Posttraumatic stress symptoms in college students: An examination of the association with emotion regulation, posttraumatic growth, and nonsuicidal self-injury

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DEDICATION

I dedicate this to my grandfather, Magan Hari, who spent his life working tirelessly to provide a solid foundation for my family. I would not have had the opportunity to obtain a college degree from a university in the United States without his hard work and dedication. Thank you, Dada.
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The present study aimed to investigate the relationship between posttraumatic stress symptoms, nonsuicidal self-injury, emotion regulation, and posttraumatic growth in college students. One-hundred and fifty-three participants, aged 18-57, completed self-report measures about their experiences with posttraumatic stress symptoms (PTSS), nonsuicidal self-injury (NSSI), emotion regulation (ER), posttraumatic growth (PTG), and potentially traumatic events (PTEs). In line with hypotheses, results indicated a significant positive correlation between PTSS and both NSSI and PTG. Contrary to predictions, no significant relation was seen between ER and PTG and ER did not moderate the relationship between PTSS and PTG. A post hoc correlational analysis assessing potential trauma categories with relation to NSSI demonstrated that experiencing sexual assault, other unwanted sexual advance, and non-specific “other” events had a significant positive relation with NSSI. Overall, this study contributes to the literature replicating a relation between PTSS, NSSI and PTG. However, with findings from this sample not showing a relationship between ER and PTG or supporting the moderation effect of ER with PTSS and PTG more research is needed to further understanding in this area.
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Introduction

PTSD: Symptomology and a General Outline

Posttraumatic Stress Disorder (PTSD) is an anxiety related disorder that can develop after an individual experiences a traumatic event (American Psychiatric Association, 2017). According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) a traumatic event is defined as a situation in which one has experienced “exposure to actual or threatened death, serious injury, or sexual violence.” (DSM-5; APA, 2017, p 271). This trauma can be experienced directly by the individual or witnessed by the individual either once or repetitively (such as in the case of first responders). A traumatic event can also be experienced in a situation where the individual learns that a traumatic event occurred to close friend or family member. Potentially traumatic events (PTEs) include: combat, natural disasters, serious accidents, sexual assault, or other forms of personal assault (American Psychiatric Association, 2017). PTSD is a psychological condition that is chronic if left untreated. Historically speaking, PTSD has been associated with combat veterans, but it is important to note that anyone is susceptible. It can occur across any ethnicity, nationality, and age.

The most recent version of the DSM states that there are four diagnostic clusters in which the behavioral symptoms of PTSD are characterized. These are: re-experiencing, avoidance, negative cognitions and mood, and arousal (DSM-5; APA, 2017; Wisco, et al., 2016). Re-experiencing relates to unprompted memories of the traumatic event, related recurring dreams, and flashbacks of the traumatic event. Avoidance refers to the evasion of stimuli related to the trauma such as thoughts or external factors like places, people, and activities. Negative cognitions and mood include
dissociative amnesia, persistent (and often distorted) negativity and blame towards the self or others, alienation, diminished interests, and constricted affect. Lastly, arousal is characterized by irritable or self-destructive behavior, hypervigilance, sleep disturbances, concentration issues, and exaggerated responses (DSM-5; APA, 2017).

Common reactions to trauma can include: anxiety, specific fears, sadness, depression, guilt, anger, and irritability. Other responses include distressing patterns of thinking, psychological numbness, and high stress. Physiological responses to trauma often present as fatigue, muscle tension, gastric symptoms, and general discomfort (Tedeschi and Calhoun, 2004). A variety of PTEs such as natural disasters, combat, and sexual or physical assault can lead to PTSD. The psychological and physiological repercussions associated with PTEs can be debilitating and impact daily living if left untreated. PTSD can occur across all domains, it is not limited to a specific group of people.

While PTSD can affect anyone who experiences a traumatic event, the risk for trauma exposure is not equal for all populations (Breslau, et al., 1998; Kessler, et al., 1995; Read, et al., 2011). For example, in the general population, although men are at risk for higher exposure to potentially traumatic events, women report trauma (exposure to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence) more often (Perkonigg et al., 2000; Read, et al., 2011). In the National Comorbidity Survey Replication (NCS-R), PTSD was evaluated among 5,692 participants. The NCS-R was conducted between February 2001 and April 2003. PTSD was assessed using the DSM-IV criteria, and the lifetime prevalence of PTSD for all adults in the United States was estimated to be 6.8%. When broken down by gender, the
NCS-R found that prevalence of PTSD was higher among women (9.7%) than men (3.6%; Gradus, 2013; Kessler, et al., 2005).

