Post Traumatic Stress and The Emotional Experiences of Anger and Happiness

by

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ABSTRACT

Previous research indicates that difficulties in emotion regulation and greater dissociation from one’s emotions are often observed among trauma survivors. Further, trauma survivors often show greater negative emotions such as anger, and diminished positive emotions such as happiness. Relatively less is known about the relationship between posttraumatic stress symptoms, dissociation, emotion regulation difficulties, and non-trauma related emotional experiences in daily life. This study examined whether greater reports of posttraumatic stress symptoms, difficulties in emotion regulation, and dissociative tendencies were associated with greater intensity of anger and lower intensity of happiness during a relived emotions task (i.e., recalling and describing autobiographical memories evoking specific emotions). Participants were 50 individuals who had experienced a traumatic event and reported a range of posttraumatic stress symptoms. Participants rated how they felt while recalling specific emotional memories, as well as how they remembered feeling at the time of the event. Results showed that dissociative tendencies was the best predictor of greater intensity of anger and, contrary to the hypothesis, dissociative tendencies was predictive of greater happiness intensity as well. These findings are consistent with previous research indicating a paradoxical effect of heightened anger reactivity among individuals with dissociative tendencies. In addition, researchers have argued that individuals with a history of traumatization do not report lower positive emotional experiences. The present findings may suggest the use of dissociation as a mechanism to avoid certain trauma related emotions (e.g, fear and anxiety), in turn creating heightened experiences of other emotions such as anger and happiness.
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Chapter 1

INTRODUCTION

Suffering a traumatic event can lead to negative and debilitating consequences. Traumatic events involve death, serious injury, or threat of death or injury (APA, 2000). Another key defining feature of a traumatic event is that it elicits intense negative emotions, such as fear, helplessness, or horror (APA, 2000). These negative emotions may persist and manifest in various ways, even years after the trauma has occurred (Khouzam, Ghafoori, & Hierholzer, 2005). One of the most well known consequences of trauma exposure is the development of Post Traumatic Stress Disorder (PTSD; described below). Even sub-clinical levels of posttraumatic stress symptoms (PTS), however, have the potential to impair the survivor psychologically, physically, and emotionally, as well as those closest to the survivor (e.g., family members, friends), and society as a whole (Khouzam et al, 2005). Arguably, the intense negative emotions elicited along with a traumatic event account for many of these adverse health and relationship consequences. Therefore, it is important to examine individuals’ emotional responses across varying levels of traumatic stress.

Most research studies of emotion and trauma have studied individuals with PTSD. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychological Association [APA], 2000), to meet criteria for PTSD an individual must have experienced an event that elicited feelings of intense fear, helplessness, or horror (Criterion A), “re-experiencing” symptoms such as flashbacks and nightmares (Criterion B), and avoidance symptoms, including avoidance of stimuli related to the event, feelings of detachment from others, and a restricted range of affect...
(Criterion C; APA, 2000, p. 468). Lastly, criterion D represents hyperarousal symptoms, including an exaggerated startle response, poor concentration, and hypervigilence for danger (APA, 2000). Lifetime prevalence of PTSD in the United States is approximately 7.8% (US Department of Veterans Affairs 2011), and may be twice as likely to develop in women than men (Kessler, Sonegga, Bromet, Hughes, & Nelson, 1995). Therefore, trauma is an issue that affects many people and has the potential for severe consequences.

In addition to the debilitating effects of PTSD, even sub-clinical levels of posttraumatic stress symptoms may have implications for physical and emotional health. For example, survivors of childhood or adulthood sexual abuse are more likely than those who do not have a history of these experiences to report lower perceived health status, more negative health behaviors, and more somatic symptoms (Waigandt, Wallace, Phelps, & Miller, 1990). Furthermore, victims of incest or rape more frequently report somatic symptoms such as headaches, gastrointestinal problems, chronic abdominal pain, and dysuria (Felitti, 1991). Similar results are also found in studies that have assessed physical health outcomes in war veterans. Based on a national epidemiological survey study, the National Vietnam Veterans Readjustment Study, compared to civilians, veterans with higher exposure to war zones reported more health problems (Kulka, Schlenger, and Fairbank, 1990). In addition to physical health consequences, emotional effects of trauma may have far-reaching implications. These effects are discussed below, as the present study focuses on emotional responses in individuals with prior trauma exposure.
Traumatic stress, emotion regulation, and dissociation

Emotions are central to the functioning of human beings and, generally speaking, have adaptive utility in helping individuals attain goals (Tooby & Cosmides, 1990). Emotions may be problematic, however, when not properly regulated (Nykliček & Zeelenberg, 2011). Emotion regulation may be defined as the ability to respond and experience emotions in an appropriate manner, and difficulties with emotion regulation are associated with poor health and somatic complaints (Gross, 1998; Gross & Muñoz, 1995; Gross & John, 2003; Denollet, Nykliček & Vingerhoets, 2008). In recent years there has been more of a focus on emotion regulation in psychopathology, in addition to past efforts focused on cognitive and behavioral problems (Berenbaum, Raghavan, Le, Vernon, & Gomez, 2003; Kring, Sloan, & Sloan, 2009; Harned, Rizvi, & Linehan, 2010). The ability to manage emotions effectively is reflected in several psychological disorders (e.g., anxiety, depression, personality disorders), including PTSD.

