THE RELATIONSHIP BETWEEN EMOTION REGULATION CHOICE AND POSTTRAUMATIC GROWTH

by

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ABSTRACT

ANA I. OREJUELA-DÁVILA. The relationship between emotion regulation choice and posttraumatic growth. (Under the direction of DR. SARA M. LEVENS)

Posttraumatic growth (PTG) is the experience of positive psychological change that may occur in the aftermath of a traumatic event. Previous research has extensively examined the cognitive underpinnings of PTG, yet the role of emotion regulation (ER) in PTG has yet to be fully elucidated. The present study sought to investigate how emotion regulation choice (ERC) contributes to PTG. One hundred and sixty six participants completed an ERC task in which they chose to either distract or reappraise in response to negative pictures of varying intensities (low, medium, and high) with the goal of diminishing their negative emotional responses to the photos. Proportion of reappraisal choice was recorded for each intensity level and emotion flexibility scores were calculated across intensities. Analyses were conducted to determine if reappraisal choice proportion and emotion flexibility on the ERC task predicted PTG. Results revealed that overall higher reappraisal use predicts PTG. In addition, it was found that emotion flexibility and reappraisal choice proportion during high intensity trials also predict PTG. Findings suggest that reappraisal is a useful ER strategy for navigating the aftermath of a traumatic event and promoting PTG.

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INTRODUCTION

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All individuals are likely to experience a traumatic event at some point in their lives. However, it remains unclear why individuals react to trauma in different ways. For example, some people may react adversely and develop maladaptive stress reactions such as posttraumatic stress symptoms, posttraumatic stress disorder (PTSD), substance abuse, depression, and dysphoria. These adverse reactions to trauma can negatively impact health, overall functioning, productivity, and health service utilization, thus posing a considerable economic burden for health care systems and society as a whole (Hidalgo & Davidson, 2000). On the other hand, some individuals may remain relatively unaffected by a trauma and instead show resilience, which is the "maintenance of a relative stable trajectory of healthy functioning following exposure to a potential trauma" (Bonanno, 2005). Resilient individuals experience relatively mild and short-lived disruptions in their overall functioning, and are thus able to return to their previous normal levels of functioning relatively quickly (Bonanno, 2005).

Another potential reaction to trauma is posttraumatic growth (PTG). In contrast to resilience, PTG is not simply a return to baseline levels of functioning. Instead, it is a phenomenon that goes above and beyond previous baseline levels and into a new way of being**.** Overall, PTG is the experience of positive psychological change that can occur in the aftermath of a traumatic event (Tedeschi & Calhoun, 2004). For PTG to take place, an individual's fundamental assumptions about the world must be challenged, to the point where the individuals question their understanding of the world and their place in it (Tedeschi & Calhoun, 2004). A critical element of reacting to a trauma and its aftermath

is how one regulates the emotions generated by the traumatic experience. However, it is currently unknown whether specific emotion regulation strategies support the development of PTG. Thus, the goal of the present study is to examine the role of emotion regulation choice in the PTG process.

Posttraumatic Growth

The potentially transformative power of suffering is an ancient concept, but it has not been until recently that researchers have engaged in the scientific and systematic study of this phenomenon (Tedeschi & Calhoun, 2004). The PTG model describes five different domains that constitute growth, including: 1) changed sense of relationship with others (warmer, more intimate), 2) changed sense of self (greater sense of personal strength), 3) changed philosophy of life (greater appreciation of life), 4) changed priorities, and 5) spiritual development (Tedeschi & Calhoun, 2004). Change and growth in these five domains have been associated with a wide variety of positive outcomes, such as increased life satisfaction (Triplett et al., 2012), decreased posttraumatic distress (Groleau et al., 2012), better perceived health status (Andersson & Conley, 2013) better adjustment outcomes in cancer patients (Silva et al., 2012), increased psychological well-being (Durkin & Joseph, 2009), increased psychological preparedness (Janoff-Bulman, 2004), increased self-efficacy (Janoff-Bulman, 2004), healthier responses to subsequent traumas, and increased altruism (Staub and & Volhard, 2008). Therefore, promoting PTG could help buffer the effects of adverse reactions to trauma while simultaneously enhancing a variety of positive health outcomes. This would not only help promote well-being among trauma-exposed individuals by helping them find meaning in their suffering, but it would also help lessen the economic burden of the effects of trauma.

Although PTG has been studied extensively during the past two decades, some of the specific processes and mechanisms underlying PTG have yet to be fully understood (Tedeschi & Calhoun, 2004). Thus far, research has focused on the thought processes that may underlie PTG. For example, previous PTG research has focused on the disruption of an individual's core beliefs and the subsequent restructuring of his or her assumptive world after a traumatic event (Cann et al., 2010). Core beliefs are fundamental beliefs about oneself, others, and the world. These beliefs give structure to an individual's world and determine how an individual perceives and understands that world. When an individual experiences a trauma, their world may be affected in such a way that the traumatic experience challenges their core beliefs and forces them to re-examine them. The thought processes involved in this reexamination then makes it possible to recognize positive changes and experience PTG (Cann et al., 2010). Thus, higher disruption to core beliefs is thought to increase the potential for experiencing PTG (Cann et al., 2010; Tedeschi & Calhoun, 2004).

Previous PTG research has also focused on the thought processes associated with rumination, which consists of thinking about specific information through repetitive thoughts (Cann et al., 2011). Ruminative thoughts that are precipitated by a traumatic event may be either intrusive or deliberate. Intrusive ruminative thoughts are those that enter one's mind involuntarily, and they are associated with associated with ongoing distress (Cann et al., 2011). On the other hand, deliberate ruminative thoughts are more controlled, and they are focused on problem-solving and making sense out of the traumatic experience (Cann et al., 2011). Deliberate rumination can also be aimed at rebuilding disrupted core beliefs, and thus it is also predictive of PTG (Cann et al., 2010).

Although previous research has extensively focused on the cognitive components of PTG (i.e., core beliefs and event-related rumination), one component of the PTG model that has been relatively understudied is the management of distressing emotions through emotion regulation. The model states that managing distressing emotions is necessary in order to achieve PTG (Tedeschi & Calhoun, 2004), but the specific emotion regulation strategies involved in managing distressing emotions to promote growth have not been examined in the context of PTG.

Emotion Regulation

According to Gross's Process Model of Emotion Regulation (for a review, see Gross, 1998), emotions consist of a wide range of response tendencies that influence how an individual responds to perceived challenges (Gross, 2002). These response tendencies include behavioral, physiological, and subjective components that support the myriad of purposes that emotions serve. Emotional reactions are critical as they help individuals make decisions, evaluate their environments, enhance their sensory functions, prepare for fast behavioral responses (such as the fight-or-flight responses), and analyze social cues (Gross, 1998). Emotion regulation consists of "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998, p. 275). This includes changes in the duration and magnitude of the emotions, as well as the behavioral and physiological responses that they may produce (Gross, 1998).

Theoretically, there are a wide variety of emotion regulation strategies that an individual can use to manage distressing emotions (Sheppes, 2012). One type of emotion regulation strategy is distraction, which involves disengaging attention from negative

emotions by thinking neutral thoughts that are not in conflict the emotions (Sheppes, Scheibe, Suri, and Gross, 2011). This strategy serves as an early filter that blocks emotions before there are represented in working memory for further evaluation and processing (Sheppes, Scheibe, Suri, and Gross, 2011). Utilizing distraction in high-intensity emotional situations is thought to be adaptive and reflect successful emotion regulation (Sheppes, 2012; Sheppes, Scheibe, Suri, and Gross, 2011). One reason for this is that distraction requires less cognitive resources which may allow an individual to better manage high-intensity situations (Sheppes et al., 2014). However, distraction is considered to be a maladaptive emotion regulation strategy when one has to attend to repeated stressors or when utilized over a long period of time because distraction may prevent important emotional information from being processed (Sheppes et al. 2014; Sheppes, Scheibe, Suri, and Gross, 2011).