Risks for trauma exposure have also been found to be related to sociodemographic factors such as ethnicity (Kessler et al., 1995; Read et al., 2011) and socioeconomic status (Perkonigg et al., 2000; Read et al., 2011). A study conducted by Read et al. (2011) examined the rates of trauma exposure and PTSD as defined by the DSM-IV among 3,014 incoming college students. The investigators used items from the Traumatic Life Events Questionnaire to create a measure of lifetime trauma exposure. They used 7 items to examine exposure to accidents/natural disasters/fire, combat, sudden unexpected death of a loved one, life-threatening illness to the self or loved one, physical assault to self or witnessed, sexual assault, or any other life threatening, distressing, or injurious event. In this sample the most prevalent traumatic events were life threatening illness (35%), the sudden death of a close family member/friend (34%), accident, fire, or natural disaster (26%), physical violence (24%), sexual assault (7%), and combat (1%). If trauma exposure was endorsed, the PTSD Checklist—Civilian Version (PCL-C) was also completed. Based on scores form the PCL-C, participants were classified as PTSD-positive or PTSD-negative. Of the 66% of participants reporting they had experienced a PTE, 9% of the participants met criteria for PTSD. This finding is consistent with previous studies examining trauma exposure and PTSD in college students (Vrana & Lauterbach, 1994). In both community and college populations, life threatening illness was the most common PTE experienced, however sexual assault was the PTE most commonly associated with PTSD. Furthermore, similar to the community population, women in the college population report more PTEs. Additionally, low
socioeconomic status and ethnic minority status are associated with higher risk for experiencing PTEs in both community and college populations. These findings indicate that the experience of PTSD and the occurrence of PTEs is similar across the adult population of the United States (Read, et al., 2011).

**Self-Harm Tendencies: Nonsuicidal Self-Injury/Deliberate Self Harm**

The terms nonsuicidal self-injury (NSSI) and deliberate self-harm (DSH) refer to actions that are intended to inflict injury resulting in immediate tissue damage without suicidal intent (Taliaferro & Muehlenkamp, 2015; Hamza, Stewart, & Willoughby, 2012; Zullig, 2016). Most NSSI actions are performed in the absence of suicidal ideation (Klonsky, Victor, & Saffer, 2014). Examples of such actions include self-mutilation, head banging, burning, self-hitting, scratching to the point of bleeding, punching oneself and inhibiting the healing of wounds (Klonsky, 2011; Hamza, Stewart, & Willoughby, 2012; Zullig, 2016). Estimates of prevalence suggest that 13 to 21% of adolescents (Baeotens et al., 2011; Heath, et. al, 2008; Brausch & Gutierrez, 2010; Klonsky, Victor, & Saffer, 2014) and 4-6% of adults engage in NSSI (Briere & Gil, 1998; Klonsky, 2011).

For students who are psychologically vulnerable and lack support, college can increase the risk for NSSI (Taliaferro and Muehlenkamp, 2015). About 17% of college aged students have engaged in NSSI at some point, and the onset of NSSI occurs principally during freshman year of college (Taliaferro and Muehlenkamp, 2015; Whitlock, et al., 2011). Although there is a correlation between self-harm and suicide attempts, it is important to note that individuals can engage in self-harm without the intention of dying (Toprak, et al., 2011; Nock, et al., 2006). The majority of self-injury occurrences are carried out with the intention of releasing stress or tension, not ending
one's life. Nonetheless, suicide ideation has been found to be present in 28-41% of these cases (Yates, 2004). The repetition of self-mutilation can desensitize college students to the pain and fear that is accompanied with self-harm, thus increasing risk for suicide (Toprak, et al., 2011). The occurrence of self-harm in the psychiatric population is higher than that of the general population. Furthermore, males are more likely to engage in self-injurious behavior than females (Toprak, et al., 2011). In a study conducted by Toprak, et al. in 2011, certain factors significantly correlated to self-harm. These factors include: habitual smoking, low socioeconomic status, poor familial relationships, and alcohol, inhalant, and tranquilizer abuse (Toprak, et al., 2011). Taliaferro and Muehlenkamp (2010) collected data from 16,044 undergraduate students. They analyzed the data to identify risk factors that differentiated individuals into three groups: those who reported no history of self-harm, those who reported NSSI only, and those who reported NSSI and a suicide attempt. Their findings show that bisexual/questioning sexual orientation, history of neglect/abuse, psychological and emotional distress, and eating disorders can also contribute to the engagement in self-injurious behaviors. In this study, a significant difference between sexes was not found. However, freshmen and nonwhite individuals were more likely to report NSSI than their counterparts (Taliaferro & Muehlenkamp, 2015).

A study conducted by Heath and colleagues (2008) examined the prevalence of NSSI in a sample of 728 college students. They studied the frequency, gender differences, method of NSSI, and the age of onset of the behavior in this sample. Additionally, they examined risk factors for NSSI by comparing students who engage in NSSI to a control group on variables of emotion regulation, attachment, and childhood
trauma. The prevalence rate for NSSI in this sample was 11.68%. The majority of students who engaged in NSSI behaviors reported that they did so two to four times (40.3%). Similar to the findings of Taliaferro & Muehlenkamp (2015), a significant difference in sexes was not found. The most popular form of NSSI in this sample was cutting (65.2%) and the least popular was banging head (8.7%). The majority of participants reported the age of onset of NSSI behaviors to be between 14 and 16 years old (43.5%). When considering risk factors, a significant difference in emotion regulation difficulties was shown between the NSSI and Control groups. There were no significant differences in regards to attachment or childhood trauma (Heath, et al., 2008).