Research has shown that persons who have been exposed to traumatic events oftentimes display emotion regulation difficulties that can hinder their ability to recover from the trauma (Creamer, Burgess, & Pattison, 1992; Sigmon, Greene, Rohan, & Nichols, 1996). Clinical diagnostic criteria for PTSD include disruptions in emotion, as suggested by symptoms of hyperarousal (exaggerated emotional responses) and hypoarousal (dampened emotional responses, restricted range of emotions; APA, 2000; Litz, 1992). Self-report studies of emotion in PTSD similarly have found evidence of hyperemotionality, such as greater reports of irritability, anxiety, or emotional lability, and hypoemotionality, such as reports of a more restricted range of affect, emotional numbing (i.e., avoidance of positive and negative emotions), or anhedonia (Litz, 1992).
With respect to hyperemotionality, those above the clinical cut off for PTSD report higher levels of intense negative affect and physiological arousal (APA, 2000). On the other hand, emotional numbing also is an important characteristic of PTSD (APA 2000). Although emotional numbing has been conceptualized as the opposite of hyperarousal, because it reflects dampened rather than heightened emotions, it may stem from hyperarousal processes. According to Litz and Gray (2001) and Horowitz (1986), two seemingly opposing types of internal processes, namely intrusion and denial, may arise in order to cope with the extreme stress of a traumatic event. The intrusion phase is characterized by feelings of hyperarousal and re-experiencing, which can be painful for the individual to deal with. Thus, the denial mechanism is activated in order to ward off or numb the painful emotions related to the traumatization (Litz & Gray, 2001; Horowitz, 1986). In support of these ideas, Weems, Saltzman, Reiss, and Carrion (2003) found that hyperarousal predicted emotional numbing one year after traumatization in a sample of children 7 to 14 years old. Similar results were found using a sample of combat veterans and, in a separate study, sexual assault survivors (Flack, Litz, Hsieh, Kaloupek, & Keane, 2000; Litz, 1997; Tull & Roemer, 2003). In addition, Flack, Milanak, and Kimble (2005) found that hyperarousal and avoidance were the best predictors of subsequent emotional numbing in college students reporting a range of stressful life events.

Similar to emotional avoidance, another strategy used to cope with the emotional arousal associated with trauma exposure may be dissociation. Bernstein and Putnam (1986) define dissociation as the lack of integration of experiences, thoughts, and feelings into conscious awareness. Dissociation is a phenomenon that is experienced, to some degree, by individuals without clinical disorders. However, it is thought that dissociation
is more prevalent among those with major mental illnesses. Previous research indicates that dissociation from one’s emotions is often observed among trauma survivors and is a significant predictor of the development of PTSD (Ozer, Best, Lipsey, & Weiss, 2003).

In sum, trauma exposure and traumatic stress may be associated with heightened emotional intensity, and in turn greater emotion regulation difficulties and greater emotional avoidance or dissociation. Further, these emotional processes and difficulties may occur not only among individuals with PTSD, but also among those with trauma exposure and varying (e.g., subclinical) levels of posttraumatic stress symptoms (Horowitz, 1986).

**Trauma and emotional experience of anger**

Theories of PTSD traditionally have focused on the emotions of fear and anxiety (APA, 2000; Ohman, 1993). Other negative emotions, however, may accompany traumatic stress reactions, and can have pronounced and long-lasting effects (Khouzam et al, 2005). Tedeschi and Calhoun (1995) found that after the experience of a traumatic event, negative emotions such as loss and despair were more likely to be reported. In a separate study, Resick and Schnicke (1992) found that the experience of traumatic events generated feelings of alienation, confusion, and a sense of betrayal. Additionally, other researchers have found that shame and guilt are often present in many cases after the survival of a traumatic event.

One emotion that may be particularly consequential for trauma survivors is anger. As noted earlier, anger outbursts and irritability are listed as symptoms of hyperarousal in the DSM (APA, 2000), and a growing body of literature has begun to investigate the role of anger in individuals with trauma exposure. In a review of studies of PTSD and anger,
Novaco and Chentob (1998) found anger to be a prevalent symptom of PTSD, especially in veterans with combat experiences. Moreover, in a meta-analysis Orth and Weiland (2006) found higher reports of anger and hostility in a sample of individuals with PTSD, especially due to combat trauma compared to veterans without combat experiences. Further, trauma survivors report elevated levels of anger, which can lead to self-harming behaviors and other forms of aggression (Van der Kolk, van der Hart, & Burbridge, 2002).

There are two theories that hypothesize the psychological processes that cause anger to be related PTSD. One of these is survival mode theory, developed by Chemtob and colleagues (Chemtob, Novaco, Hamada, Gross, & Smith, 1997). The authors hypothesize that individuals suffering from PTSD have a lower threshold for perceiving situations as threatening. This perception of threat is thought to then activate a biologically pre-determined survival mode. In other words, the sympathetic nervous system’s fight or flight reaction is activated, and a corresponding experience and/or display of anger. The second theory, fear avoidance theory, was developed by Foa and colleagues (1995) to explain the relation between psychological processes and anger in PTSD. This theory hypothesizes that individuals with PTSD are inclined to avoid feelings of fear that are activated by the trauma and by posttraumatic intrusions. Thus, in order to avoid fear-related emotions, anger may emerge, serving as a way to divert the focus from fear onto anger. Additionally, the focus on anger may be more desirable due to the fact that anger has a more positive emotional valence than fear, because it is activating (approach-oriented) versus passive (Berkowitz, 1999; Izard, 1991). Based on
both survival mode and fear avoidance theory, it can be expected that higher levels of trauma severity will be related to more intense emotional experiences of anger.

A small handful of studies have focused on the relationship between anger and trauma by studying autobiographical memories. Vrana, Hughes, Dennis, Calhoun, and Beckham (2009) compared anger intensity and physiological responses to an autobiographical memory task (or “relived emotions” task) in 70 women with PTSD and 50 without PTSD. The findings of this study suggest that in response to the relived anger task, women with PTSD reported greater anger than women without PTSD (Vrana et al., 2009). Similar results were found in an earlier study by the same authors in a sample of male combat veterans (Beckham et al., 2002).

In addition to the relationship between anger and other traumatic stress symptoms, anger has shown relationships with emotion regulation difficulties and dissociation. It is theorized that high levels of anger after the experience of a trauma are due to an arousal regulation deficit that perpetuates increased anger (Chemtob, et al 1997; Novaco, 2010). Specifically, Chemtob (1997) argues that the activation of the survival mode relates to the dysregulation of anger as individuals seek confirmatory evidence for threats in their environment, which leads to increases in physiological arousal and anger. Specifically, the activation of the hypervigilance that accompanies the survival mode can override the inhibitory processes that regulate anger. In support of this theory, 24 male war veterans reported higher anger emotional experiences and aggression when compared to 23 well-adjusted war veterans (Chemtob, Hamada, Roitblat, & Muraoka, 1994). Therefore, it is expected that individuals with higher traumatic stress symptoms and emotion regulation difficulties will report more intense emotional experiences of anger.
Similar to the relationship between hyperarousal and avoidance symptoms discussed earlier, higher levels of anger experience may be associated with higher levels of dissociation. For example, in one study, individuals with PTSD and comorbid borderline personality disorder reported elevated levels of anger, anxiety, and dissociation (Low, Jones, MacLeod, Power, & Duggan, 2000). In another study using a sample of adolescents who had been exposed to violence, a history of trauma was associated with higher levels of dissociation, anger, depression, and posttraumatic stress (Singer, Anglin, Menden, Song, & Lunghofer, 1995). Feeney, Zoellner, and Foa (2000) examined the relationship between anger and dissociation using a sample of female assault survivors with PTSD within three months after the assault and found that anger and dissociation were strongly correlated. These researchers conceptualized “anger and dissociation as complementary methods of emotional disengagement” (Feeney et al., 2000, p. 96). In other words, anger could be viewed as a form of dissociation that aims to avoid the experience of other emotions such as sadness, shame, or fear. Thus, it could be expected that the use of dissociation as an emotional avoidance strategy could exacerbate the experience of anger.

