

5-2015

The Impact of Childhood Trauma as Moderated by PTSD, Relationship with Caregiver, and Rumination

Aislyn M. Allen

University of South Carolina - Aiken

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The Impact of Childhood Trauma as Moderated by PTSD,
Relationship with Caregiver, and Rumination

A Thesis

Presented to

The Faculty of the Department of Psychology

University of South Carolina Aiken

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

By

Aislyn M. Allen

May 2015

Abstract

The current study explored the relationship between childhood trauma and deliberate rumination, as well as PTSD symptomology, psychological and physiological functioning. Participants consisted of 55 undergraduate students, ages 18-23; who completed measures about a specific traumatic event, psychological functioning, parental attachment, PTSD symptoms, deliberate rumination, childhood maltreatment, and a demographics questionnaire. Reported childhood trauma was a specifically identified traumatic life event, child maltreatment, or having a parent with a substance abuse or mental disorder. Following completion of measures, participants were asked to answer questions while heart rate, heart rate variability, and electrodermal activity were monitored. Results indicated there was relation among child maltreatment, psychological functioning, and physiological functioning. Further, results suggested that childhood maltreatment was associated with worse psychological functioning, specifically in the domains of interpersonal relationships, social roles, and symptom distress. It was also found that growing up with a parent who abused substances was correlated with having worse psychological functioning and higher heart rate. In addition, having a parent with mental illness was found to be correlated with having higher heart rate variability. Moreover, results suggest that those who experienced PTSD symptoms, as well as those who reported high maltreatment, had worse psychological functioning than those who did not. Finally, it was found that deliberate rumination was positively correlated with PTSD symptoms.

The Impact of Childhood Trauma as Moderated by PTSD,
Relationship with Caregiver, and Rumination

Trauma during childhood may be experienced as a solitary instance or as recurrent events that happen on a regular basis. Complex trauma refers to exposure to multiple traumas, whether occurring many times or a series of different traumas experienced by the individual (Cook, Blaustein, Spinazzola, & Kolk, 2003). Children who are maltreated (Paivio & Pascual-Leone, 2010), have parents who abuse substances (Nicholson et al., 2006), or have parents with a mental disorder (Aldridge, 2006) are most at risk to experience complex trauma. Experiencing complex trauma has been associated with developing long-term health consequences (Felitti et al., 1998). However, not all children who have experienced complex trauma have negative consequences; some resilient children appear to avoid these negative outcomes (Cicchetti & Rogosch, 2009). Previous findings have suggested PTSD may exacerbate, and ruminative coping may attenuate the impact of complex trauma on psychological and physiological functioning. Optimal adaptation to childhood trauma may be inferred from self-reports of functioning and from physiological measures of autonomic nervous system arousal under stressful conditions.

Types of Trauma

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) describes trauma as “exposure to actual or threatened death, serious injury, or sexual violence” (American Psychiatric Association, 2013, p. 271). Trauma does not need to be directly experienced, but may be caused by witnessing the trauma occurring to others, learning about a traumatic event that a family member or close friend experienced, and extreme or repeated exposure to abhorrent elements of a traumatic event. The DSM 5 (American Psychiatric

Association, 2013) also holds that experiencing one or more traumatic events may increase the risk for developing Posttraumatic Stress Disorder (PTSD).

Paivio and Pascual-Leone (2010) stated that traumatic events can be one of two types. Type I trauma is a single occurrence that has consequences driven by the event's severity and extremity (e.g., natural disasters, refugee and war zone trauma, or vehicular accidents). Complex trauma or reoccurring trauma is classified as Type II trauma. Type II trauma may encompass many types of trauma or may include repeated exposure to a single stressor. Maltreatment, community violence, and medical trauma are all examples of complex trauma. Complex trauma during childhood is frequently associated with parents who engage in maltreatment, parents who abuse alcohol or other substances, and parents who have a mental illness (Cook et al., 2003).