Batejan and colleagues (2015) drew data from a larger study of health risk behaviors in college students. In this study, participants were randomized to the experimental or control condition. The experimental condition consisted of questionnaires including NSSI measures. They found that in a sample of 367 college students, 56% indicated at least one lifetime NSSI behavior. In this sample, wound picking was the most commonly endorsed method of NSSI (37.3%), and embedding was the least endorsed (3.6%). Additionally, when comparing non-self-injuring participants’ views on the functions of NSSI to the views of participants who did self-injure, the investigators found that non-self-injuring participants rated the autonomy, interpersonal boundaries, and sensation seeking functions as more relevant to NSSI than their counterparts. Both groups of participants did not differ in their relevance ratings for the other ten functions of NSSI (affect regulation, antidissociation, antisuicide, marking distress, self-punishment, interpersonal influence, peer bonding, revenge, self-care, and toughness; Batejan, et al., 2015).
Some research suggests that trauma history might be related to NSSI (Thomas, Lund, & Bradley, 2014). Previous research has found a connection between childhood sexual abuse (CSA) and NSSI (Weierich & Nock, 2008; Briere & Gil, 1998; Moller, Tait, & Byrne, 2012). Research on relationships between other types of trauma and NSSI is not as prolific, but a relationship between PTSS and NSSI has been found in an adult sample (Nada-Raja & Skegg, 2011). Even less is known about how composite trauma history relates to NSSI. Nonetheless, when examining 296 participants Thomas and colleagues (2014) found that 33.8% of them reported NSSI history and that composite trauma frequency was predictive of having a NSSI history. However, no specific trauma categories were predictive of NSSI, which suggests that total trauma exposure instead of particular trauma exposure predicts whether an individual has a history of NSSI (Thomas, Lund, & Bradley, 2014). It is important to note that NSSI/DSH behaviors can often serve as emotion regulation strategies for individuals (Anestis, et al., 2013; Gratz, 2001; Zullig, 2016). NSSI can produce an alleviation of distressing feelings. Additionally, individuals who tend to ruminate or use self-blame as an emotion regulation strategy are more likely to engage in NSSI behaviors (Kelada, Hasking, & Melvin, 2016).

**Emotion Regulation**

Emotion regulation refers to 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 process can be both automatic or controlled and conscious or unconscious. Emotion regulation implicates fluctuations in “emotion dynamics.” This term, coined by Ross Thompson in 1990, refers to the “latency, rise time, magnitude, duration, and offset of responses in behavioral, experiential, or
physiological domains” (Gross, 1998, p 275). That is to say that emotion regulation requires moderating the experience of certain emotions rather than eliminating them. Emotion regulation can be described as including cognitive components of awareness, understanding, and acceptance of emotions, the ability to control behaviors and behave as one desires when experiencing negative emotions, and the ability to use appropriate emotion regulation strategies to create a desired emotional response in order to meet goals or demands (Gratz & Roemer, 2004).

The process of emotion regulation is crucial to mental health. An inability to regulate one’s emotions (emotion dysregulation) plays a role in numerous disorders as described by the DSM (Gross, 1998). In the adult population, emotion dysregulation is commonly seen alongside anxiety and mood disorders (Gross, 1998).

Studies also suggest a relationship between difficulties in emotion regulation and PTSD. Ehring and Quack (2010) examined whether emotion regulation difficulties were significantly related to levels of PTSD symptoms and if this relation was impacted by type of trauma experienced. The data were collected from 616 participants who completed the Trauma History Questionnaire (THQ), the Impact of Event Scale-Revised (IES-R), and the Difficulties in Emotion Regulation Scale (DERS). A significant relationship between emotion regulation difficulties and PTSD symptom severity was supported. This finding supports the idea that emotion regulation difficulties are a risk factor for the development of PTSD. The investigators also found that survivors of early-onset, chronic, interpersonal trauma reported higher emotion regulation difficulties than survivors of other forms of trauma. This finding is interesting when considering that the
highest rates of PTSD are associated with people who have experienced interpersonal violence, and it supports additional study of emotion regulation in the context of PTSD.

As mentioned previously, NSSI can serve as a method for emotion regulation. Indeed, emotion regulation is consistently credited to be the primary function of NSSI. Linehan (1993) was one of the first researchers to define the relationship between difficulties in emotion regulation and NSSI. She proposed that childhood abuse and maltreatment experiences could result in difficulties in emotion regulation and chronic hyperarousal, which interact to maintain emotion regulation difficulties (Armey, Nugent, & Crowther, 2012). Similarly, self-mutilating behavior (SMB, a form of NSSI) may reduce a host of affects including anxiety and depression. A study conducted by Kemperman, et al., 1997 examined this idea. They found that SMB did in fact increase positive affect in a population of female self-mutilators with borderline personality disorder (Briere and Gil, 1998). Women in this study reported higher positive affect after engaging in self-harming behaviors. This finding further supports the claim that NSSI can serve as a method for emotion regulation.