Due to the fact that a great deal of the literature on anger and trauma has focused on individuals with clinical levels of PTSD symptoms, the present study examines anger experiences of individuals who have suffered a traumatic event and report a range of posttraumatic stress symptoms (i.e., both above and below a clinical cut-off for PTSD). This population is of importance, as individuals who have experienced traumatic events may still be at increased risk of heightened anger and its resulting health and interpersonal problems.
Trauma and emotional experience of happiness

Previous research on trauma and emotions has focused largely on negative emotions (e.g., fear, anxiety, anger, shame, sadness); however, more recently researchers have begun to study the role of positive emotions in trauma. Given the likelihood that individuals will experience a traumatic event at least once in their lifetime, it is important not only to focus on the effect of trauma on negative emotions, but also to focus on the effects trauma survival may have on the experience of positive emotions. Based on diagnostic criteria, PTSD can be associated with feelings of detachment and a restricted range of affect, including restriction of positive emotions (APA, 2000). In a sample of Vietnam war veterans, higher frequency of emotional concealment was reported for positive emotions when compared to well adjusted war veterans (Roemer, Litz, Orsillo, & Wagner 2001).

Unlike the relation between emotion regulation difficulties and hyperarousal that lead to increased experiences of anger, these emotional and physiological responses may actually lead to diminished experiences of happiness. Williams, Chambless, and Ahrens (1997) argue that individuals with PTSD may develop a fear of emotional arousal regardless of emotional valence (i.e., as positive or negative). Therefore, positive emotions may be avoided due to the similar physiological arousal felt in negative emotions (Williams et al, 1997). Additionally, Litz (1992) argues that it is not that individuals with PTSD experience a decline in positive emotions, but instead that it is more difficult to elicit these emotions due to pervasive hyperarousal and difficulties in regulating these states. In support of this idea, Litz, Orsillo, Kaloupek and Weathers (2000) found that Vietnam combat veterans had higher heart rate reactivity, as if
responding to threat, while viewing positive and negative images and suppressed expressive responses when viewing positive images compared to well adjusted Vietnam war veterans. Similar results were found using a population of assault survivors (Foa, Feske, Murdock, Kozak, & McCarthy, 1991). Therefore, diminished intensity of happy emotional states may be associated with difficulties in regulating emotions.

Unlike research on the emotional experiences of anger, the relationship between dissociation and positive emotions such as happiness has not been established. However, as stated before higher dissociative tendencies are associated with higher experiences of negative emotions (e.g., anger, depression, and anxiety; Low et al 2000; Singer et al, 1995; Feeny et al, 2000). Therefore, it is expected that the use of dissociation as an emotion avoidance strategy will be related with lower levels of happiness. Arguably, diminished happiness in trauma survivors may be attributable to comorbid depression. Of note, however, Litz (1997) found that in a trauma exposed community sample in which 55% met PTSD criteria, emotional numbing could not be accounted for by comorbid depression. Therefore, diminished happiness experience may occur due to trauma exposure and related changes in emotional processing.

**Re-lived emotions task**

The present study uses a re-lived emotions task to examine anger and happiness among individuals with prior trauma exposure and varying levels of posttraumatic stress symptoms. This task has been used by emotion researchers to evoke or induce specific emotions in a controlled laboratory setting (Ekman, Friesen, & Ancoli, 1980). The re-lived emotions task was used by Levenson (1991) to induce anger, disgust, sadness, fear, surprise, and happiness in a sample of older adults. As a part of the research paradigm,
participants were asked to think about a time that they felt each emotion (i.e., the “target emotion”) and to continue to do so until the target emotion was experienced very strongly in the moment (Levenson et al., 1991). The argument for using this individualized imagery as opposed to standardized imagery (e.g., emotional photographs) stems from the fact that it allows each participant to focus on emotionally meaningful and relevant memories. As a result, the emotional responses evoked in the laboratory should be more reflective of the emotions experienced in the individual’s daily life.

Comparable to the re-lived emotions task that is used in emotion research, imagery or autobiographical memory (AM) procedures are used by researchers that study trauma. Studies that use imagery or AM procedures ask participants to create and re-live past events that relate either to the trauma or other emotions of interest. For example, one study used anger, sadness, neutral, anxious, and trauma related imagery scripts to examine neuronal circuitry underlying emotion regulation difficulties in traumatized participants (Lanius, Williamson, Hopper, Densmore, Boksman, Gupta, Neufeld, Gati, & Menon, 2003). Additionally, these procedures have also been used by Wenzel, Pinna and Rubin (2004) to investigate the properties of anxiety-related autobiographical memories and emotional experience in participants with PTSD. Specifically, participants with PTSD rated 15 word-cued memories including 3 negative, 3 positive, and 3 most important events (Rubin, Bernsten, & Boals, 2008). Given that these types of procedures have been used as valid methods of evoking emotions and measuring emotional experiences, this type of measurement was deemed appropriate for this study. Therefore, the current study proposes to assess the extent that trauma severity, emotion regulation
difficulties, and dissociative tendencies predict emotional experience of anger and happiness in a re-lived emotions task.

**Purpose of this Study**

The current study examined the extent to which trauma symptoms, emotion regulation difficulties, and dissociative tendencies predict emotional experience of anger and happiness in a re-lived emotions task. Research on the relationship between actual emotional experiences and traumatic stress symptoms, emotion regulation, and dissociation has been mixed and not established across varying levels of trauma. Further, past studies have not examined the relationship between the emotional experience of happiness and emotion regulation and dissociation. Based on the literature, six hypotheses were posed:

**Hypotheses**

H1: Emotion at the time of the event will predict greater intensity of anger experience when recalling an anger-inducing memory.