Another type of emotion regulation strategy is reappraisal, which consists of reinterpreting the meaning of emotional content (Sheppes, Scheibe, Suri, and Gross, 2011). More specifically, reappraisal involves engaging with negative emotions at an early processing stage, allowing them to be maintained in working memory, and then reinterpreting them by providing them with an alternative and/or elaborated meaning through a later cognitive filter (Sheppes, Scheibe, Suri, and Gross, 2011). Utilizing reappraisal in low-intensity emotional situations is considered to be adaptive because individuals are able to afford dedicating time and cognitive effort towards changing the semantic meaning of the emotional situation (Sheppes et al., 2014). In contrast, utilizing reappraisal in high-intensity emotional situations may be maladaptive because dedicating the cognitive resources required to rethinking an emotional stimulus may deplete

cognitive resources that the individual needs to manage the high-intensity emotional situation (Sheppes, Scheibe, Suri, and Gross, 2011).

The ability to flexibly choose an ER strategy that is responsive and adaptive to the situational demands in an individual's environment has been identified as a component of health adaptation (Bonanno, 2005; Sheppes et al., 2014; Troy and Mauss, 2001). Therefore, successful adaptation depends not so much on one particular ER strategy, but rather on the ability to flexibly choose between strategies in a manner that corresponds with situational demands and the nature of a stressor (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Westphal, Seivert, & Bonanno, 2010). This ability to flexibly and deliberately alternate between ER strategies is a process that has been referred to as "emotion regulation choice" (ERC; Sheppes, Scheibe, Suri, and Gross, 2011).

ERC has been measured using an experimental paradigm developed by Sheppes, Scheibe, Suri, and Gross (2011) that allows a participant to choose which ER strategy they would like to implement in response to an emotional stimulus. In this ERC paradigm, participants view pictures on a computer that vary in emotional intensity (1/2 low intensity pictures and 1/2 high intensity pictures) and are then instructed to choose and implement an ER strategy (either distraction or reappraisal) that will help them feel less negative (Sheppes, Scheibe, Suri, and Gross, 2011). This is an innovative design, given that participants were able to choose their preferred ER strategy (instead of being assigned to specific study conditions that instructed them to either distract of reappraise). Results revealed that participants tend to choose distraction in response to high intensity negative pictures, and reappraisal in response to low-intensity negative pictures (Sheppes, Scheibe, Suri, and Gross, 2011).

The Present Study

Critically, the adaptiveness of choosing distraction in high-intensity situations and reappraisal in low-intensity situations—while theoretically valid—has not been empirically tested in relation to PTG. The present study seeks to expand the research on PTG and ERC by examining how ERC may contribute to PTG. Given the role of flexible ERC in healthy adaptation, it is possible that flexible ERC may also help to promote PTG. Both distraction and reappraisal are emotion regulation strategies that individuals may utilize to cope with the aftermath of a traumatic event, and the ability to flexibly and appropriately choose between these two strategies might help to promote PTG. In addition, the ER strategy of reappraisal may be essential for the re-building of core beliefs, which is necessary for PTG to occur. Reappraisal is a proactive strategy; once an individual uses reappraisal to positively reframe a negative event, that reframing can persist to the next time the negative event is encountered. In this way, use of reappraisal may be particularly key for PTG. However, the role of flexible ERC and reappraisal use in PTG has yet to be investigated.

To address this gap, the present study seeks to examine ERC mechanisms within the framework of PTG. This study utilized a modified version of the ERC task that was developed by Sheppes, Scheibe, Suri, and Gross (2011). For the ERC task, participants viewed 50 pictures on a computer that varied in emotional intensity (15 low-intensity pictures, 20 medium-intensity pictures, and 15 high-intensity). For each picture shown, participants were instructed to choose and implement their preferred ER strategy (either distraction or reappraisal). After implementing their strategy, participants provided a subjective rating of how negative they felt after viewing each picture. Strategy choice

was recorded as proportion of reappraisal use as a function of intensity. Emotional flexibility scores were calculated by subtracting the average proportion of reappraisal during low intensity trials from the average proportion of reappraisal during high intensity trials. After completing the task, participants completed a questionnaire indicating whether they have experienced a traumatic event or not within the past 6 months. Participants who answered in the affirmative completed follow-up questionnaires assessing the degree of PTG they have experienced.

Our hypotheses for the present study are two-fold. First, we predict that overall higher levels of reappraisal choice and trait use will predict higher levels of PTG. Second, based on flexible use of strategy as a function of cognitive effort, we hypothesized that a flexible use of ER strategies will be predictive of PTG. This flexibility will be exemplified in two ways. First, there will be higher reappraisal choice proportion during low intensity trials (and lower reappraisal choice proportion during high intensity trials). And second, there will be a curvilinear relationship between reappraisal and PTG, such that *higher* levels of reappraisal use will promote PTG in low and medium intensities, yet *lower* levels of reappraisal will promote PTG in response to high intensity photos (see Figure 1 for the hypothesized relation between reappraisal and PTG).

METHOD

Subject Recruitment:

One hundred and sixty six participants were recruited through SONA, which is the online subject pool of the Department of Psychology at University of North Carolina-Charlotte (UNCC). A description of the study was posted on SONA, and interested participants signed up for a study session. Those who completed a session received academic credit for their participation. Subjects must be currently enrolled undergraduate students at UNCC, active participants of SONA, at least 18 years of age, and fluent in English.

Measures:

Demographics: Participants provided information regarding their age, gender, race/ethnicity, year in school, major, religious affiliation, medications that they are currently taking, and diagnosis of mental disorder (if applicable).

Trauma History: A Trauma History Questionnaire was utilized to screen for eligible participants. Potential traumatic events include the following: death of a loved one, medical problems (experienced by oneself or a loved one), accidents that lead to serious injury (to self or others), natural disasters, witnessing and/or experiencing physical and/or sexual assault, domestic violence, robbery, and combat-related experiences.

Traumatic Event: Participants who indicate that they have experienced a traumatic event were asked to describe this event, and to think about it while completing the PTGI, CBI, and ERRI.

Posttraumatic Growth (PTG): Subjects were administered the Posttraumatic Growth Inventory (PTGI) to assess PTG. The PTGI is a measure with high reliability and validity that has been extensively used with traumatized populations (Tedeschi & Calhoun, 1996). It is a 21-item scale that measures the extent to which individuals report positive change in the aftermath of a traumatic event. The items asses the degree to which individuals experience change in the five domains of PTG, which are the following: new possibilities ("I established a new path for my life"), personal strength ("I discovered that I'm stronger than I thought I was"), relating to others ("A sense of closeness with others"), spiritual change ("A better understanding of spiritual matters"), and appreciation of life. The PTGI utilizes a 6-point Likert response format, with item scorings ranging from 0 ("I did not experience this change as a result of the event") to 5 ("I experienced this change to a very great degree as a result of the event"). Intermediate scores are given for self-reported changes that occurred to a very small degree (1), a small degree (2), a moderate degree (3), and a great degree (4). The PTGI has good internal consistency (Cronbach's alpha = .90) and test-retest reliability (.71; Tedeschi & Calhoun, 1996).

Core Beliefs**:** The Core Beliefs Inventory (CBI; Cann et al., 2010) is a 9-item measure that is designed to assess the degree to which a specific traumatic event has disrupted one's core beliefs about oneself, others, and the world. Items are rated on a 6-point scale ranging from 0 ("Not at all") to 5 ("To a very great degree"), and include statements such as "Because of the event, I seriously examined my beliefs about my relationships with other people" and "Because of the event, I seriously examined my beliefs about the meaning of my life." This measure has good internal reliability (Cronbach's $\alpha = .82$) and acceptable test-retest reliability ($r = .69$). In addition, the

pattern of correlations of the CBI with other scales suggest good evidence of the construct validity of this inventory (Cann et al., 2010).