Child Maltreatment

The most well documented trauma is that of child maltreatment (Paivio & Pascual-Leone, 2010). Child maltreatment is when a child is neglected or abused, whether physically, psychologically, or sexually. Neglect can be physical as well, but more commonly, neglect is emotional. Emotional neglect consists of a caregiver's lack of attention to a child's psychological needs such as love, encouragement, and support (Paivio & Pascual-Leone, 2010). Physical neglect may be common, but due to it being so closely related to poverty, it is difficult to discern between physical neglect and economic hardship (Cicchetti & Valentino, 2006). Many children experience maltreatment each year that is attributed to a lack of guardian's actions and presence. Estimates suggest in 2010 that 695,000 children in the United States experienced maltreatment. In this estimate over 78% of maltreated children suffered from neglect, roughly 18% endured physical abuse, 8% were

victims of emotional abuse, and the remaining 9% were abused sexually. In 2011, it was estimated that 9.2 out of 1,000 American children experienced some form of maltreatment (Children's Bureau, 2012). The above estimate is only of the prosecuted cases and does not include cases never substantiated or never reported.

A 2012 meta-analysis concluded that about 30-40% of adult women and 13% of adult men were sexually assaulted in their childhood if self-reported accounts are included in estimates (Children's Bureau, 2012). Teenagers are most at risk with 33% having been sexually assaulted between the ages of 12 and 17 (Paivio & Pascual-Leone, 2010). Adults who were sexually assaulted or abused in childhood have a greater likelihood of struggling with sexual dysfunction as well as difficulty controlling anger (Frank, 1995). Cook et al. (2003) reported that childhood sexual abuse significantly increased the risk for Major Depressive Disorder. In addition, continual exposure to maltreatment may cause the body to elicit inappropriate fear responses in preparation to stress. Over activation of fear responses has been associated with long term physical and emotional consequences later in adulthood. Interpersonal relationships may also be compromised; perhaps due to an absence of self-confidence and social skills that may not have been internalized during childhood (Paivio & Pascual-Leone, 2010). Cicchetti and Valentino (2006) reported that adults who experienced maltreatment were more at risk to maltreat their children. Further, children whose parents have been diagnosed with a mental disorder are also at risk to abuse and neglect their children (Aldridge, 2006).

Parent with a Mental Disorder

Research and data is limited for children who have a parent with a mental disorder but it is estimated that between 2% and 30% of children have at least one parent with a

mental illness (Aldridge, 2006). Nicholson, Biebel, Hinden, Henry, and Stier (2001) reported that 65% of women and 52% of men who have been diagnosed with a mental disorder are parents. Among co-occurring disorders, it is estimated that two-thirds of women diagnosed have at least one child (Nicholson et al., 2006). However, less than 40% of mothers with a mental illness remain the primary caregiver during the first 10 years of their child's life (Hans, Bernstein, & Henson, 1999). Many children are forced to move frequently due to change of caregiver or when living with their primary caregiver, due to eviction or home foreclosure. Children of parents with mental illness have high rates of school absenteeism that may contribute to developmental delays (Cohen & Wardrip, 2011). Most of these children live below the poverty line. The lack of financial resources results in difficulty for children to receive nutritional meals consistently, as well as adequate medical care, adding to the risk for cognitive deficits. The likelihood of witnessing violence or illegal activity adds to the risk of PTSD (Whitaker, Orzol, & Kahn, 2006). In addition, between 25% and 50% of children who have a parent with a mental disorder will be diagnosed with a psychological disorder in their lifetime (Barker, Jaffee, Uher, & Maughan, 2011).

Parent with Substance Abuse

Substance related disorders are one of the most commonly diagnosed disorders in adults with children (Nicholson et al., 2001). Over 23% of participants in the Adverse Childhood Experiences (ACE) study reported living with a caregiver who abused alcohol during childhood (Felitti et al., 1998). These children are also at greater risk to abuse alcohol as well as three times more likely to marry a partner who abuses alcohol. It is estimated that about 10.5% of individuals below the age of 18, or 7.5 million children, in the United States

are living with a parent who has experienced alcohol use disorder in the past year.