Often times, people who self-injure experience a negative event which can lead to a buildup of unwanted affect. As a result, they seek to release the tension through self-injury. Engaging in NSSI permits the individual to focus his/her attention on the action in place of the undesired affect. This distraction and relief reinforces the NSSI behavior. This relationship can cause NSSI to become a classically conditioned response to unpleasant emotions (Armey, Nugent, & Crowther, 2012). Klonsky (2009) examined the functions of NSSI in 39 young adults who had histories of self-injurious behaviors. Consequences, affect, and reasons for engaging in NSSI behaviors were assessed through
administration of a structured interview. Findings suggested that for individuals who engaged in NSSI, following the self-harm, improvements in emotions and a decrease in emotional arousal were noted. The most common feelings/emotions participants reported experiencing prior to engaging in NSSI behavior included feeling overwhelmed, sad, or frustrated. The act of self-injury reportedly brought affective relief for these participants. In this study, the primary reason participants chose to self-injure was for affect regulation with self-punishment reasons provided as secondary (Klonsky, 2009).

**Posttraumatic Growth**

The reactions individuals experience after a traumatic event differ. For some, chronic problems develop that prolong the pain (i.e. PTSD). For others, the traumatic event serves as a catalyst for better psychological functioning. This can be referred to as “posttraumatic growth” (PTG; Sheline and Rosén, 2017). PTG is defined as the occurrence of positive change that happens after an individual experiences a “highly challenging life crisis” (Tedeschi & Calhoun, 2004, p. 1). This positive change allows for the individual to develop in a way that transcends what was present before the traumatic event occurred. The changes that the individual experiences as a result of the traumatic event are seen are important. PTG “involves a movement beyond pretrauma levels of adaptation” (Tedeschi & Calhoun, 2004, p. 4; Wild & Paivio, 2003). PTG is different from trauma recovery in that PTG not only includes a successful reduction of psychological symptoms, but it also includes growth beyond the prior level of functioning. Individuals who experience this growth experience an enhanced meaning of life (Wild & Paivio, 2003).
The evaluation of PTG involves “self-reported positive psychological changes” that are stimulated by the experience of a traumatic event. Changes that can occur include: “improved interpersonal relationships, a greater sense of new possibilities, increased personal strength, heightened spirituality, and an enhanced appreciation for life” (Sheline & Rosén, 2017, p. 403.) Moreover, the occurrence of posttraumatic growth following exposure to a traumatic event is more likely than a psychiatric disorder (Tedeschi & Calhoun, 2004). From research, traumatic life events that have led to posttraumatic growth include the loss of loved one by death, cancer, vehicular accidents, sexual assault, and sexual abuse (Tedeschi & Calhoun, 2004). The growth that occurs is not a direct result of the trauma itself. Instead, it is a byproduct of how the individual responds to the aftermath of the trauma (Tedeschi & Calhoun, 2004).

PTG is catalyzed by an extremely distressing event that challenges a person’s sense of themselves, others, and the world. However, before the growth can occur, the individual has to experience some degree of psychological relief from the symptoms of trauma, and s/he has to experience some success in dealing with the trauma such as attempting to resolve distress. The individual also has to be able to handle the negative emotions associated with the traumatic event in order to experience PTG (Tedeschi & Calhoun, 2004; Wild & Paivio, 2003). However, it is important to note that the presence of posttraumatic growth does not cancel out pain or distress from the traumatic event. Certain individual characteristics allow an individual to be more susceptible to experiencing posttraumatic growth. Some of these characteristics are: extraversion, openness to experience, the ability to manage distressing emotions, and support from others (Tedeschi & Calhoun, 2004).
Studies show a positive correlation between PTSD and PTG (Tedeschi & Calhoun, 2004; Bensimon, 2012). A study conducted by Bensimon (2012) examined the relationship between trauma, trait resilience, and PTG, and PTSD. Participants for this study were 500 students from two Israeli colleges. A positive association between trauma with PTSD and PTG was found in this study. In relation to trauma, a ‘dose-response’ effect or an exposure-response effect is seen suggesting that more intense traumatic experiences have the possibility to produce greater growth benefits. Additionally, the results of this study demonstrate a negative association between PTSD and higher resilience as a trait. Individuals endorsing high resilience were less likely to develop PTSD (Bensimon, 2012).

It is important to note that growth is not a direct result of a traumatic experience. In order to experience PTG, one has to process the traumatic event (Tedeschi & Calhoun, 2004). It is natural for individuals to develop assumptions about how the world functions and to rely on these general rules to guide actions and understand occurrences (Tedeschi & Calhoun, 2004). These assumptions provide people with a general sense of meaning and insight to the world. This worldview then is used to create paradigms in which people operate. However, when an individual experiences a traumatic event, it can challenge his/her worldview. If the interpretation of the traumatic event significantly contradicts the individual’s worldview, he/she may experience psychological distress. Such distress can in some cases then lead to cognitive processing and rebuilding. It is this rebuilding that can allow for the individual to understand his/her changed reality to produce new meaning (Tedeschi & Calhoun, 2004). The results of this process can be experienced as growth. PTG is a result of attempts at “psychological survival,” but is crucial to
remember that it often coexists with lingering distress from the traumatic event (Shigemoto & Poyrazli, 2011; Tedeschi & Calhoun, 2004). Hagenaars and van Minnen (2010) hypothesized that there would be a negative relationship between PTG and PTSD severity and that PTG would increase after exposure therapy. This increase in growth was predicted to coincide with the decrease in PTSD symptom severity. Outpatients (65) with diagnosis of PTSD were assessed for PTSD symptoms and PTG both before and after exposure therapy. Initial scores on measures demonstrated a negative relationship between PTSD and PTG, and indicated that avoidance specifically (especially emotional numbing) was also negatively related to PTG. This suggests that the avoidance of emotions is related to the inability to experience growth after a traumatic event.