Rumination: The Event-Related Rumination Inventory (ERRI; Cann et al., 2011) is a 20-item measure that assesses the degree of repetitive thinking (or rumination) about a traumatic or highly stressful event. Specifically, 10 of the items assess intrusive thoughts related to the event, while the remaining 10 items assess deliberate or purposeful thinking about the event. Items are rated on a 4-point scale ranging from 0 ("Not at all") to 3 ('Often"), and include statements such as "I could not keep images or thoughts about the event from entering my mind" and "I deliberately thought about how the event had affected me." This measure has good internal reliability for both the intrusive items (Cronbach's $\alpha = .94$), as well as the deliberate items (Cronbach's $\alpha = .88$). In addition, the pattern of correlations of the ERRI with other measures provides evidence of the construct validity of the ERRI (Cann et al., 2011).

Trait Reappraisal: Trait reappraisal will be measured using the Reappraisal Subscale of the Emotion Regulation Questionnaire (ERQ; Gross and John, 2003). This subscale contains 5 items that assess individuals' use of cognitive reappraisal as an emotion regulation strategy. The items are scored using a 7-point Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"), and they include statements such as "I control my emotions by changing the way I think about the situation I'm in." The ERQ has good reliability for both the Reappraisal Subscale (Cronbach's $\alpha = .79$).

Impact: The impact of the traumatic event was measured by asking participants to indicate how much the trauma impacted their life on a 1 ("It did not impact my life at all") to 10 ("It impacted every aspect of my life") Likert scale.

Emotion Regulation Choice (ERC) task: The ERC task for this study was inspired by a paradigm created by Sheppes and Gross (2011). To assess ERC, subjects viewed pictures from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 2008) on a computer. The IAPS is a widely used and extensively validated pictorial set that is routinely used in affective neuroscience research (Lang, Bradley, & Cuthbert, 2008). These pictures are designed to induce emotional reactions that differ in intensity.

The ERC task included a stimuli rating task, a training session, a practice session, and the ERC task. The three phases of the experiment are described in greater detail below.

Stimuli rating task: In each trial, subjects were shown a fixation cross, followed by a picture, and were then asked to rate how negative they find the picture to be, from a scale of 1 (“Not negative at all”) to 9 (“Very negative”).

Training phase: The task begins with a four-trial (i.e., four pictures) training phase, during which the participants look at IAPS pictures and will be instructed to either think about something that is emotionally neutral (distraction), or to think about the pictures in a way that reduces their negative meaning (reappraisal). Specifically, the four trials in this training phase will consist of two distraction trials and two reappraisal trials (with one low-intensity trial and one high-intensity trial for each strategy).

Practice phase: After the training phase, participants completed four practice trials (with two trials at each intensity level), where they are allowed to freely choose between distraction and reappraisal while they are viewing the IAPS pictures. As they choose their ER strategy, the participants were encouraged to talk out loud about their chosen

strategies in order to ensure that they understand the task and are able to employ both strategies. Research assistants (RA's) listened to the participants responses to make sure that they are indeed choosing their intended responses.

Choice phase: During this phase, participants were shown pictures from the IAPS that will vary in intensity from low intensity (n=15) to medium (n=20) to high (n=15) intensity. During each trial of the choice phase, participants viewed a fixation cross on the computer, then they were shown a picture afterwhich they chose and implemented an ER strategy by pressing buttons on a keyboard that corresponded to each strategy. Next, they provided a subjective rating of how negative they feel after implementing their chosen ER strategy for the picture. This process was completed for each trial (see Figures 2 and 3).

Procedure

First, informed consent was obtained immediately upon each participant's arrival to the study session. The principal investigator (or one of her research assistants) explained the study in detail and if the student remained interested in participating, the investigator provided a copy of the consent form, read it with the student, and asked if he or she had any questions about the study. If the student agreed to participate, he or she then signed the informed consent, and the investigator co-signed. As part of obtaining informed consent, all participants were reminded that there responses are purely confidential, and that they may refuse to participate or withdraw from the study at any point, without any penalties.

After providing informed consent, participants completed questionnaires on Qualtrics and the ERC task on a computer in Dr. Levens' lab located in UNC Charlotte's

Department of Psychology. The entire process (from obtaining consent to debriefing) took about an hour.

Given that the ERC task can induce strong emotional states in participants, performing the ERC task may affect their responses on the subsequent questionnaires. To investigate and control for this possibility, one group of participants completed the trauma questionnaires immediately following the task (Group 1), while another group of participants waited additional time after the ERC task to complete the trauma questionnaires (Group 2). Therefore, the experimental procedures differed slightly for Groups 1 and 2. These differences are described below.

Group 1. This sample participated in the study from November 2014 to January 2015. They first completed demographic and mood questionnaires on Qualtrics, followed by the ERC task. After task completion, participants immediately completed all of the remaining questionnaires in the lab.

Group 2. This sample participated in the study from February 2015 to April 2015. Like Sample 1, this sample first completed demographic and mood questionnaires on Qualtrics, followed by the ERC task. After task completion, a survey link to the trauma questionnaires (CBI, ERRI, PTGI, Trauma History Questionnaire) was e-mailed to participants, who were instructed to wait at least two hours before completing them at their convenience outside of the lab.

After data collection, the surveys and task performance were scored, and the appropriate statistical analyses were conducted to address the research questions of interest.

Data Analysis:

Questionnaires: All questionnaire responses were recorded, tabulated, and scored. All questionnaire scores were evaluated via descriptive statistics to ensure that all means are within a reasonable range, and that all standard deviations indicate acceptable variability in responses. In addition, all variables were correlated to ensure that their relationships are in the expected direction, as evidenced by previous literature.

Reappraisal Choice Proportion: Reaction times and response data were recorded and tabulated for each intensity of the ERC task. Given that responses for this task were bi-modal (i.e., participants choose either distraction or reappraisal), ER choice was coded as reappraisal choice proportion (RCP) for each intensity level (low, medium & high). Descriptive statistics and correlations were calculated for RCP at each intensity, as well as for total RCP across trials.

Emotion Flexibility: Emotion flexibility was calculated by subtracting the average proportion of reappraisal during low intensity trials from the average proportion of reappraisal during high intensity trials. This method has be used by Levy-Gigi et al. (2015) to examine choice flexibility according to stimulus intensity.

Statistical Analyses: The same statistical analyses were conducted seperately for Group 1 and Group 2 to assess the relation between questionnaire responses and ERC task performance.

ANOVAS: First, a one-way repeated measures analysis of variance (ANOVA) test was conducted on RCP to asses choice variability as a function of intensity (low, medium, and high), with PTG and impact included as continuous independent variables. Paired t-tests were then conducted to follow up on any main effects of intenisty or choice.

Hierarchical Multiple Regression analyses with RCP. Hierarchical Multiple Regression (HMR) analyses were conducted to follow-up on ANOVA interactions, and to examine if RCP contributes to PTG above and beyond the impact of the traumatic event. Impact scores were entered in Step 1, and RCP for each intensity (low, medium, and high) was entered Step 2. Effect sizes will be calculated in each step of the model, and the change in R squared (ΔR2) from step 2 will be calculated to see the variance in PTGI scores that RCP accounts for (above and beyond impact). In addition, an ANOVA was conducted to test the statistical significance of the model and verify the robustness of the effect.

Hierarchical Multiple Regression analysis with emotional flexibility. Impact scores will be entered in Step 1, and emotion flexibility scores will be entered in Step 2. Effect sizes will be calculated in each step of the model. We will evaluate whether the regression coefficient for the flexibility scores significantly accounts for variance in PTGI scores.

Hierarchical Multiple Regression analysis with ERQ-R. The present study measures reappraisal use using the ERC task, but also includes measures of reappraisal use using the ERQ-R, which assess self-reported use of reappraisal. To test whether reappraisal use on the ERQ-R questionnaire differs from reappraisal use on the ERC task, a HMR analysis will also be conducted with ERQ-R to predict PTG. Impact scores will be entered in Step 1, CBI and intrusive rumination scores were entered in Step 2, and reappraisal (ERQ-R) and deliberate rumination scores were entered in Step 3. Effect sizes will be calculated in each step of the model, and the change in R squared (ΔR2) from step 3 will be calculated to see the variance in PTGI scores that is uniquely accounted for by

ERQ-R. An ANOVA was also conducted on this model to test its statistical significance and verify the robustness of its effect.