According to the 2005 to 2010 National Survey on Drug Use and Health, 8.3 million children are living with a parent who uses or abuses alcohol, or living with a parent who uses or abuses illicit substances (Substance Abuse and Mental Health Services Administration, 2013). Living with a parent who uses drugs can be detrimental to an individual's childhood, especially if the parent is their primary caregiver. Further, not only does having a parent with a mental illness or a parent who abuses alcohol put an individual more at risk for later difficulties but so does exposure to other types of trauma (Felitti et al., 1998).

Other Traumatic Life Events

In addition to childhood trauma including maltreatment and neglect, children can experience other traumas. These other types of trauma can include but not be limited to natural disaster, transportation accident, assault, life-threatening illness or injury, sudden violent death, or sudden accidental death; and can be directly experienced, witnessed, learned about, or part of the individual's job (Whitaker et al., 2006). Although not all children who experience trauma have difficulties later, many do, particularly those who experience complex trauma (Felitti et al., 1998).

Gray, Litz, Hsu, and Lombardo (2004) conducted a two part study to first assess the psychometric properties of the Life Events Checklist 5 (LEC-5), followed by an assessment of the association between the LEC-5 and measures of psychological distress. The first study measured the convergence of the LEC-5 with a measure of potentially traumatic events (PTE) of a non-treatment seeking sample of undergraduates. The LEC-5 was found to be reliable when used as a self-report measure of direct exposure as well as reliable when

used to assess indirect exposure of PTE (e.g., witnessed trauma, learned about trauma). The second study consisted of combat veterans and investigated psychological distress as related to traumatic events using the CAPS, PTSD Checklist-Military Version, and the Mississippi Scale. The LEC-5 was found to be associated with all three measures. Further, the strongest association was found to be with the trauma-specific subscales of distress on each of the measures. The study of Gray et al. (2004) not only suggested that the LEC-5 is a reliable measure of traumatic events but it also found that answers on the LEC-5 can be associated with psychological distress.

Consequences of Trauma

Persistent, chronic stress caused from childhood trauma is associated with an inability to control emotion and detect danger cues (Cook et al., 2003). The inability to control chronic stress has been shown to have more of a negative impact on childhood development than stress that can be controlled. Because of difficulties in emotion regulation and emotion cues, many children who experience trauma are more at risk for subsequent trauma, have less direction for life goals, and have more issues maintaining relationships (Cook et al., 2003).

Although the term complex trauma is a relatively new concept that has emerged during the past decade, the ACE Study has been an ongoing epidemiological study since the mid-1980s investigating childhood trauma (Felitti et al., 1998). The ACE study was begun by medical doctors who realized their patients' negative health symptoms may have stemmed from complex trauma in childhood (Felitti et al., 1998). The ACE study emphasized the molecular changes that occur as a result of events that happened during

early development. Researchers from the ACE study have proposed that recurrent complex trauma during early childhood alters the reactions of neurotransmitters (Felitti et al., 1998).

Frank (1995) found that children as young as 3½ years of age take on the stresses and responsibilities of taking care of their parent with a mental illness. A history of childhood trauma is associated with lower education, higher rates of mental illness and substance abuse, as well as unemployment (Cook et al., 2003). However, children who use strategies to accept or adapt to stress caused by trauma are less likely to have adjustment problems than children who are unable to do so (Aldridge, 2006). One ongoing issue involves predicting which children may be able to overcome or bounce back after experiencing complex trauma and which children retain scars that never heal.

Resiliency

According to Mancini and Bonanno (2008), resiliency refers to “protective factors that foster the development of positive outcomes and healthy personality characteristics among children exposed to unfavorable or aversive life circumstances,” (p. 102).

Individuals who have better outcomes in adulthood are thought to have a certain level of resiliency (Cicchetti & Rogosch, 2009).