Following exposure therapy, patients endorsed increases in relating to others and new possibilities and personal strength. Furthermore, increases in PTG were directly associated with decreases in PTSD (Hagenaars & van Minnen, 2010).

A study conducted with 100 students (50 males and 50 females) from colleges associated with Kashmir University sought to further examine the PTGI scale with students regardless of trauma exposure (Anjum & Maqbool, 2015). Specifically, researchers examined the differences between the average scores of males and females on the PTGI in general, and also on the five factors of the PTGI. Participants completed the PTGI with results demonstrating a significant gender difference on the overall score. Moreover, significant gender differences were found on four of the five PTGI subscales including: spiritual change, new possibilities, personal strength, and appreciation for life. In this study, the results suggest that in general, males experience more PTG than females (Anjum & Maqbool, 2015). It is important to note that this study did not assess trauma
exposure in relation to gender differences for PTG. Moreover, these findings have not been replicated in a sample where gender differences have been noted when PTG was assessed in conjunction with PTSD. Future research is warranted to further understand the gender difference Anjum & Maqbool (2015) found.

Shigemoto and Poyrazli (2011) examined PTSD symptoms, optimism, and the number of traumas an individual experienced in relation to PTG in a sample of US (N=182) and Japanese (N=163) college students. They hypothesized that a significant correlation would be found between PTSS, optimism, number of traumatic events, and PTG. Additionally, it was hypothesized that PTSS severity (specifically the level of intrusion, avoidance, and hyperarousal) would also be related to level of PTG. Finally, it was thought that US students would report higher levels of PTG than their Japanese counterparts due to social pressures to respond positively and spiritual influences in the Japanese culture. This was based on reported cultural differences in cognitive processing (Shigemoto & Poyrazli, 2011). In both samples, the investigators found that PTG was significantly correlated with the number of traumas and optimism. Furthermore, a positive correlation was found between PTG and PTSD symptoms. In these samples, intrusion and optimism contributed to PTG, but avoidance and hyperarousal were independent of PTG. US students reported higher levels of PTG than Japanese students.

Examining PTG in college populations is a fairly new direction of literature, and few studies currently exist. Existing research suggests that in general, males are most likely to experience PTG. Moreover, a significant correlation between number of traumas experienced and optimism and a positive correlation between PTG and some PTSD symptoms has been found. Ethnic differences between US students and Japanese students
in terms of levels of PTG have also been noted. However, it is important to note that these results have yet to be replicated, which further suggests more research examining PTG in college students is warranted.

Evidence based research demonstrates that the process of recovering from traumatic experiences involves emotional processing, such as initiating emotional or traumatic memories and processing them without avoidance (e.g., Foa, Huppert, & Cahill, 2006). Similarly, Joseph, Murphy, and Regel (2012) hypothesized that affective-cognitive processing, which is necessary to produce posttraumatic growth (PTG), involves thinking about the trauma and confronting the emotions related to it. Emotion regulation is an important part in theories of how PTG is formed, but much of the research in this area thus far has focused on cognitive and personality predictors without consideration of emotion regulation.

According to Larsen and Berenbaum (2015), only two studies have assessed the relationship between emotion regulation strategies and PTG. The first study, by Wild and Paivio (2003), examined the psychological functioning, coping, and emotion regulation that is associated with trauma recovery and features of trauma such as frequency, recency, and severity of traumatic events. College aged students (193) completed the Trauma Questionnaire (TQ), the Posttraumatic Growth Inventory (PTGI), the Symptom Check List-90-Revised (SCL-90-R), the General Wellbeing Schedule (GWB), the COPE Inventory (COPE), the Emotional Control Questionnaire-2 (ECQ-2), and the Marlowe-Crowne Social Desirability Scale. It was hypothesized that psychological adjustment, active coping, and emotion regulation would be positively associated with PTG. They also hypothesized that growth would be unrelated to psychological distress, emotional
coping, and social desirability. Moreover, the researchers hoped to see which dimensions of recovery were the best predictors of PTG and whether the features of traumatic experiences and receiving therapy after the traumatic experience were related to PTG. The results of this study showed that active coping and subjective well-being independently contributed to PTG, while emotional coping styles and psychological distress did not. Furthermore, growth was not dependent on social desirability. Higher trauma distress predicted PTG, but effective emotion regulation did not contribute to PTG in this study (Wild & Paivio, 2003).