RESULTS

Results will first be presented for Group 1 (N = 110), followed by Group 2 (N = 56). For each group, ERC task results will be discussed first, followed by regression analyses testing the impact of reappraisal choice, reappraisal use, and emotion regulation flexibility respectively on PTG.

Group 1

Reappraisal Choice Proportion Predicting Posttraumatic Growth

Descriptive statistics and zero-order correlations for all target variables are presented in Table 1. A one way repeated measures ANOVA was conducted on RCP as a function of intensity (low, medium and high). PTG and Impact were included in the repeated measures ANOVA as continuous independent variables. Analyses of within-subjects contrasts revealed a significant linear main effect of intensity, $F(1, 107) = 20.84$, $p < .001$, $n_p^2 = .16$, and PTG, $F(1, 107)=6.41$, $p < .05$, $n_p^2 = .06$, qualified by a significant linear interaction between intensity and PTG, $F(1, 107) = 4.60$, $p < .05$, $n_p^2 = .04$, and between intensity and impact, $F(1, 107) = 4.62$, $p<.05$, $n_p^2 = .04$. The main effect of impact was not significant.

To examine the main effect of intensity, follow-up t-tests were conducted on RCP across the three intensity levels. Results revealed that RCP was significantly different across the three intensity levels, with higher levels of reappraisal choice proportion in low versus medium intensity, $t(109) = 10.55$, $p < .001$, low versus high intensity, $t(109) = 14.65$, $p < .001$, and medium versus high intensity, $t(109) = 8.52$, $p< .001$. A post-hoc multiple regression analysis was conducted to examine the main effect of PTG. The

average proportion of reappraisal choice across all trials significantly predicted 22% of the variance ($p < .001$) in PTG scores ($b = 31.25$, $p < .05$).

Finally, an HMR analysis was conducted to follow-up on the ANOVA results and examine if RCP at different intensities is predictive of PTG after controlling for impact. Impact was entered as a control variable in the first step, and RCP for low, medium, and high intensity were simultaneously entered in the second step. The model accounted for 25% of the variance in PTG scores, with impact ($\beta = .42$, $p < .001$) and RCP during high intensity ($\beta = 3.43$, $p < .05$) being the best predictors in the model (Table 2).

ERC Task: Emotional Flexibility Predicting Posttraumatic Growth

To test whether emotional flexibility predicts PTG, we used the method used by Levy-Gigi et al. (2015) in which flexibility scores are calculated by subtracting the average proportion of reappraisal during low intensity trials from the average proportion of reappraisal during high intensity trials. Levy-Gigi postulates that higher flexibility scores signify a maladaptive pattern (i.e., greater reappraisal during high intensity and lower reappraisal during low intensity) as reappraisal choice could be less adaptive in response to high intensity negative content when cognitive resources may be low. Results (see Table 4) showed that after controlling for impact, emotion flexibility scores predicted PTG ($b = 5.02$, $p < .05$). Since the regression coefficient was positive, this means greater reappraisal choice in response to high intensity negative photos, the "maladaptive" pattern, predicted increased PTG. Overall this indicates that *increase* in reappraisal from low to high is predictive of higher PTG. Conversely, a *decrease* in RCP from low to high predicts lower PTG.

Reappraisal Use Predicting Posttraumatic Growth

HMR (see Table 3) was conducted to determine whether higher reappraisal (ERQ-R) use predicts higher levels of PTG above and beyond the influence of other predictors. Impact was entered as a control variable in the first step, and it accounted for a significant percent of the variance (17%, $p < .001$) in PTGI scores. In the second step, challenge to core beliefs and intrusive rumination accounted for 63% of the variance (ΔR^2=.46, $p < .001$). The final model accounted for 67% of the variance ($p < .05$), with deliberate rumination and reappraisal accounted for an additional 4% of the variance ($p < .05$). Reappraisal (ERQ-Q) was significantly correlated with PTG (r =.39, $p < .05$), and it was a significant predictor of PTGI scores (β= .12, p<.05). In the final model, challenge to core beliefs (β= .66, p <.001) and deliberate rumination (β= .24, p <.05) were also strong predictors of PTG.

Group 2

Reappraisal Choice Proportion predicting Posttraumatic Growth

Descriptive statistics and zero-order correlations for all target variables are presented in Table 5. Group 2 consisted of 54 participants (76% female; Mean age = 20.76; SD = 2.57). A one way repeated measures ANOVA was conducted on reappraisal choice proportion as a function of intensity (low, medium and high). PTG and Impact were included in the repeated measures ANOVA as continuous independent variables. Analyses of within-subject contrasts revealed a significant linear main effect of intensity $F(1, 53) = 24.86$, $p < .001$, $n_p^2 = .32$ and a significant intensity and impact interaction, F=(1, 53) = 4.45, $p < .05$, $n_p^2 = .08$. There were no other significant main effects or interactions.

Paired-samples t-tests were conducted on reappraisal choice proportion across the three intensity levels. Results reveal that reappraisal choice proportion was significantly different across the three intensity levels, with higher levels of reappraisal choice proportion in low versus medium intensity, $t(57) = 5.36$, $p < .001$, low versus high intensity, $t(57) = 11.09$, $p < .001$, and medium versus high intensity, $t(57) = 8.44$, $p < .001$.

ERC Task: Emotional Flexibility Predicting Posttraumatic Growth

To test whether the pattern of ER flexibility changed as a result of the difference in procedures between the two groups, a multiple regression analysis was conducted to predict PTG from emotion flexibility scores. However, the results were not significant for this group (see Table 8).

Reappraisal Use Predicting Posttraumatic Growth

In this group, reappraisal (ERQ-R) was not significantly correlated with PTG (r=.20, p>.05). A significant percentage of the variance was explained by Model 1 (18%; $p < .05$) and Model 2 (62%; $p < .001$). However, Model 3 did not explain a significant percent of the variance (65%; p>.05), and the change in R^2 was not significant ($\Delta R^2 = .02$; $p > .05$). In the final model (Model 3), core beliefs (β=.46, $p < .001$) and intrusive rumination (β=.34, $p < .05$) were significant predictors of PTG. However, deliberate rumination (β=.07, $p > .05$) and reappraisal (ERQ) (β=.14, $p > .05$) were not significant predictors of PTG in Model 3 (see Table 7).

DISCUSSION

The present study examined how ERC contributes to PTG. Findings of the study will be discussed in the order in which the hypotheses were presented, followed by additional findings of interest.

Reappraisal Use and PTG

It was hypothesized that higher levels of reappraisal choice and trait use would predict higher PTG. Results revealed that greater reappraisal use predicted higher PTG, supporting our first hypothesis. Specifically, we found that the total reappraisal choice proportion across all trials in the ERC task predicted higher levels of PTG in Group 1. In addition, we also found that higher trait reappraisal (as measured by the ERQ-R) predicted higher PTG. This finding was observed in Group 1 (see Table 3), but not in Group 2 (see Table 6), which is likely due to a lack of sufficient statistical power in Group 2 (which had a small sample size). Overall, this finding suggests that reappraisal as an ER strategy promotes PTG.

When a traumatic events occurs, it provokes negative emotional reactions in individuals. In addition to negative emotion directly due to the trauma, additional negative emotions may occur in response to the shattering of core beliefs. For PTG to occur, an individual's core beliefs need to be challenged (Cann et al., 2010) and the individual must transition from intrusive thoughts about the trauma, to more deliberate forms of rumination that involve purposefully reflecting on the trauma and its potential meaning (Cann et al., 2011). During deliberate rumination, individuals try to purposefully and systematically make meaning out of their traumatic event (Cann et al., 2011), and this process entails cognitive processing and restructuring in order to re-build the core

beliefs that were shattered (Tedeschi and Calhoun, 2004). The findings of this study suggest that reappraisal of negative content may facilitate the process of deliberate rumination, in which re-examining negative emotions allows individuals to make meaning out of their traumatic experience. Deliberate rumination must also be accompanied by affective engagement of the distressing emotions elicited by the trauma (Tedeschi and Calhoun, 2004). Reappraisal is also well suited for this purpose, given that it is a proactive ER strategy that allows individuals to re-evaluate the meaning of a stimulus (such as a traumatic event or distressing emotions) in a more positive light.