H2: Greater traumatic stress symptoms will enhance the ability of emotion at the time of the event to predict greater intensity of anger experience when recalling an anger-inducing memory.

H3: Greater dissociative tendencies and greater difficulties in emotion regulation will enhance the ability of traumatic symptoms and the emotion at the time of the event to predict greater intensity of anger experience when recalling an anger inducing memory.

H4: Emotion at the time of the event will predict greater intensity of happiness experience when recalling a happiness-inducing emotional memory.
H5: Greater traumatic stress symptoms will enhance the ability of the emotion at the time of the event to predict lower intensity of happiness experience when recalling a happiness-inducing emotional memory.

H6: Greater difficulties in emotion regulation and greater dissociative symptoms will enhance the ability of traumatic stress symptoms and the emotion at the time of the event to predict lower intensity of happiness experience when recalling a happiness-inducing emotional memory.
Chapter 2

METHOD

Recruitment and Participants

The university’s Institutional Review Board (Appendix A) approved all procedures, and participants gave informed consent prior to their participation. Participants who met the study criteria were 50 individuals (37 females, 14 males) who reported experiencing a traumatic event and varying levels of posttraumatic stress symptoms (PTS). Participants’ mean age was 30.0 (SD = 11.7) years. The majority of participants were single (76%), White/European American (64%), and females (74%). Most participants reported lower to lower/middle income (74%). The majority of the sample reported a mean education level of 15.4 (SD = 2.6) years. See Table 1 for specific demographic information including ethnicity.

Participants were recruited from the Phoenix community via flyers and word of mouth. Recruitment sites included the Arizona State University campus counseling center, local mental health agencies, and a local mental health private practice. The study was advertised as a research study of emotion that was looking for individuals with “previous traumatic experiences.” Participants were compensated $75 for their participation. This project was funded by a grant through the Institute for Mental Health Research.

To be eligible to participate, all participants had to be age 18 or older and to report having experienced an event that qualified as traumatic (described below). Of the sample, 16 (32%) were abuse/assault survivors, 9 (18%) reported events involving injury or hospitalization, 11 (22%) reported death of a loved one, 4 (8%) were car accident
survivors, 1 (2%) reported combat trauma, and 9 (18%) reported an unspecified event. Individuals were not included in the study if they reported active substance use, suicidality, psychosis, major medical conditions (e.g., a serious heart condition), or a history of seizures. These measures were gathered prior to lab involvement.

Measures

Participants completed an online survey that assessed demographics and the key constructs of interest, namely posttraumatic stress symptoms, difficulties in emotion regulation, and dissociative tendencies. These measures are included in Appendix B, C, and D, respectively. Measures not relevant to the present study also were collected.

PTSD Symptom Checklist for DSM-IV-Specific Event version (PCL-S; Weathers, Litz, Huska, & Keane, 1996). The PCL-S is a 17-item self-report measure that assesses symptoms of PTSD that correspond to DSM-IV-TR (APA, 2000) criteria. First, participants described a specific traumatic event, namely an event witnessed or experienced that involved actual or threatened death or serious injury or a threat to the physical integrity of self or others. The traumatic event must have also elicited feelings of helplessness, intense fear, or horror. Next, participants rated, with respect to that event, how much they had been bothered by 17 PTSD-related symptoms in the past month. Items reflected the major DSM symptom categories of re-experiencing (e.g., “Suddenly acting or feeling as if the stressful experience were happening again [as if you were reliving it]”), hyperarousal (e.g., “Having physical reactions [e.g., heart pounding, trouble, breathing, sweating] when something reminded you of the stressful experience”), and avoidance/numbing (e.g., “Feeling emotionally numb or being unable to have loving feelings for those close to you”). Ratings were made on a 1 to 5 scale where 1 = not at all
and 5 = extremely. Ratings were summed to form one total score that could range from 17 to 85. Higher scores reflect more posttraumatic stress symptoms. Previous studies with the PCL-S provided evidence of concurrent validity in that it was highly correlated with the Clinician-Administered PTSD Scale (CAPS; $r = .93$; Norris & Hamblen 2003) and had strong internal consistency ($r = .86$; Yao, Cottraux, Note, De-May, & Guillard, 2002). For the current study the mean score was 43.98 (SD = 12.95), and for this study the Cronbach’s alpha was .87.

**Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004).** The DERS was developed by Gratz and Roemer (2004) to assess emotion regulation difficulties. These difficulties are identified as “the awareness, understanding, and acceptance of emotions, and the ability to act in desired ways regardless of emotional state” (Gratz & Roemer, 2004, p. 41). Sample items include, “When I’m upset, I feel out of control” and “I pay attention to how I feel.” Participants rate how often each of 36 items apply to them using a 5-point scale: 1 = almost never (0–10%), 2 = sometimes (11–35%), 3 = about half the time (36–65%), 4 = most of the time (66–90%), 5 = almost always (91–100%). Ratings were averaged to create a total score that could range from 1 to 5, with higher scores reflecting greater difficulties in emotion regulation. Gratz and Roemer (2004) reported a strong internal consistency of .93 and for this study the Cronbach’s alpha was .85.

**Dissociative Experiences Scales (DES; Bernstein & Putnam, 1986).**
Dissociation refers to the lack of integration of thoughts, experiences, feelings, and emotions into conscious awareness (Blaney & Million, 2008). The DES is a reliable and valid 28-item self-report questionnaire that measures dissociation in normal and clinical
populations. Participants identify the percentage of the time they encounter each of 28 dissociative experiences using a scale that ranges from 0 (never) to 100 (Always). Ratings are averaged across the 28 experiences to create a total DES score that can range from 0 to 100. Sample items include, “Some people have the experience of finding themselves in a place and have no idea how they got there,” and “Some people have the experience of feeling that their body does not seem to belong to them.” Bernstein and Putnam (1986) have reported a test-retest reliability of .84 in a sample including individuals with PTSD. For this study, the Cronbach’s alpha was .92.

**Relived Emotions Task.** The relived emotions task is designed to evoke relatively specific, personally meaningful emotions in a controlled laboratory setting. This procedure was adapted from Ekman, Friesen, and Ancoli (1980). In the present study, participants were asked to write about, think about, and describe out loud memories that evoked anger and happiness, respectively. The writing portion of this task was added to the procedure outlined by Levenson and colleagues (1991) in order to evoke real-life and personally meaningful emotions in the lab. Participants also were asked to relive memories that were neutral and shameful; these were not relevant to the current study.