Children who mature in environments consisting of maltreatment are consistently subjected to stress that may have consequences enduring throughout the rest of their lives (Cicchetti & Rogosch, 2009). Chronic stress not only impacts psychological reactions but also alters biological responses through activation of the nervous responses system. Studies of resilience in maltreated children reveal the possibility of coping processes and resources on multiple levels of analysis as children strive to adapt under conditions of severe stress. Through a series of consecutive studies, Cicchetti and Rogosch (2009) found that the

majority of children who were maltreated showed some aspects of resiliency. In addition, resilient children were regarded as having more positive self-esteem and calmer approach to dilemmas than children without resiliency. Moreover, results of cortisol measurements indicated that children who were physically abused had lower cortisol levels than comparison groups in the morning but when confronted with a stressor, their levels of cortisol production increased more quickly than other groups. The data of Cicchetti and Rogosch (2009) suggested that chronic stress was associated with the development of resiliency. Moreover, resiliency may be a moderating factor in negative biological outcomes that occur during adolescence or adulthood as a result of childhood trauma.

Biological Adaptations

Repeated exposure to trauma in childhood may cause the child's body to prepare in advance for the next occurrence of a traumatic event. Physiological preparedness happens through elevated heart rate, increased sweat production, nervous system arousal, and other system activations. The autonomic nervous system (ANS) is involved when a threat is perceived and controls the amount of nervous system activation the body has. When the ANS is continually activated, such as during repeated traumas in childhood; over time the body's physiological reaction will increase with even the slightest stressor. Repeated physiological preparedness is an adaptation that may have long lasting impacts on stress reactions during adolescence and adulthood. Negative consequences occurring later in adulthood most often stem from complex trauma (Felitti et al., 1998).

Physiological indicators of stress. Physiological stress is indicated in many ways. Among these can be prolactin, human growth hormone, and heart rate (Miller, Chen, & Parker. 2011). The ANS is part of the peripheral nervous system and is involved with the

primary physiological stress components of the body. The sympathetic nervous system and the parasympathetic nervous system are two branches of the ANS that control the body's physiological reactions to stressors. The hypothalamic-pituitary-adrenal axis (HPA axis) regulates the release of cortisol, the primary hormone responsible for stress response.

Anxiety disorder, alcoholism, major depressive disorder, and posttraumatic stress disorder are among the many disorders influenced by the effect of cortisol released during chronic stress (Miller et al., 2011).

ANS activation can be measured by using the electrocardiogram (ECG) or measuring electro-dermal activity (Andreassi, 2007). Activation of the sympathetic and parasympathetic nervous systems are complimentary. At any given time one system has dominance over the other either long term, called tonic, or short term, called phasic. Electrodermal activity (EDA), respiration rate, heart rate (HR), salivation, blood pressure, and pulse pressure are just a few of the functions that the ANS regulates and controls. ECG and EDA both play a role in the measuring of ANS activity (Andreassi, 2007).

The ECG has been used by cardiologists since the mid-1800s (Ashley & Niebauer, 2004). An ECG measures and graphically displays the electrical impulses, or patterns of polarization and depolarization, that occur as the heart beats. These electrical impulses, which allow the heart to contract, that travel throughout the body, are detected on the skin by the ECG electrodes. The potentials are then amplified and recorded in order to produce an electrocardiogram. While electrocardiograms were originally used to monitor the functioning of a patient's heart, or to assist in resuscitation of a patient in distress, the ECG has also been a useful tool in medical and psychological research (Ashley & Niebauer,

2004). Over the past few decades, those interested in the psychological field have been using this tool to explore the relationship between heart activity and emotional state.

Typically, ECG is used to measure the activity of the sympathetic nervous system (SNS) which accelerates heart rate in times when the body needs energy, particularly in times of high emotion. ECG does this by measuring the electrical activity transmitted throughout the body when the heart beats. At every beat, the heart is depolarized to trigger its reaction. HR is the number of times the heart beats per unit of time, usually the number of beats per minute. SNS activity causes the amount of time between the beats to be shorter and PSNS activity makes the time longer (Andreassi, 2007).

Heart rate variability (HRV) is computed based on the interval of time between heart beats. Studies have shown that those with consistently lower HRV are more often diagnosed with depression, stress, anxiety, PTSD, and other long-term health consequences (Ashley & Niebauer, 2004). Increased SNS activity or decreased parasympathetic nervous system (PSNS) is indicative of lower HRV. EDA and ECG are correlative measures of the ANS response to emotional reactions (Ashley & Niebauer, 2004). ECG and EDA measure the relationship between ANS response and childhood trauma in the current study.