However, it should be reiterated that distress needs to be present in order for PTG to occur. Recall that it is distress that ultimately prompts the shattering of core beliefs, as well as the occurrence of intrusive rumination (Tedeschi and Calhoun, 1996). Therefore, a certain amount of distress is necessary to facilitate growth, and this distress occurs when emotions are not regulated. Because of this, it is possible that reappraisal may only promote PTG once the individual reaches the deliberate rumination stage, and not before.

Interestingly, although trait reappraisal and reappraisal choice proportion both predicted higher PTG, the two did not correlate with each other (see Table 1). No prior research using the ERC task has reported a correlation with the ERQ, suggesting that the ERC task and the ERQ questionnaire are measuring unique aspects of reappraisal. The ERQ measures the self-reported use of reappraisal in everyday life, whereas the ERC task measures the preference for reappraisal versus distraction as a function of intensity. It may be that the ERQ targets how an individual thinks they manage their emotions, whereas the ERC task targets choice between two possible strategies. In addition, while the ERQ is believed to measure reappraisal at a trait level, performance of the ERQ may

have been affected by ER capabilities that were enhanced as a result of the traumatic event. Therefore, future research on the unique contributions of the ERQ and the ERC task in assessing reappraisal are warranted.

Emotional Flexibility

We hypothesized that flexible of use of ER strategies would be associated with greater PTG. Overall our findings replicate previous findings by Sheppes, Scheibe, Suri, and Gross (2011) in that reappraisal choice proportion (RCP) decreased as intensity increased. In addition, our findings support our hypothesis that flexible use of ER would be associated with greater PTG, but not in the direction that we predicted. We predicted that greater RCP during low intensity trials (and lower RCP during high intensity trials) would predict PTG. We also predicted that there would be a curvilinear relationship between ERC and PTG such that *higher* levels of reappraisal use would promote PTG in low and medium intensities, yet *lower* levels of reappraisal would promote PTG in response to higher intensity negative content. Contrary to our prediction, greater reappraisal during low intensity trials and less reappraisal in high intensity trials did not predict PTG. Nor was there a curvilinear relationship between ERC and PTG, given that the quadratic effect from the ANOVA was not significant (only the linear effect was significant). Rather, greater RCP during *high* intensity trials predicted PTG, while RCP during low and medium intensity was not predictive of PTG. This finding is surprising in light of the previous ERC research concluding that greater reappraisal in response to high intensity content is maladaptive. These conclusions were made on the basis of available cognitive resources; specifically, the authors concluded that reappraisal during low

intensity trials is considered adaptive given that the individual has the cognitive resources to allocate towards reappraisal (Sheppes, Scheibe, Suri, and Gross, 2011).

Initially, we had based our hypothesis on the availability of cognitive resources and predicted that reappraisal during low intensity trials would be associated with greater PTG. Our finding that greater proportion of reappraisal during high intensity trials that predicted PTG sheds new light on the adaptiveness of reappraisal according to context. The ERC pattern identified by Sheppes and colleagues (2011) in which greater reappraisal in response to high intensity negative content is maladaptive is likely true in the context of limited cognitive resource availability. However, in the context of PTG, in which proactively managing intense negative content is beneficial, a greater tendency to reappraise high intensity negative content may be more likely to promote PTG than managing cognitive resources. In retrospect, given that PTG requires individuals to engage in deliberate rumination to derive meaning from a traumatic event, it makes sense that a greater preference to choose reappraisal in response to high intensity negative content would promote PTG. Further, deliberate rumination and reappraisal are both proactive processes, in which individuals must willingly and purposefully utilize cognitive resources to attain a certain goal (i.e., to extract meaning out of the trauma). In the case of PTG, allocating cognitive resources towards deliberate rumination and reappraisal proves to ultimately be adaptive, in that it allows an individual to move beyond their trauma and into a new state of being. Overall, this pattern of findings suggests that PTG is not about adaptively managing resources, but about utilizing those resources to re-evaluate core beliefs, move from intrusive to deliberate rumination, and make meaning out of the traumatic experience.

Other Findings of Interest

There are a number of additional findings of interest that while not predicted, warrant discussion. One unexpected finding of interest was that the CBI and PTGI correlated very highly with each other in both Group 1 and 2 (see Table 1 and Table 5). Typically, these two measures have a correlation of about .57 (Cann et al., 2010), which is significantly less than the correlations observed in the Group 1 (N = 110) and 1 2 (N = 56) of the present study. Initially, we thought that the high correlation in Group 1 was due to participants answering the CBI immediately after completing the ERC Task. We thought that the task may have placed Group 1 participants in an "emotion regulation" state in which their traumatic event became particularly salient, and that this somehow produced the high correlation that was observed between the CBI and PTGI. However, this possibility was not supported, given that the high correlation was also observed in Group 2, where participants were required to wait at least one hour before completing the trauma questionnaires after finishing the ERC task. Future research should therefore investigate why this sample might have a heightened correlation between CBI and PTGI than previously published samples.

A second interest finding of note was the role of traumatic event impact. Impact of the traumatic event correlated highly with the PTGI, CBI, and ERRI. In particular, it had the highest correlation with intrusive rumination, and this was observed both in Group 1 and Group 2. Previous research has established that for PTG to occur, core beliefs needs to be challenged (Cann et al., 2010), and this can only happen if the impact of the event is strong enough to produce that effect. The fact that the impact of the event was highly correlated with intrusive rumination suggests that impact might affect not just

disruption to core beliefs, but also the degree of intrusive rumination that an individual experiences.

Group Differences

There were several findings that differed between Group 1 and 2 of this study. As stated previously, we found that trait reappraisal (as measured by the ERQ-R) predicted PTG in Group 1, but not in Group 2. In addition, trait reappraisal correlated highly with deliberate rumination in Group 1, but not with Group 2. We also found that total RCP across trials and RCP during high intensity predicted PTG in Group 1, but not in Group 2. It is likely that these differences are due to a lack of statistical power, as Group 2 had about half the number of participants than Group 1. It is also possible that these differences could also potentially be due to the order in which the questionnaires were administered. Recall that Group 1 completed the trauma questionnaires right after completing the ERC task, while Group 2 completed the questionnaires later on in the day. As mentioned earlier, the task could have put individuals in an "emotion regulation" state which affect their responses on the questionnaires. The differences between Group 1 and Group 2 have implications for research that examines individual differences and suggest that the order in which experimental tasks and questionnaires are completed can greatly impact results.

Limitations and Future Directions

While the findings of the present study contribute significantly to the PTG literature by revealing ER mechanisms that may underlie PTG, there are a number of limitations worth discussing. First, there is considerable difference in the sample size between Group 1 and Group 2. Furthermore, while the number of participants in each

group is sufficient for experimental design studies, studies investigating PTG via survey have reported considerably higher sample sizes. Another potential limitation is that our sample consisted entirely of college undergraduates. While the sample comes from a diverse state institution with high levels of non-traditional college students, the present sample may limit the generalizability of our findings. College is a time of transition in which individuals are exploring their identities and developing their emotion regulation capabilities. Thus, it is possible that the present findings may reflect the relation between emerging emotion regulation strategies and PTG.

In addition, the demographic information for Group 1 is not yet available. However, previous research using the subject pool suggests that the demographics of samples are largely consistent from one semester to the next, suggesting that the known demographics for Group 2 should be representative of the larger Group 1 sample.