The second study, conducted by Manne et al. (2004), longitudinally examined predictors of PTG in breast cancer patients using the PTGI and the Emotional Approach Coping Scale (EAC). Emotional approach coaching can be defined by attempts to approach emotions in response to situations that are perceived as emotionally taxing. Additionally, the EAC has subscales that measure emotional processing and emotional expression. The researchers assert this scale assesses emotion regulation strategies, and they used the EAC as a metric of ER in the study. Findings suggested that patients who scored high in emotional expression were at a higher likelihood for increased PTG over time.

Larsen and Berenbaum (2015) also assessed emotional processing with PTG hypothesizing that emotional expression would be associated with higher levels of PTG. Results from a sample of 107 adult women who had experienced a traumatic event in the past 3 years, demonstrated that emotion regulation strategies (specifically emotional processing) had a significant indirect effect on PTG.
A study conducted by Zhao, Wu, & Zhen (2017) aimed to increase the understanding of how social support and emotion regulation were associated with PTSD and PTG in 315 middle school students after the Ya'an Earthquake. It was hypothesized that emotion regulation (i.e., cognitive reappraisal and expressive suppression) would mediate the relationship between social support and both PTSD and PTG. The results of the study demonstrated that social support, through expressive suppression, had a significant indirect relationship to PTSD. Additionally, results showed that social support, through expressive suppression, had a nonsignificant indirect prediction on PTG (Zhao, Wu, & Zhen, 2017).

Yu, et al. (2014) examined the effects of emotion regulation and general self-efficacy on PTG in 230 Chinese cancer survivors. In particular, the relationship of PTG with positive and negative affect, ER, and general self-efficacy among cancer survivors was examined. Findings indicated that perceived level of PTG was related to greater positive affect, effective ER, and a higher level of general self-efficacy. Positive emotion partially mediated the relationship of expressive revealing and general self-efficacy on perceived PTG. Moreover, positive affect fully mediated the relationship between expressive suppression and posttraumatic growth (Yu, et al., 2014).

Finally, Hussain and Bhushan (2011) investigated the mediating role of cognitive-emotional regulation strategies between traumatic experiences and both posttraumatic stress (PTS) and PTG in 226 Tibetan refugees residing in northern India. Results indicated that when the nine different cognitive-emotional regulation strategies were tested for their mediating effect between traumatic experiences and PTS, only two (acceptance and putting into perspective) were shown to be partial mediators. Similarly,
four of these strategies (positive refocusing, refocus on planning, putting into perspective, and catastrophizing) emerged as partial mediators between traumatic experiences and PTG. There is a growing interest in the association between PTG and ER; however, only a small body of research examining this relationship exists. Moreover, there is currently only one published study assessing the relationship between PTG and ER in college students. The existing literature suggests that there is more to be learned about the relationship between ER and PTG.

**Present Study**

The current study examined the relationship between PTSS, NSSI, ER, and PTG in a college population. Specifically, hypotheses for the present study were as follows: 1) PTSS will be significantly related with both NSSI and PTG; 2) There will be a significant positive correlation between ER and PTG; 3) ER will moderate the relationship between PTSS and PTG.

**Methods**

**Participants**

Undergraduates at the University of Mississippi were recruited and participated in exchange for course credit. Participants were 153 students age 18-57 (M= 19.84; SD=3.62). Ethnic breakdown was as follows: 116 students identifying as White (75.8%), 19 students identifying as Black (12.4%), and 18 students (11.8%) identifying as Asian, Native America, Pacific Islander, Native Hawaiian, or Multiracial.

**Measures**

*Posttraumatic Stress Disorder Checklist-Civilian* (PCL-C; Weathers, et al., 1993). The PCL-C is a 17-item self-report scale that measures the DSM-IV symptoms
related to PTSD. Participants are asked to indicate to what extent they have experienced PTSS after a stressful experience. Examples of PTSS include experiencing unwanted thoughts or images, recurrent and disturbing dreams, physical reactions such as trouble breathing, avoidance of activities and situations that bring back reminders of the traumatic event, feeling irritable, and feeling emotionally numb. Questions are asked on a Likert scale ranging from 1 (not at all) to 5 (extremely). Reliability and validity for the PCL have been reported in numerous studies in community, combat veteran, and college undergraduate settings (Blanchard, et al., 1996; Conybeare, et al., 2012; Ruggiero, et al., 2003; Weathers, et al., 1993)

*Life Events Checklist* (LEC; Weathers, et al., 2013). The LEC is a self-report measure designed to identity PTE in the respondent’s lifetime. This measure includes 16 PTEs, such as natural disaster, sexual assault, physical assault, and transportation accidents. It also includes one “other” item assessing any other stressful event not encompassed in the first 16 PTEs. Participants selected to what extent they experienced each event (Happened to me, Witnessed it, Learned about it, Not sure, Doesn’t Apply). The LEC has demonstrated satisfactory temporal stability in both a combat veteran and college undergraduate sample (Gray, et al., 2004).