Benedek and Kaernbach (2010) defined EDA as “the variation of the electrical properties of the skin in response to sweat secretion” (p. 81). Eccrine is one of two types of sweat glands and is used most in measuring EDA due to being widely distributed on the body (Andreassi, 2007). Electrodes are typically placed in the palms of the hands because of ease of access and availability of eccrine glands (about 3,000 sweat glands per square inch; Benedek & Kaernbach, 2010). EDA data measures the functioning of the SNS through changes in skin conductance response and skin potential, the two primary methods

of measurement. Skin conductance responses can be elicited both physically and psychologically through appropriate stimuli. In the current study, both EDA and HRV were measured as participants discussed childhood memories to explore the relationship between childhood trauma and biological adaptations (Benedek & Kaernbach, 2010).

Repeated stressors during childhood, specifically related to trauma, may cause the ANS to be activated at even the slightest stressor. ANS activation can be measured by ECG, HRV, and EDA. Studies have shown that although ANS arousal can be beneficial to the individual in preparation for trauma, it can have negative long term health consequences (Felitti et al., 1998).

Moderating Factors on Biological and Psychological Adaptations

Studies have suggested PTSD may exacerbate, and ruminative coping may attenuate the impact of complex trauma on psychological and physiological functioning (Roisman, Tsai, & Chiang, 2006). As previously stated, not every person who experiences trauma has negative outcomes. Children who have positive outcomes despite childhood trauma are said to have developed the characteristic of resiliency. Often formed during development, resiliency is a dynamic process of positive adaptation that aids in effectively handling stressors under significant adversity (Luthar, Cicchetti, & Becker, 2000). There are many ways of adaptation such as attachment styles, physiological preparedness, and trauma resolution. Attachment styles resulting from quality of care during childhood has been associated with ANS responses (Dozier & Kobak, 1992; Roisman et al., 2004; Jain & Labouvie-Vief, 2010). The body can also biologically prepare itself for response when arousal may be needed by activating neurological response systems (Halligan, Michael, Wilhelm, Clark, & Ethers, 2006). Ruminating may also contribute to resiliency by allowing

the individual to process the trauma leading to resolution (Pezdek & Salim, 2011; Foster & Webster, 2001). With many individuals, the body adapts, psychologically and physically to deal with the past and prevent any potential future traumas.

Trauma, in particular complex trauma, can be processed in a multitude of ways. Processing of trauma can be observed behaviorally or expressed internally. Some individuals avoid thinking about their trauma and others cannot inhibit the self from ruminating. The development of PTSD can be detrimental to a person and can decrease ability to adapt and develop resiliency because of the symptoms such as re-experiencing or avoiding reminders of the trauma. Re-experiencing trauma is not always a negative occurrence when it is used to resolve feelings about the event, such as when deliberately ruminating. Resolving emotions about trauma can help foster resiliency. Having a positive relationship with a primary caregiver can promote resiliency for the individual by having someone they can rely on. However, just as having a strong relationship can foster resiliency, a weak relationship may lead to less resiliency. These factors listed above are different moderators that can contribute to ability to develop or not develop resiliency (Cicchetti & Rogosch, 2009).

In summary, although many children are exposed to complex trauma, not all those who are exposed experience negative changes to physiological or psychological systems. In the present study, PTSD and deliberate rumination were hypothesized to moderate the association between child maltreatment, psychological and physiological functioning. Children who experienced trauma, but who did not develop PTSD and who engaged in deliberate rumination were expected to exhibit more positive adaptations than those who

experienced symptoms of PTSD and did not engage in deliberate rumination. The following sections review evidence associated with each of these proposed moderators.