Another potential limitation of this study is its cross-sectional design. The present study provided a snapshot of ERC at a specific point in time, and although the task and questionnaires have all been validated, it is possible that ERC may change across time, especially during the aftermath of a traumatic event. Therefore, future research should utilize a longitudinal design to examine how the relationship between ERC and PTG may vary as a function of time during the aftermath of a traumatic event. Longitudinal designs may also help elucidate other aspects of how ERC flexibility may vary based on whether the individual is reacting to a transient traumatic incident versus a chronic trauma. Findings from the present study suggest that availability of cognitive resources was not a central driver of the adaptiveness of reappraisal in PTG; however, in the context of chronic trauma, the availability of cognitive resources may be more important.

The current study also utilized pictures with emotional content in order to elicit negative emotional reactions. Although the intense content of these images may not be encountered on a daily basis, pictures such as these are increasingly being presented on social media and news outlets, which makes response patterns to such photos more valid and important. Also, the fact that these images are becoming more common place could lower the negative impact that they have on individuals. Future studies should therefore examine if similar findings are produced when using other emotional stimuli, such videos or stress-inducement experimental tasks, such as the Trier Social Stress Test (TSST; Kirschbaum, Pirke, and Hellhammer, 1993). The present study also measured impact using only 1 item. Future studies could incorporate the Centrality of Event Scale (CES; Berntsen and Rubin, 2006), which is a more comprehensive and nuanced assessment of the degree of impact that a traumatic event can have on an individual's identity and daily life.

Finally, the present study examined only two emotion regulation strategies, positive reappraisal and neutral distraction. There are a variety of other potential ER strategies that individuals could potentially choose, such as negative reappraisal, positive distraction, suppression, and acceptance. Future research should examine how emotion regulation strategies besides distraction and reappraisal affect the relationship between ERC and PTG as a function of intensity. This is important because traumatized individuals may prefer to choose other strategies (such as suppression and reappraisal) when navigating the emotional aftermath of their traumatic event.

Conclusions

The present study examined ERC within the context of PTG. Our results revealed that overall higher levels of reappraisal (as measured by the ERC task and ERQ-R) predict higher levels of PTG. This suggests that reappraisal may be a necessary ER strategy to employ when one is rebuilding shattered core beliefs, as well as when one is moving from intrusive to more deliberate forms of rumination. Reappraisal may also aid with the progression of deliberate rumination, given that it is a proactive ER strategy that requires individuals to engage with negative emotions and re-evaluate them in a way that allows for growth to occur. In addition, we found that emotional flexibility as a function of intensity predicts PTG, but not in the direction that had been predicted. Instead, our findings revealed that it was reappraisal during *high* intensity trials that predicts PTG, while reappraisal during low and medium intensities was not predictive of PTG. In addition, this pattern demonstrated that the relationship between ERC and PTG is not curvilinear as we had originally expected. While choosing reappraisal during low intensity may be considered adaptive within the context of managing the availability of cognitive resources, such is not the case for PTG. PTG is not about conservatively managing cognitive resources, but about utilizing those resources to re-build shattered core beliefs and facilitate the process of deliberate rumination. The results of the present study suggest that reappraisal may be crucial for these processes to unfold in a way that ultimately promotes PTG.

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APPENDIX A: FIGURES

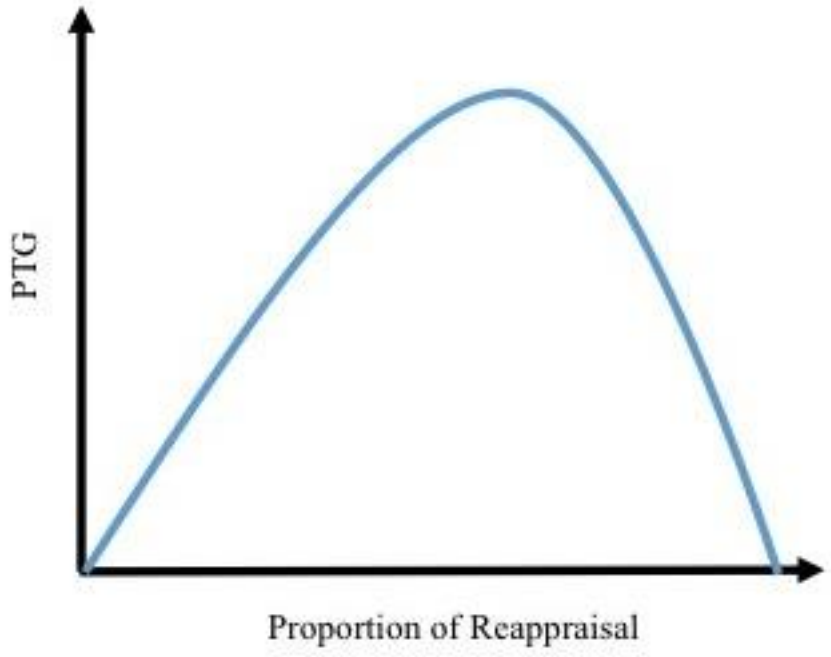

Figure 1. Proposed relationship between Posttraumatic Growth (PTG) and proportion of reappraisal during the ERC task.

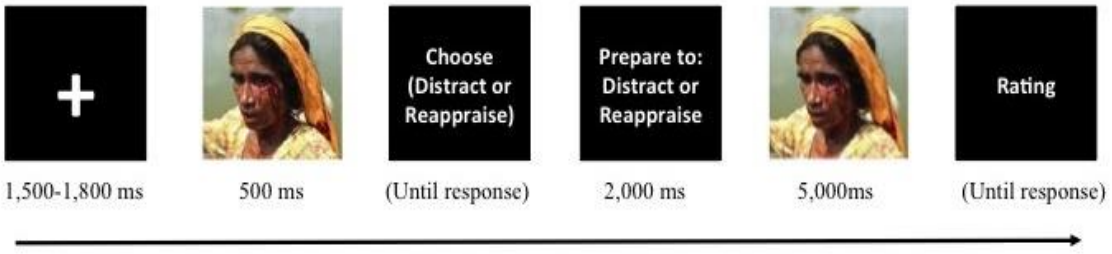

Figure 2. Trial structure of ERC task.

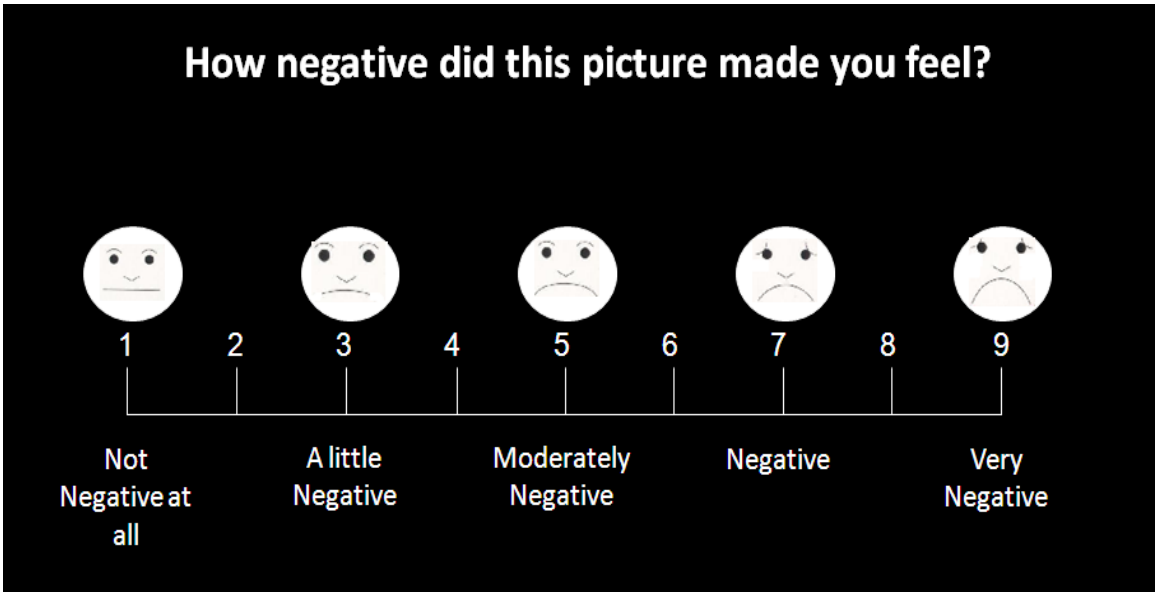

Figure 3. Picture rating scale.