*Acquired Capability for Suicide-Fearlessness about Death Scale* (ACSS-FAD; Ribeiro, et al., 2013). The ACSS-FAD is a self-report measure that indexes a sense of fearlessness about death and potential capability for suicide. The interpersonal theory of suicide suggests that for individual to engage in suicidal behavior and self-harm, such desires also need to be combined with the actual capability to do so. The ACSS-FAD includes 7 questions related to death and dying that are asked on a Likert Scale ranging
from 0 (not at all like me) to 4 (very much like me). Total scores on the scale may range from 0 to 28, and higher scores indicate greater levels of fearlessness about death. The ACSS-FAD has shown adequate internal consistency, and across samples, respondents endorsed an average score of 2 (Ribeiro, et al., 2014). As the capability for self-harm is characterized by elevated pain tolerance as well as fearlessness about death, the ACSS-FAD was used as an analogue for NSSI in this sample.

**Difficulties in Emotion Regulation Scale** (DERS; Gratz & Roemer, 2004). The DERS is 36 item self-report measure scale that measures multiple aspects of emotion dysregulation. Questions are asked on a Likert Scale ranging from 1 (Almost never 0-10%) to 5 (Almost always 91-100%). The DERS represents the most comprehensive measure of emotion regulation to date (Weinberg & Klonsky, 2009). The scale exhibits good reliability and validity in adults and adolescents (Gratz & Roemer, 2004; Weinberg & Klonsky, 2009).

**Posttraumatic Growth Inventory** (PTGI; Tedeschi & Calhoun, 1996). The PTGI is a 21 item self-report measure that assesses positive outcomes reported by individuals who have experienced traumatic events. Participants rate their agreement with each of the 21 items—such as “I changed my priorities about what is important in life” and “I have a greater sense of closeness with others.” Items are rated on a Likert Scale ranging from 0 (I did not experience this change as a result of my crisis) to 5 (I experienced this change to a very great degree as a result of my crisis). The PTGI has demonstrated good internal consistency and acceptable test-retest reliability (Hooper, Marotta, & Depuy, 2009; Tedeschi & Calhoun, 1996).
Procedure

Students from the University of Mississippi were recruited from an online subject recruitment program (i.e. SONA systems) for an in-person study. Upon arrival to the study room, participants were given a brief introduction of the study. Participants completed a packet of self-report questionnaires via pencil and paper. All procedures were approved by the University of Mississippi’s Institutional Review Board.

Results

Preliminary Analysis

Correlational analysis was used to test the associations between PTSS, NSSI, PTG, and ER. As hypothesized, a significant positive correlation existed between PTSS and NSSI and PTSS and PTG. However, contrary to the hypothesis, a significant positive correlation was not found between ER and PTG. Preliminary analyses are provided in Table 1.

Primary Analyses

For the primary analysis, a moderation analysis was conducted to test the hypothesis that emotion regulation moderates the relationship between PTSS and PTG. Using Hayes (2013) PROCESS model (bootstrapping 5000 iterations) a moderation analyses was run. A significant interaction effect was not found with ER and PTSS, which did not support moderation.

Post hoc analysis

To further understand the relation between variables, post hoc correlational analysis was completed to test if specific PTEs (as assessed by the LEC) were related to NSSI. The results found significant positive correlations between sexual assault (r = .21,
p > .01; rape, attempted rape, made to perform any type of sexual act through force or threat of harm), other unwanted or uncomfortable sexual experience (r = .33, p > .001), and a non-descript “other” very stressful event or experience and NSSI (r = .21, p > .01). No other significant relation was found with other trauma types. These findings contradict those of Thomas, Lund, & Bradley (2014), who found that no specific trauma categories were related to NSSI.

**Discussion**

The present study aimed to further understand the relationships among PTSS, NSSI, ER, and PTG in a college sample. It was hypothesized that a significant positive correlation would be found between PTSS and NSSI and PTSS and PTG. As expected, a significant positive relationship exists between PTSS and NSSI. Similarly, there was a significant positive correlation between PTSS and PTG. These results corroborate previous findings and underscore the strong influence PTSS can have on both negative and positive constructs. Many life changes happen during college. These changes can lead to a separation from previous social support due to a variety of reasons. For students who are psychologically vulnerable and lack support, college can increase the risk for NSSI (Taliaferro and Muehlenkamp, 2015). Furthermore, the probability of experiencing a PTE is relatively high in the college population, and the rate of developing PTSD is higher than that of the general population. Since trauma has to exist to experience PTG, it is obvious why a significant positive correlation existed between PTSS and PTG in this sample.

Although variable in the literature, this study hypothesized that a significant positive correlation would exist between ER and PTG. Contrary to hypothesis, the
findings from this sample did not find such association. It was thought that effective emotion regulation (as assessed by the DERS) would be associated with higher scores on the PTGI. Studies that previously found a significant positive correlation between ER and PTG look primarily at adult women who had either survived a traumatic experience or were survivors of breast cancer (Larsen & Berenbaum, 2015; Manne et al., 2004).

