<th>Control</th>
<th>Full Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Affect</td>
<td>27.26</td>
<td>28.36</td>
<td>27.70</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>16.59</td>
<td>15.41</td>
<td>16.04</td>
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<tr>
<td>PTG</td>
<td>58.40</td>
<td>60.60</td>
<td>59.74</td>
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<tr>
<td>CBI</td>
<td>3.22</td>
<td>2.91</td>
<td>3.09</td>
</tr>
<tr>
<td>CES</td>
<td>57.57</td>
<td>55.22</td>
<td>56.80</td>
</tr>
<tr>
<td>Meaning-Making</td>
<td>12.16</td>
<td>12.47</td>
<td>12.35</td>
</tr>
<tr>
<td>Total Distress</td>
<td>9.89</td>
<td>10.07</td>
<td>9.95</td>
</tr>
</tbody>
</table>

Note: *p < .05
Figure 1. Path diagram of Model 1

Figure 1. The figure represents a path diagram of Model I. Depicted are the relations between writing condition, level of event centrality at the end of the writing session, level of disruption of core beliefs at the end of the writing sessions and posttraumatic growth. The values in the diagram represent the unstandardized beta values of the relations between variables. Values before the slash represent the total effect (i.e., $c$). Values after the slash represent the direct effect (i.e., $c^*$) after accounting for the variance in the proposed mediators. *$p < .05$
Figure 2. The figure represents a path diagram of Model II. Depicted are the relations between writing condition, changes in event centrality over writing sessions, changes in core beliefs over writing sessions and changes in posttraumatic growth. The values in the diagram represent the unstandardized beta values of the relations between variables. Values before the slash represent the total effect (i.e., $c$). Values after the slash represent the direct effect (i.e., $c'$) after accounting for the variance in the proposed mediators. *$p < .05$
Appendix A

IRB Approval

September 8, 2014

Gina Radice
c/o Susan Kenford
ML 6411

Re: Protocol #13-070 Understanding the Mechanisms that Promote Posttraumatic Growth through Expressive Writing

Dear Ms. Radice:

The IRB has reviewed the request to modify your study, referenced above. We understand that you will be adding three research assistants. We are able to continue to approve your study based on the information you provided. Therefore, your above-referenced study, as modified, continues to be approved in the Expedited category under Federal Guidelines 45CFR46. Your approval expires on April 7, 2015 and a Progress Report is due by that date. The form can be found online at www.xavier.edu/irb/forms

Please note that if you wish to further modify your study, it will be necessary to obtain IRB approval prior to implementing the modification. If any adverse events occur, please notify the IRB immediately.

We truly appreciate your efforts and attention to compliance within the spirit of human subject’s protection. We wish you great success with your research.

Sincerely,

Morell E. Mullins, Jr., Ph.D.
Chair, Institutional Review Board
Xavier University

MEM/sb
Appendix B

Moderation Analyses Results

In accordance with the proposed analyses, we tested if EC at study initiation moderated the relation between EW and PTG, after accounting for the effects of post-intervention CBI. Results revealed that event centrality did not moderate the relation between EW and PTG, $b = -.05$, $t(125) = -.24$, $p = .81$.

Additionally, we tested whether post-intervention EC and post-intervention CBI moderated the relation between EW and PTG. Results indicated they did not. Both the interaction between EC and PTG, $b = .06$, $t(131) = .296$, $p = .78$, and the interaction between CBI and PTG, $b = -4.77$, $t(131) = -1.3$, $p = .20$, were not significant. Additionally, when the interaction terms were added to the model as a set, the total variance accounted for did not increase, change in $R^2 = .01$. 