APPENDIX B: TABLES

Table 1: Descriptive statistics and correlations for group 1.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. PTGI	65.42	26.92	-										
2. CBI	29.10	11.82	.79**	-									
3.Del_R	24.11	8.41	.64**	.72**	-								
4. Int_R	23.16	8.76	.43**	.54**	.78**	-							
5. RCP-T	.58	.18	.21*	.18	.14	.09	-						
6. RCP-L	.75	.20	.16	.09	.12	.10	.77**	-					
7. RCP-M	.57	.21	.13	.16	.10	.05	.93**	.60**	-				
8. RCP-H	.43	.23	.26*	.22*	.15	.10	.86**	.45**	.72**	-			
9. ERQ-R	29.06	8.03	.24*	.13	.19*	.03	.01	-.08	.02	.07	-		
10. Impact	6.01	2.30	.41**	.47**	.50**	.58**	-.01	.10	-.06	-.04	.02	-	
11. Flex.	0.00	1.00	.13	.12	.04	.02	.21*	-.41*	.22*	.63**	.14	-.13	-

Table 2: Hierarchical multiple regression analysis predicting posttraumatic growth from reappraisal choice proportion across intensities (Group 1).

	b	S.E.	*β*	R	R^2
Model 1				.41**	.17**
(intercept)	36.32**	6.59			
Impact	4.84**	1.03	.41**		
Model 2				.50**	.25**
(intercept)	24.47*	10.53			
Impact	4.90**	1.00	.42**		
RCP_Low	3.16	14.60	.02		
RCP_Medium	-14.24	17.78	-.11		
RCP_high	39.75*	14.12	3.43*		
Note. N = 110. * indicates p<.05. ** indicates p<.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score. RCP = Reappraisal Choice Proportion.					

Table 3: Hierarchical multiple regression analysis predicting posttraumatic growth from impact, core beliefs, rumination, and reappraisal (Group 1).

	B	S.E.	*β*	R^2	ΔR^2
Model 1				.17**	
(intercept)	36.32**	6.59			
Impact	4.84**	1.03	.41**		
Model 2				.63**	.46**
(intercept)	11.43*	5.19			
Impact	.82	.87	.07		
Core Beliefs	1.77**	.16	.78**		
Intrusive Rumination	-.11	.24	-.04		
Model 3				.67*	.04*
(intercept)	-1.86	7.25			
Impact	.978	.84	.08		
Core Beliefs	1.50**	.19	.66**		
Intrusive Rumination	-.52	.31	-.169		
Deliberate Rumination	.76*	.37	.24*		
Reappraisal (ERQ)	.39*	.20	.12*		
Note. N = 110. * indicates p<.05. ** indicates p<.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score.					

Table 4: Hierarchical multiple regression analysis predicting posttraumatic growth from flexibility scores (Group 1).

	b	S.E.	*β*	R^2	ΔR^2
Model 1				.17**	
(intercept)	36.32**	6.59			
Impact	4.84**	1.03	.41**		
Model 2				.21**	.04**
(intercept)	34.62**	6.53			
Impact	5.13**	1.02	.44**		
Flexibility	5.02*	2.34	.19*		
Note. N = 110. * indicates p<.05. ** indicates p<.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score. RCP = Reappraisal Choice Proportion.					

Table 5: Descriptives statistics and correlations for group 2.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. PTGI	68.61	33.71	-										
2. CBI	27.57	13.77	.72**	-									
3.Del_R	26.10	8.57	.56**	.60**	-								
4. Int_R	23.12	9.61	.62**	.69**	.70**	-							
5. RCP-T	.63	.15	-.02	.14	.19	.15	-						
6. RCP-L	.77	.17	.07	.16	.13	.06	.71**	-					
7. RCP-M	.65	.17	-.07	.04	.14	.16	.89**	.48**	-				
8. RCP-H	.47	.21	-.04	.15	.18	.13	.83**	.37**	.62**	-			
9. ERQ-R	30.90	6.51	.20	.18	.18	-.07	.03	.10	-.13	.12	-		
10. Impact	6.17	2.40	.37*	.45**	.44**	.51**	.15	.05	.03	.29*	.10	-	
11. Flex.	0.00	1.00	-.04	.08	.12	.14	.17	-.47*	.16	.64**	.05	.25	-

Table 6: Hierarchical multiple regression analysis predicting posttraumatic growth from reappraisal choice proportion across intensities (Group 2).

	b	S.E.	*β*	R^2	ΔR^2
Model 1				.13*	
(intercept)	36.95*	11.62			
Impact	5.11*	1.75			
Model 2				.17*	.04
(intercept)	30.38	24.04			
Impact	5.76*	1.87	.41*		
RCP_Low	25.80	28.35	.13		
RCP_Medium	-4.81	33.35	-.03		
RCP_high	-30.46	28.18	-.19		
Note. N = 56. * indicates p <.05. ** indicates p <.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score. RCP = Reappraisal Choice Proportion.					

Table 7: Hierarchical multiple regression analysis predicting posttraumatic growth from impact, core beliefs, rumination, and reappraisal (Group 2).

	B	S.E.	*β*	R^2	ΔR^2
Model 1				.18*	
(intercept)	36.22*	11.47			
Impact	5.74*	1.75	.43*		
Model 2				.62**	.44**
(intercept)	6.89	9.01			
Impact	.55	1.42	.04		
Core Beliefs	1.26**	.30	.52**		
Intrusive Rumination	1.07*	.43	.32*		
Model 3				.65	.02
(intercept)	-18.10	17.31			
Impact	.27	1.41	.02		
Core Beliefs	1.11**	.31	.46**		
Intrusive Rumination	1.14*	.51	.34*		
Deliberate Rumination	.25	.50	.07		
Reappraisal (ERQ)	.74	.50	.14		
Note. N = 56. * indicates p<.05. ** indicates p<.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score.					

Table 8: Hierarchical multiple regression analysis predicting posttraumatic growth from flexibility scores (Group 2).

	b	S.E.	*β*	R^2	ΔR^2
Model 1				.14*	
(intercept)	37.96*	11.51			
Impact	5.09*	1.73	.37		
Model 2				.16*	.02
(intercept)	35.15*	11.78			
Impact	5.55*	1.78	.41		
Flexibility	-4.70	4.35	-.14		

Note. N = 56. * indicates p<.05. ** indicates p<.001. b = unstandardized beta. S.E. = standard error. Dependent variable: PTGI Total Score. RCP = Reappraisal Choice Proportion.

APPENDIX C: QUESTIONNAIRES

Demographic Questionnaire

1. Please select. Are you: "Male" or "Female"

2. What is your major? (please write undeclared if you have not yet decided on a major) _____

3. Has an immediate family member (mother, father, sister, brother) ever been diagnosed with depression? Y / N

4. What best describes your racial identity: _____

5. How old are you in years? _____

6. What is your religious affiliation, if any? _____

7. Do you routinely take prescription medication for a physical condition? What is the general type and frequency?

8. Do you routinely take non-prescription medication (such as aspirin or Tylenol)? If so, what kind of medication, how often and how much?

9. Has a medical doctor or psychologist ever diagnosed you as suffering from any of the conditions listed below?

Diagnosis	**NO**	**YES**
Anxiety disorders (e.g., anxiety disorder, panic disorder, phobias, etc.)	0	1
Eating disorder (e.g., bulimia, anorexia)	0	1
Depression (e.g., major depression, dysthymia, etc.)	0	1
Posttraumatic Stress Disorder (PTSD)	0	1
Learning disability	0	1
Attention-Deficit/Hyperactivity Disorder (ADHD/ADD)	0	1
Behavior Disorder (e.g., Conduct disorder, oppositional defiant disorder)	0	1
An alcohol or substance abuse problem/disorder	0	1
Other condition. Specify _____	0	1

Trauma History Questionnaire

Cann, A., Calhoun, L. G., Tedeschi, R. G., Taku, K., *Vishnevsky, T., *Triplett, K. N. & Danhauer, S. C. (2009). A short form of the Posttraumatic Growth Inventory, *Anxiety, Stress & Coping, online,* 1-11.