The research assistant introduced the relived emotions task with the following instructions: “Now I am going to ask you to remember some times in your life when you felt very emotional, or didn’t feel any emotions. As you are remembering these events, I’d like you to imagine that you are back in that moment, and to focus on the feelings you had at that time.” To assist participants in recalling each event, they were given a sheet of paper and were asked to write about the event. For each emotion (i.e., anger, happiness),
the following instructions were given: “At this time I am going to ask you to think about and write about a time when you felt very (angry [or happy]). To help you focus on that time and the (anger [or happiness]) you felt, please write a brief description of what happened, in about 4 sentences, on this piece of paper.” Participants were given two minutes alone to recall and briefly to describe their event in writing. The written instructions were as follows: Using the space below, please write a brief description (about 4 sentences) of a time when you felt very ANGRY [or HAPPY]. For example, when and where did the experience happen? Who else, if anyone was present? What was it about the situation that made you angry [or happy]?

After the two-minute time limit, the research assistant came back into the room and collected the participant’s description of the event. The research assistant then gave the following instructions: “Now I would like you to sit and think about (the event that the participant chose). During this time think about the details of (the event that the participant chose), for example, names, places, or any other specific information you can remember. I’m going to go ahead and leave the room, and as soon as I do please begin picturing the memory. When you can picture (the event that the participant chose) very clearly, please press the number ‘1’ [on the keyboard].” The research assistant then left the room and provided the remainder of the instructions over an intercom from an adjacent room.

Once the participant indicated, by pressing a specific key on a computer keyboard, that he or she clearly felt the emotion by pressing a specific key on a computer keyboard, the research assistant used an intercom to ask the participant to describe the situation out loud, using the following instructions: “Now I’d like you to describe the
event out loud. Describe it as if you were talking to a friend so they can fully understand what you are doing every step of the way. Try to remember as much as you can about the event and give as much detail as possible. You will have 3 minutes. Go ahead and keep talking until I tell you to stop.” Once the three minute time limit was over, using an intercom, the research assistant used an intercom to let the participant know he or she could stop talking and asked a series of questions (see Relived Emotions Rating Sheet).

**Relived emotions task rating sheet.** After recalling and describing out loud an emotion inducing memory, which included anger, happiness, shame, and a neutral memory, participants were asked to rate on a zero (no emotion at all) to eight (the most emotion you have ever felt) Likert-type scale (1) how they felt “just now” while recalling the event, and (2) how they remembered feeling at the time of the event. Higher scores on each of these items reflect greater intensity of subjective emotional experience. Order in which the emotions were presented was counter-balanced. For this study the two emotions of interest were anger and happiness. Specific items for the anger memory were as follows: “Using a scale of 0 to 8, where 0 is no anger at all, and 8 is the most anger you’ve ever felt, how much anger did you feel just now when you were reliving [memory]?” and “Using the same 0 to 8 scale, where 0 is no anger at all, and 8 is the most anger you’ve ever felt, how much anger did you feel at the time when [memory] occurred?” The same items were used for the happiness memory, with “happiness” replacing the stimulus of “anger.” Questions were administered orally via intercom by an experimenter in an adjacent room. Participants provided their answers out loud and the experimenter recorded their answers on the rating sheet.
Procedure

**Telephone screening and pre-session questionnaire.** Interested participants contacted the laboratory and left a message on a secure laboratory voicemail. They were given instructions per the outgoing message that a research assistant would return their call to provide them with more information about the study. During the telephone screening call, the research assistant obtained information to assess the participant’s eligibility for the study. This included gathering information as to whether participants had experienced an event that qualified as “traumatic” (see Appendix A for specific questions about the traumatic event). Level of posttraumatic stress symptoms was determined during the same telephone screen using the PCL-S.

If the participant met the inclusion criteria, they were scheduled for a one-time, 2 to 3 hour laboratory session. They also were sent a link to an online survey that was hosted on a secure website, [www.surveymonkey.com](http://www.surveymonkey.com). This survey included the key study measures described above. Participants were asked to complete the survey prior to their laboratory session. Hard copies of the questionnaires were mailed to participants who preferred to complete the measures in this format. Participants were informed that their responses would be kept confidential, that participation in the research study was completely voluntary, and that they could withdraw their participation at any time.

**Laboratory session.** Laboratory procedures took place during one, 2 to 3 hour session that included the relived emotions task. Upon arrival, participants were greeted by a trained research assistant and informed consent procedures were administered. After completing procedures relevant to another investigation (i.e., for which physiological sensors were attached and participants viewed pictures on a computer monitor),
participants completed the relived emotions task. As described above, participants were asked to write about, think about, and describe out loud four specific emotional memories, two of which were relevant to the present investigation (anger and happiness). Participants always were prompted to relive a neutral scenario first and then were prompted to relive anger-, happiness-, and shame-inducing memories in one of six counterbalanced orders (e.g., anger, happiness, shame; happiness, shame, anger; and so on). After each relived memory, the researcher asked each question on the relived emotions rating sheet (described above) via the intercom, and participants responded to each question orally.

Immediately after the relived emotions task, the research assistant thanked the participant as follows: “I want to thank you for sharing your memories with us. It can be difficult and painful to talk about emotional experiences, but we’ve learned it can be helpful to talk about them out loud. We really want to learn more about people’s experiences in a real way. It contributes to what we can learn about different people and different situations, and we really appreciate that.” Participants were debriefed about the study’s purpose at the end of the study, were paid $75, and any questions were addressed. Additionally, participants were provided with referrals to mental health services in case they needed further support.

**Data Analysis Plan**

Two sets of hierarchical regressions were conducted to test the study hypotheses. The first set of regressions tested hypotheses 1, 2, and 3 and used reported anger intensity as the outcome variable. The second set of regressions tested hypotheses 4, 5, and 6 and used reported happiness intensity as the outcome variable. For set one, emotion reported
at the time of the event was entered in step 1. In step 2 posttraumatic stress symptoms was added to the equation to determine whether it would enhance the ability to predict intensity of anger experience in the relived emotions task. In step 3 difficulties in emotion regulation and dissociative tendencies were entered as a cluster variable to determine whether or not they would enhance the ability to predict intensity of anger experience in the relived emotions task.