Perhaps the results of the two studies that demonstrated a positive relationship were not replicated because of the difference in traumatic events. More specifically, the study by Manne and colleagues (2004) examined a population of breast cancer survivors, while the percentage of the current study that experienced a life-threatening illness was 7.2%. The study conducted by Larsen & Berenbaum (2015) found the significant positive correlation between ER and PTG in a population of women who mostly endorsed experiencing traumatic events that differ from the ones that were most common in this population. The top three PTEs this sample endorsed were: 1) transportation accident; 2) natural disaster; and 3) a nonspecific “other.” On the contrary, the top three PTEs in the study conducted by Larsen & Berenbaum (2015) were: 1) miscellaneous or multiple events (i.e. moving into a homeless shelter, unexpected loss of contact with a child); 2) sudden and unexpected death of a close relative; and 3) divorce or serious relationship breakup.

Another reason there was not a significant positive correlation between ER and PTG in this population could be because the mean score on the DERS was 81, which indicates that the majority of participants experience difficulties in ER. Since effective ER was hypothesized to be related to PTG, and the majority of this sample experienced difficulties in ER, it is not surprising there was no relation. The variability of the results
of this study in comparison to others further support the claim that additional research is necessary to better understand the relationship between ER and PTG.

Additionally, it was hypothesized that ER would moderate the relationship between PTSS and PTG. Existing literature highlights the importance of ER (as opposed to emotion dysregulation) in reducing PTSS. Recovering from traumatic experiences involves emotional processing and PTG emerges out of satisfactory affective coping processing. Given this, it was hypothesized that individuals who were better able to regulate their emotions after endorsing PTSS would experience higher PTG. However, contrary to hypothesis, a significant interaction effect was not found with ER and PTSS. It was thought that this could be because although the sample included participants who had experienced PTEs and endorsed PTSS, the mean of the sample was below the clinical cutoff, meaning that the number of participants with likely PTSD was low. When data were reviewed, the mean score on the PCL in this sample was 33, which is lower than the recommended cutoff of 50 (Blanchard et al., 1996).

In an effort to better understand the relationship between NSSI and PTEs, a post hoc correlational analysis was conducted. Specifically, the purpose was to see whether certain PTEs were more predictive of NSSI. Results demonstrated that experiencing sexual assault, other unwanted sexual advance, and non-specific “other” events had a significant positive relation with NSSI. Existing literature examining PTEs with NSSI is sparse; however, the findings of this study contradict the findings of a study conducted by Thomas, Lund, and Bradley (2014), which found that no specific trauma categories were predictive of NSSI. It would be of interest to further study the association between trauma types and NSSI to better understand if certain traumatic events are more
predictive of self-harming behaviors. Additionally, the analogue measure for NSSI might ultimately be more associated with suicidality as opposed to self-harm capability in general. Replication of the present finding in addition to use of a measure more specific to self-harm experience would prove beneficial.

Limitations

Although this study provides additional information about the experience of PTSS, NSSI, ER, and PTG in college students, some important limitations must be noted. First, these data come from a non-clinical sample of college students. Although some of these students may have experienced trauma and developed PTSS, this study used a sample of convenience. Future studies could look at the relationship between constructs of interest in college students with clinical diagnoses of PTSD to see if the results can be replicated.

Secondly, while this sample is predominately White, it is representative of the demographic composition of students at the university. Nonetheless, studies with a more diverse ethnic composition would be beneficial to assess any potential ethnic difference in the relationship between PTSS, NSSI, ER, and PTG.

Third, a question intended to determine the gender of the participant was inadvertently left out of the demographics scale. Consequentially, this study was unable to examine whether significant gender differences exist between constructs of interest. Future studies could look at whether the findings of this study can be replicated when also assessing gender.
Conclusions

The purpose of this study was to further understanding of constructs of posttraumatic stress symptoms and posttraumatic growth along with potentially related constructs of nonsuicidal self-injury and emotion regulation in college students. It was hypothesized that a significant positive correlation would exist between PTSS and NSSI, PTSS and PTG, and ER and PTG. It was further speculated that ER would moderate the relationship between PTSS and PTG. A significant positive correlation was found between PTSS and both NSSI and PTG. Contrary to hypothesis, a significant positive relationship did not exist between ER and PTG. Also contrary to hypothesis, a significant interaction effect was not found with ER and PTSS, which did not support moderation. This is one of the first known studies to examine all constructs of interest together in a college sample. Furthermore, results from the current study support future research examining the relationship between these constructs in a college population is warranted.
References


Table 1. Summary of Preliminary Correlational Analyses

<table>
<thead>
<tr>
<th></th>
<th>PTGI</th>
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<td>.34**</td>
<td>.09</td>
</tr>
<tr>
<td>ACSS</td>
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<tr>
<td>DERS</td>
<td>.09</td>
<td>.43**</td>
<td>.58**</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: (N=153); PTGI= Posttraumatic Growth Inventory; ACSS= Acquired Capability for Suicide Scale; PCL= PTSD Checklist; DERS= Difficulties in Emotion Regulation Scale. ** = p >.01