Have any of the following highly stressful events happened to you? Please click next to the event to indicate if you have ever experienced the event (column 1) and if you have experienced the event in the past 6 months (column 2).

Ever in your life	In past 6 months	
YES	YES	I experienced the UNEXPECTED death of a close relative, close friend, or significant other.
YES	YES	I PERSONALLY experienced a VERY SERIOUS medical problem.
YES	YES	A close friend, significant other or close family member experienced a VERY SERIOUS medical problem.
YES	YES	I experienced an accident that led to SERIOUS INJURY to me.
YES	YES	Someone very close to me experienced an accident that led to SERIOUS INJURY.
YES	YES	I caused an accident that led to a SERIOUS INJURY to someone.
YES	YES	MY place of residence was SERIOUSLY damaged by fire or other natural cause.
YES	YES	I experienced a situation in which I felt I faced potential death or serious bodily harm.
YES	YES	I witnessed a SEVERE assault of a friend or family member.
YES	YES	I was a victim of a SEVERE physical assault.
YES	YES	I was sexually assaulted.
YES	YES	I experienced SERIOUS physical abuse by an intimate partner.

YES YES I was robbed or mugged.

YES YES I was stalked.

YES YES I was deployed with the military to an active combat zone.

Posttraumatic Growth Inventory

Indicate for each of the statements below the degree to which this change occurred in your life as a result of your crisis [or researcher inserts specific descriptor here], using the following scale.

> Note to investigators – you will need to format the items so that participants have a way of responding to each one. The procedure we recommend is to place the numerical values of the scale after each item.
>
> In addition, the Roman numeral codes for the factors should also be removed.

0= I did not experience this change as a result of my crisis.
1= I experienced this change to a very small degree as a result of my crisis.
2= I experienced this change to a small degree as a result of my crisis.
3= I experienced this change to a moderate degree as a result of my crisis.
4= I experienced this change to a great degree as a result of my crisis.
5= I experienced this change to a very great degree as a result of my crisis.

1. I changed my priorities about what is important in life. (V)
2. I have a greater appreciation for the value of my own life. (V)
3. I developed new interests. (II)
4. I have a greater feeling of self-reliance. (III)
5. I have a better understanding of spiritual matters. (IV)
6. I more clearly see that I can count on people in times of trouble. (I)
7. I established a new path for my life. (II)
8. I have a greater sense of closeness with others. (I)
9. I am more willing to express my emotions. (I)
10. I know better that I can handle difficulties. (III)
11. I am able to do better things with my life. (II)
12. I am better able to accept the way things work out. (III)
13. I can better appreciate each day. (V)
14. New opportunities are available which wouldn't have been otherwise. (II)
15. I have more compassion for others. (I)
16. I put more effort into my relationships. (I)
17. I am more likely to try to change things which need changing. (II)
18. I have a stronger religious faith. (IV)
19. I discovered that I'm stronger than I thought I was. (III)
20. I learned a great deal about how wonderful people are. (I)
21. I better accept needing others. (I)

Note: Scale is scored by adding all responses. Factors are scored by adding responses to items on each factor. Items to which factors belong are not listed on form administered to participants.

PTGI Factors
Factor I: Relating to Others
Factor II: New Possibilities
Factor III: Personal Strength
Factor IV: Spiritual Change
Factor V: Appreciation of Life

Tedeschi, R.G., & Calhoun, L.G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress, 9,* 455-471.

Core Beliefs Inventory

Cann, A., Calhoun, L. G., Tedeschi, R. G., Kilmer, R. P., Gil-Rivas, V., *Vishnevsky, T., & Danhauer, S. C. (2009) The Core Beliefs Inventory: A brief measure of disruption in the assumptive world. *Anxiety, Stress & Coping, 23*, 19-34.

Some events that people experience are so powerful that they 'shake their world' and lead them to seriously examine core beliefs about the world, other people, themselves, and their future.

Please reflect upon the event about which you are reporting and indicate the extent to which it led you to seriously examine each of the following core beliefs.

Because of the event, I seriously examined the degree to which I believe things that happen to people are fair.
Because of the event, I seriously examined the degree to which I believe things that happen to people are controllable.
Because of the event, I seriously examined my assumptions concerning why other people think and behave the way that they do.
Because of the event, I seriously examined my beliefs about my relationships with other people.
Because of the event, I seriously examined my beliefs about my own abilities, strengths and weaknesses.
Because of the event, I seriously examined my beliefs about my expectations for my future.
Because of the event, I seriously examined my beliefs about the meaning of my life.
Because of the event, I seriously examined my spiritual or religious beliefs.
Because of the event, I seriously examined my beliefs about my own value or worth as a person.

Scale"

0	1	2	3	4	5
not at all	to a very small degree	to a small degree	to a moderate degree	to a great degree	to a very great degree

Event Related Rumination Inventory (ERRI)

Cann, A., Calhoun, L. G., Tedeschi, R. G., Triplett, K. N., &Vishnevsky, T., & Lindstrom, C. M. (2011). Assessing posttraumatic cognitive processes: The Event Related Rumination Inventory. *Anxiety, Stress, & Coping, 24,* 137-156.

Intrusive items and deliberate items are presented separately, with instructions specific to each set of items. The scale used is:

0	1	2	3
Not at all	Rarely	Sometimes	Often

INTRUSIVE RUMINATION ITEMS

After an experience like the one you reported, people sometimes, but not always, find themselves having thoughts about their experience even though they don't try to think about it. Indicate for the following items how often, if at all, you had the experiences described during the weeks immediately after the event (or in the last few weeks).

I thought about the event when I did not mean to.
Thoughts about the event came to mind and I could not stop thinking about them.
Thoughts about the event distracted me or kept me from being able to concentrate.
I could not keep images or thoughts about the event from entering my mind.
Thoughts, memories, or images of the event came to mind even when I did not want them.
Thoughts about the event caused me to relive my experience.
Reminders of the event brought back thoughts about my experience.
I found myself automatically thinking about what had happened.
Other things kept leading me to think about my experience.
I tried not to think about the event, but could not keep the thoughts from my mind.

DELIBERATE RUMINATION ITEMS

After an experience like the one you reported, people sometimes, but not always, deliberately and intentionally spend time thinking about their experience. Indicate for the following items how often, if at all, you deliberately spent time thinking about the issues indicated during the weeks immediately after the event (or in the last few weeks).

I thought about whether I could find meaning from my experience.
I thought about whether changes in my life have come from dealing with my experience.
I forced myself to think about my feelings about my experience.
I thought about whether I have learned anything as a result of my experience.
I thought about whether the experience has changed my beliefs about the world.
I thought about what the experience might mean for my future.
I thought about whether my relationships with others have changed following my experience.
I forced myself to deal with my feelings about the event.
I deliberately thought about how the event had affected me.
I thought about the event and tried to understand what happened.

Emotion Regulation Questionnaire (ERQ)

The Emotion Regulation Questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression.

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. Journal of Personality and Social Psychology, 85, 348-362.

Instructions and Items:

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree

1. ____ When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
2. ____ I keep my emotions to myself.
3. ____ When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
4. ____ When I am feeling positive emotions, I am careful not to express them.
5. ____ When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
6. ____ I control my emotions by not expressing them.
7. ____ When I want to feel more positive emotion, I change the way I'm thinking about the situation.
8. ____ I control my emotions by changing the way I think about the situation I'm in.
9. ____ When I am feeling negative emotions, I make sure not to express them.
10. ____ When I want to feel less negative emotion, I change the way I'm thinking about the situation.

Note: Do not change item order, as items 1 and 3 at the beginning of the questionnaire define the terms "positive emotion" and "negative emotion".

Scoring (no reversals)

Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9.