The second set of hierarchical regressions focused on happiness. In step 1 emotion at the time of the event was entered to predict intensity of happiness experience. In step 2 posttraumatic stress symptoms was added to the equation to determine whether it would enhance the ability to predict intensity of happiness experience. In step 3 difficulties in emotion regulation and dissociative tendencies were entered as a cluster variable to determine whether they would enhance the ability to predict intensity of happiness experience in the relived emotions task.
Chapter 3

RESULTS

A priori Analyses

Prior to testing the hypotheses, descriptive results were calculated for the primary study variables and are presented in Table 1. Table 2 presents means and standard deviations for these variables, namely posttraumatic stress symptoms, difficulties in emotion regulation, dissociative tendencies, and self-reported emotional experiences (i.e., anger and happiness) to the relived emotions task. Correlations among these variables are presented in Table 3.

Tests of Hypotheses

Hierarchical linear regressions were used to test the six hypotheses. For the first set of regressions, emotional intensity (anger or happiness) at the time of the event was entered on step 1. Posttraumatic stress symptoms (PCL-S scores) was entered on step 2. Difficulties in emotion regulation (DERS score) and dissociative tendencies (DES score) were entered as a cluster variable on step 3. For hypothesis one (anger experience), together the four predictors accounted for a significant portion of the variance in emotional experience of anger, adjusted $R^2 = .267$, $F(4, 43) = 5.285$, $p < .001$. For step 1, the anger intensity reported at the time of the event contributed a significant amount of variance to the model ($p < .001$). In Step 2, posttraumatic stress symptoms did not contribute a significant amount of variance to the model ($R^2$ change = .014, $p = .367$). In step 3, difficulties in emotion regulation and dissociative tendencies significantly enhanced the variance accounted for in the model ($R^2$ change = .112, $p = .036$).
Examination of the beta weights for the full model indicated that only anger emotional intensity at the time of the event ($\beta = .508$, $t = 3.72$, $p < .001$) and dissociative tendencies ($\beta = .408$, $t = 2.46$, $p = .018$) were significant predictors (see Table 4).

For hypothesis two (happiness experience), together the four predictors accounted for a significant portion of the variance in the experience of happiness in the relived emotions task, adjusted $R^2 = .332$, $F (4, 44) = 6.98$, $p < .001$. For step 1, happiness emotional intensity at the time of the event contributed a significant amount of variance to the model ($p < .001$). In Step 2, posttraumatic stress symptoms did not contribute a significant amount of variance to the model ($R^2$ change = .004, $p = .589$). In step 3, difficulties in emotion regulation and dissociative tendencies did not contribute a significant amount of variance to the model ($R^2$ change = .069, $p = .094$). Beta weights for the full model indicated that dissociative tendencies was a significant predictor of happiness experience in the re-lived emotions task, $\beta = .359$, $t = 2.23$, $p = .031$ (see Table 5), as was happiness experienced at the time of the event, $\beta = .631$, $t = 5.09$, $p < .001$. 

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CHAPTER 4

DISCUSSION

The current study examined the extent that trauma symptoms, difficulties in emotion regulation, and dissociative tendencies predicted emotional experiences of anger and happiness in a relived emotions task (i.e., recalling and describing autobiographical memories evoking specific emotions). Specifically, it was expected that (1) greater anger intensity at the time of the event, greater traumatic stress symptoms, greater emotion regulation difficulties, and greater dissociative tendencies would predict greater intensity of anger, and (2) lower happiness intensity at the time of the event, greater traumatic stress symptoms, greater emotion regulation difficulties, and greater dissociative tendencies would predict lower intensity of happiness.

The first hypothesis, which predicted that anger emotional experience at the time of the event would predict greater anger intensity during the relived emotions task, was supported by the data. Similarly, hypothesis four, which predicted that reported happiness at the time of the event would predict greater intensity of happiness experience when recalling a happiness inducing emotional memory, was supported. These findings relate to Levenson’s (1991) argument that using personally meaningful memories to induce specific emotions in the lab are likely to reflect the emotions in the participant’s daily life. These results show that experiences that are emotionally salient, in that they come to mind when participants are asked to recall an emotional memory, may produce similar emotional experiences in a laboratory setting. Specifically, the more anger experienced at the time of the event, the more anger reported during the relived emotions task. Similarly, the more happiness an individual experienced during the event, the more
happiness he or she reported in the lab. Through these personal and meaningful memories, re-lived emotion tasks can help induce emotional experiences that resemble those felt in real world settings. In turn, measuring such experiences can provide important information, such as regarding the influence of trauma on emotion.

The second hypothesis, which predicted that greater posttraumatic stress symptoms would enhance the ability of emotional experience at the time of the event to predict greater emotional experience of anger in the relived emotions task, was not supported by the data. This is inconsistent with the fact that a relationship between traumatic stress symptoms and anger has been found in past research. For example, Vrana and colleagues (2009) found that women with PTSD were more likely than women without PTSD to report higher levels of anger during a relived emotions task. In addition, Orth and Weiland (2006) found based on a meta-analysis of various self report studies a large relationship (an effect size of .48) between posttraumatic stress disorder and emotional experiences of anger, particularly among veterans with combat experience.

It also is possible that anger is more closely related to posttraumatic stress symptoms for individuals above a clinical cut-off for PTSD. The fact that the present study assessed individuals both above and below clinical cut offs for PTSD may in part explain the lack of findings. That is, the varying degree of posttraumatic stress symptoms may have reduced the impact of these symptoms on experiences of anger in a relived emotions task. In addition, negative emotions other than anger may show a stronger relationship to posttraumatic stress symptoms. For example, Newton and Ho (2008) found that among a sample of trauma exposed individuals, greater intensity of negative emotions was reported in a diary study, but anxiety and tension were reported more intensely than
anger. Future studies should focus on comparing different groups, such as individuals with PTSD, PTS (sub-clinical levels of PTSD), and with no history of traumatization, in order to disentangle these results, and should measure several specific negative emotions. Finally, as discussed below, it is possible that specific aspects of posttraumatic stress (e.g., dissociation) are more likely to predict emotional experience than posttraumatic stress symptoms measured as one entity.