Rumination

Rumination is a common coping mechanism used to process events that have occurred. Despite rumination being a coping mechanism, it can sometimes be more hurtful than helpful. One type of hurtful rumination is referred to as intrusive rumination. Intrusive rumination is often unintentional thinking about an event that usually leads to distress instead of beneficial processing; intrusive rumination is commonly associated with PTSD (Stockton, Hunt, & Joseph, 2011). The second type of rumination that can be hurtful to an individual is task-irrelevant rumination, which utilizes stimuli unassociated with the trauma an individual is trying to repress to distract them from reminders of the trauma (Hertel, 1998). Deliberate rumination is most often considered a positive coping style. With this type of rumination, the individual intentionally thinks about a trauma to resolve any conflict they may be having emotionally in regards to that memory (Stockton et al., 2011).

Memories of trauma have been shown to affect physiological stress responses regardless of how long ago the trauma occurred (Foster & Webster, 2001). Because of this, studies have been conducted in order to assess if these memories still influence behavior when discussed (Pezdek & Salim, 2011; Jorgensen & Zachariae, 2006; Glynn, Christenfield, & Gerin, 2007). Some researchers have also thought that suppressing memories can be more beneficial for those who have experienced trauma, but recent findings suggest otherwise (Halligan et al., 2006).

Just as high emotion provoking stimuli activates physiological responses, simply remembering traumatic events elevates physiological responses. Halligan et al. (2006)

conducted a study to assess if HR during the recounting of traumatic memories was predictive of recovery in the follow-up interview 6 months later. Prior to the interview, participants completed the Posttraumatic Disorder Scale in addition to other measures. Participants who met the criteria for PTSD were asked to return 6 months after the experiment for a follow up interview to assess symptoms. Participants consisted of 62 physical and sexual assault survivors who were asked to imagine and describe the assault shortly after the incident occurred. The researchers asked participants to respond to structured response questions in order to elicit specific, but limited, information about the assault experienced while HR was monitored. Following the interview, participants completed a distress scale that asked them to indicate the level of distress they felt with each question asked. Participants were also assessed for PTSD and divided for those with and without PTSD. Results indicated that participants who were diagnosed with PTSD reported greater distress of having to discuss the traumatic event, but had lower HR than those not diagnosed. When assessed at the 6 month follow-up interview, while discussing trauma participants diagnosed with PTSD had lower HR compared to participants not diagnosed with PTSD. Interestingly, participants in the PTSD group who had the highest HR also reported lower distress than those with less symptoms of PTSD (Halligan et al., 2006).

The researchers found when an individual initially ruminates about trauma they have higher physiological stress response. However, as the person talks about the experience or trauma, their physiological stress responses decrease. The second finding also suggests that participants with higher HR were engaging in inhibition while reported the amount of distress ruminating caused them. From the results of this study, the authors concluded that deliberate rumination is a component of adaptation and can aid in resolution of trauma

(Halligan et al., 2006). The study of Halligan et al. (2006) is informative but additional research has been conducted to explore the relationship of memories and physiological stress responses.

In an effort to expand the information known about memory and physiological responses, Foster and Webster (2001) investigated the relationship between physiological responses and length of time a memory has been consolidated. The authors sought to determine the exact relationship, if any, between the age of a memory and its specific effect on responses. Participants consisted of 10 graduate students who were asked to recount in great detail a memory consisting of anger and a memory that was amusing to them (Foster & Webster, 2001). The age in memory spanned from less than a year to 18 years.

Results indicated the age and type of memories were positively correlated with EDA. However, angry memories not only resulted in a significant increase in EDA but also HR activity. The findings of the study suggested that the type of memory as well as the age of a memory is associated with increased physiological arousal. Further, the results indicated that older memories were associated with increased EDA (Foster & Webster, 2001). Studies by Halligan et al. (2006) and Foster and Webster (2001) suggest that the age and type of memory recounted are positively correlated and may be altered by ruminating about the trauma. The following study examined types of memories as well, but with a more general focus of effects of positive memories versus negative memories.