It was also predicted that greater traumatic stress symptoms would be associated with lower intensity of happiness experience when recalling a happiness inducing emotional memory. The data failed to support this hypothesis. Although claims of diminished positive emotional experiences among trauma survivors have been reported in the literature, most researchers have found this relationship in samples of war veterans (Roemer, Litz, Orsillo, & Wagner, 2001). In addition, previous research has found that trauma survivors report fewer occurrences of happy events but not necessarily less intensity of positive emotional experience when such an event occurs. Therefore, it is possible that when participants re-lived a happy inducing event they were able to evoke the full subjective emotional experience of happiness in the lab. Future studies may benefit from measuring number of positive emotional occurrences, along with the measurement of emotional experiences during these events, in order to fully assess the emotional disruptions experienced after a traumatic event.

The hypothesis that greater difficulties in emotion regulation and greater dissociative tendencies would enhance the ability of posttraumatic stress symptoms and emotional experience at the time of the event to predict greater emotional experience of anger in the relived emotions task was supported by the data. Specifically, dissociative
tendencies was the strongest predictor of anger emotional experience in the relived emotions task. These results are consistent with past research that has found anger and dissociation to be related to each other (Singer et al, 1995; Low et al, 2000; Feeney et al, 2000). In other words, these results are consistent with the conceptualization that anger and dissociation are used as coping mechanisms for emotional disengagement (Feeney et al, 2000). Further, these findings support the idea that dissociation may be a particularly important aspect of the response to traumatic stress, with respect to implications for subsequent mental health functioning (Ozer et al., 2003; Spiegel, 2012).

Difficulties in emotion regulation was not related to anger intensity during the relived emotions task. Previous research, however, has established this relationship. Chemtob (1997) argued that it is the activation of the survival mode in individuals with PTSD that exacerbates anger, through the disruption of an inhibitory process that usually regulates anger. In the current study, however, overall difficulties in emotion regulation were assessed and not specific difficulties in anger regulation. In addition, the measure used in the current study to assess emotion regulation difficulties included facets of emotion regulation such as emotional awareness, emotional clarity, and goal-directed behavior, in addition to examining emotional inhibition. Further, difficulties in emotion regulation may be an issue that differs between individuals above and below clinical cut offs for PTSD. As noted above, evaluation of these two groups may need to be further researched.

Finally, it was expected that greater difficulties in emotion regulation and greater dissociative symptoms would enhance the ability of traumatic stress symptoms and the emotion at the time of the event to predict lower intensity of happiness experience when
recalling a happiness inducing emotional memory. In contrast to this prediction, dissociative tendencies led to higher experiences of happiness during the relived emotions task. Previous studies on trauma and emotional experiences have not evaluated the relationship between dissociation and the emotional experience of happiness; therefore, the results of this study shed light on the relationship between these two variables. The fact that dissociative tendencies were associated with greater happiness is consistent with the argument that positive emotional intensity is not necessarily diminished after traumatization (Litz, 1992; Newton & Ho, 2008). Just as the use of dissociation as a coping mechanism may, paradoxically, lead to the exacerbation of anger experience, happiness experience may be enhanced as well. To the extent that dissociation occurs in order to avoid emotions related to the trauma, namely fear and anxiety, other emotions, such as happiness, may be heightened (Litz 1992; Low et al 2000; Feeny et al, 2000; Newton & Ho, 2008). It is important to note that dissociative tendencies was also strongly related to posttraumatic symptoms and difficulties in emotion regulation. More specifically, individuals who reported higher levels of dissociative tendencies also reported higher reports of traumatic stress symptoms and higher difficulties in emotion regulation. It may, therefore, have masked the impact of the relationship between these two variables and the dependent variable of interest (intensity of anger and happiness). Accordingly, there is a need for more research to evaluate these relationships.

**Limitations**

The current findings provide useful information about the specific predictors of anger emotional intensity in trauma survivors; however, the study had several limitations
that should be noted. First, the sample was fairly small and included only participants who self-selected into the study. Due to the small sample size, the findings have low statistical power. Given these limitations, it is important to note that the generalizability of these results is also limited. Furthermore, the financial incentive of $75 may have attracted participants to the study for whom this amount of money was a significant factor. This could indicate that individuals across a diversity of incomes were not represented in the sample. Specifically, the present study had a large proportion of individuals who reported having a low to lower-middle socioeconomic status.

Another limitation of the study is that although individuals with several types of traumatic experiences were included in the study, many were not well represented (e.g., combat veterans). Furthermore, the anger events recalled during the relived emotions task were freely chosen by the participants and were not evaluated to determine if they were related to the participant’s primary traumatic event. Emotional experiences that are related to one’s trauma have been found to be distinctly different than emotions that are not related to the trauma (Litz & Gray, 2002). Therefore, the lack of consideration of this issue could have affected the ratings of both emotional experiences of anger and happiness.

Another limitation of this study is that emotional experiences of anger and happiness, which were the study’s primary dependent measures, each were assessed by one self-report item. Participants were asked to rate the emotional experiences using a measurement that perhaps did not necessarily capture the full emotional experience, as a multiple item assessment would have. In addition, measurements of emotional experience were assessed only one time, which calls into question both its reliability and validity.
Lastly, a limitation of all studies using a re-lived emotions task is that they rely solely on assessments of subjective emotional experience. Therefore, other methods of assessing emotional experiences (e.g., physiological methods or daily diaries) may be important to consider in future research.

**Implications and Conclusion**

Although the relationship between trauma and anger has been previously studied, only relatively recently have researchers begun to examine the specific processes influencing this relationship. Furthermore, there continues to be a gap in the literature that examines the relationship between specific positive emotions (e.g., happiness) and trauma. The findings from the current study suggest that it is the presence of dissociative tendencies after the experience of a traumatic event that predicts greater intensity of the emotional experience of anger during a relived emotions task.

Understanding the role of dissociation may assist mental health practitioners implement interventions that not only focus on reducing heightened negative emotional experiences (e.g., anger) but interventions that address the use of dissociation to disengage from emotions related to the trauma. During therapy, it is important for clinicians to help clients fully experience the emotions related to the trauma that are being avoided through the use of dissociation (Barlow, 2007; Feeny et al, 2000; Lee & Scragg, 2001). Possible interventions should focus on healthy coping mechanisms that help the client process these emotions. Furthermore, clinicians should take into consideration that clients with a history of traumatization may have the full capacity to experience positive emotions regardless of their dissociative tendencies and, therefore, should be encouraged to experience these emotions.
References


http://dx.doi.org.ezproxy1.lib.asu.edu/10.1007/978-0-387-29986-0_1


http://dx.doi.org.ezproxy1.lib.asu.edu/10.1023/A:1007725015225

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1023/A:1007806132319

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1002/jts.20066

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1037/0021-843X.100.2.156

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1037/0022-006X.63.6.948

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1007/s10862-008-9102-4

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1037/0022-3514.85.2.348

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1176/appi.ajp.2010.09081213


http://dx.doi.org.ezproxy1.lib.asu.edu/10.1016/S0006-3223(02)01466-X

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1037/0882-7974.6.1.28

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1016/0272-7358(92)90125-R

http://dx.doi.org.ezproxy1.lib.asu.edu/10.1046/j.1440-1614.2002.01002.x


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<tr>
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Table 2
Key study variables Means and Standard Deviations

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<th>Difficulties in Emotion</th>
<th>2.16 (.71)</th>
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<td>Regulation</td>
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<tr>
<td>Dissociative Experiences Scale</td>
<td>1.39 (1.17)</td>
</tr>
<tr>
<td>Anger experience at the time</td>
<td>7.40 (1.03)</td>
</tr>
<tr>
<td>Anger experience in lab</td>
<td>5.52 (1.57)</td>
</tr>
<tr>
<td>Happiness experience at the time</td>
<td>7.43 (1.00)</td>
</tr>
<tr>
<td>Happiness experience in lab</td>
<td>6.18 (1.60)</td>
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</tbody>
</table>

Note: PCL-S ratings were made on a 1 to 5 scale where 1 = not at all and 5 = extremely. Anger and happiness emotional experiences at the time of the event and in the lab were measured using a 0 to 8 scale where 0 = no emotion at all and 8 = the most emotion you have ever felt.
Table 3

Pearson Correlations among Study Variables

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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
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<tr>
<td>2. Difficulties in Emotion Regulation Scale (DERS)</td>
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<td>3. Dissociative Tendencies Scale (DES)</td>
<td>.36*</td>
<td>.65**</td>
<td>-</td>
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<tr>
<td>4. Anger experience at the time of the event</td>
<td>.19</td>
<td>.06</td>
<td>.28</td>
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<td>5. Anger experience in relived task</td>
<td>.19</td>
<td>-.22</td>
<td>-.18</td>
<td>.44**</td>
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<td>6. Happiness experience at the time of the event</td>
<td>-.12</td>
<td>-.10</td>
<td>.01</td>
<td>.37**</td>
<td>-.08</td>
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<td>7. Happiness experience in relived task</td>
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<td>-.15</td>
<td>-.30*</td>
<td>-.08</td>
<td>.00</td>
<td>.56**</td>
<td>-</td>
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Note: Ns range from 48 to 50.
*p < .05 ** p < .
Table 4
Results of Regression Predicting Anger Experience during Relived Emotions Task (N = 48)

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>Sig. (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Anger experienced at the time of event</td>
<td>.689</td>
<td>.202</td>
<td>.450</td>
<td>3.42</td>
<td>.001</td>
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<tr>
<td>Step 2</td>
<td>Anger experienced at the time of event</td>
<td>.653</td>
<td>.206</td>
<td>.426</td>
<td>3.17</td>
<td>.003</td>
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<tr>
<td></td>
<td>Traumatic stress symptoms</td>
<td>.015</td>
<td>.016</td>
<td>.123</td>
<td>.912</td>
<td>.367</td>
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<tr>
<td>Step 3</td>
<td>Anger experienced at the time of event</td>
<td>.788</td>
<td>.209</td>
<td>.508</td>
<td>2.37</td>
<td>.001</td>
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<td></td>
<td>Traumatic stress symptoms</td>
<td>-.001</td>
<td>.018</td>
<td>-.007</td>
<td>-.045</td>
<td>.964</td>
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<td>Difficulties in emotion regulation</td>
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<td>.397</td>
<td>-.077</td>
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<td>.670</td>
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<tr>
<td></td>
<td>Dissociative tendencies</td>
<td>.550</td>
<td>.224</td>
<td>.408</td>
<td>2.46</td>
<td>.018</td>
</tr>
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</table>
Table 5

Results of Regression Predicting Happiness Experience during Relived Emotions Task (N = 49)

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
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<th>Sig. (p)</th>
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<tbody>
<tr>
<td>Step 1</td>
<td>Happiness experienced at the time of event</td>
<td>.899</td>
<td>.194</td>
<td>.561</td>
<td>4.64</td>
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<td>Step 2</td>
<td>Happiness experienced at the time of event</td>
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<td>.196</td>
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<td></td>
<td>Traumatic stress symptoms</td>
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<td>Step 3</td>
<td>Happiness experienced at the time of event</td>
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<td>.631</td>
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<td>.017</td>
<td>-.098</td>
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<td>-1.20</td>
<td>.238</td>
</tr>
<tr>
<td></td>
<td>Dissociative tendencies</td>
<td>.497</td>
<td>.223</td>
<td>.359</td>
<td>2.23</td>
<td>.031</td>
</tr>
</tbody>
</table>
APPENDIX A

IRB APPROVAL
To: Nicole Roberts
From: Carol Johnston, Chair
Date: 03/08/2013
Committee Action: Renewal
Renewal Date: 03/08/2013
Review Type: Expedited F4 F7
IRB Protocol #: 0702001615
Study Title: Emotion and the Brain
Expiration Date: 03/01/2014

The above-referenced protocol was given renewed approval following Expedited Review by the Institutional Review Board.

It is the Principal Investigator’s responsibility to obtain review and continued approval of ongoing research before the expiration noted above. Please allow sufficient time for reapproval. Research activity of any sort may not continue beyond the expiration date without committee approval. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol on the expiration date. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study termination.

This approval by the Biosci IRB does not replace or supersede any departmental or oversight committee review that may be required by institutional policy.

Adverse Reactions: If any untoward incidents or severe reactions should develop as a result of this study, you are required to notify the Biosci IRB immediately. If necessary a member of the IRB will be assigned to look into the matter. If the problem is serious, approval may be withdrawn pending IRB review.

Amendments: If you wish to change any aspect of this study, such as the procedures, the consent forms, or the investigators, please communicate your requested changes to the Biosci IRB. The new procedure is not to be initiated until the IRB approval has been given.

Please retain a copy of this letter with your approved protocol.