A study by Pezdek and Salim (2011) was conducted to explore differences in physiological, psychological, and behavioral changes when recalling positive memories compared to negative memories. Participants were separated into two groups depending on their answers to the Affective Experiences Scale (AES) that assessed childhood fears and

phobias. If a participant indicated experiencing a public speaking phobia they were placed in the first group. They were then informed that they had a very positive experience in childhood with regards to public speaking and asked to give a speech about a topic of their choice. A participant was placed in the second group if they indicated having a medical or animal phobia. The participant was then asked if they had ever had a positive event with the phobia, if they did, they were asked to recall it. Cortisol levels and self-reported anxiety measures were taken of both groups. Before and after the speech was given in the first group, the participant provided salivary samples and completed the Trier Social Stress Test that assessed differences in stress levels. Findings indicated that those who had higher stress before the speech, reported lower levels of stress after speaking. The authors suggested that remembering a positive event can have an effect on behavior. Further research is needed but if simply activating memories has an effect on behaviors or stress levels, this is critical in discussion of childhood memories on current adult functioning. The results of Pezdek and Salim (2011) are related to the current study by suggesting that having the memory of a traumatic event can affect the behavior of an individual, therefore can serve as a moderating factor in outcomes and decisions of the person (Pezdek & Salim, 2011).

Jorgensen and Zachariae (2006) compared physiological stress responses, EDA and HRV, of participants who were introduced to two different experimental stressors. Participants were categorized into four groups depending on whether they reported high or low symptoms of anxiety and also whether they tended to repress these symptoms or not. The Marlowe Crowne Social Desirability Scale (MC-SDS) in conjunction with a measure of trait-anxiety, was used to classify individuals as truly low-anxious, repressive, truly high-anxious, or defensive high-anxious style.

Participants who scored low in anxiety and low in defensiveness, associated with deliberate rumination, were said to have a truly low anxious coping style. A repressive coping style, associated with task-irrelevant rumination, was given to those who scored low in anxiousness but high in defensiveness. Individuals who scored high in anxiety and low in defensiveness were said to have the high anxious type of coping style. Participants who scored high both in anxiety and defensiveness associated with intrusive rumination were considered to have a defensive high anxious coping style. Although all types of coping styles were measured, comparisons between the repressive coping style and the truly low anxious on responses to stressors were of particular importance (Jorgensen & Zachariae, 2006). Repressive coping style was of interest due to studies finding associations between the repressive coping style and increased EDA during emotionally threatening tasks. In addition, previous results suggested that those with a repressive coping style tended to underreport emotional stress compared to their EDA but there were no consistent findings in regards to the three other types of coping. In contrast to predictions, autonomic arousal appeared consistent across all four groups (Jorgensen and Zachariae, 2006). Results, or lack of, suggested that similar autonomic reactivity occurred to the stressors (Jorgensen & Zachariae, 2006). The researchers suggested that all types of coping and rumination result in physiological stress responses.

A study of Glynn et al. (2007) also measured ANS responses during a stressor, with an added element of harassment. The authors sought to determine whether there was a relationship between delaying the rumination of an anger provoking stressor and the elicited cardiovascular response. Undergraduates participated in two study sessions while their HR were measured and recorded by ECG. Each individual was randomly assigned to one of

two groups. Those in the “immediate group” were instructed to return 30 minutes after the stressor task, while those in the “delayed group” were asked to return a week later to conclude the study. Baseline measurements were taken, and after these were recorded, the stressor task began. The task was labeled “mental arithmetic with harassment” and required the participant to count backwards while being interrupted and lightly chastised by the experimenter in order to produce feelings of anger and cardiovascular response. Upon returning, all participants were asked to recall all details of the prior task as vividly as possible while all previously recorded physiological responses were measured again during their recounting (Glynn, et al., 2007).

The most significant finding was that participants who ruminated about the stressor had lower physiological stress responses after discussing the event (Glynn et al., 2007). However, when rumination did not take place; blood pressure was elevated up to a month later when recalling the harassment stressor. In addition, after a week the physiological responses elicited during recall did not diminish. These results suggest that although time had elapsed between stress and memories, the physiological responses did not diminish unless rumination occurred (Glynn, et al., 2007). Therefore, suggesting heightened physiological responses may occur in adulthood when recalling a childhood trauma, despite the length of time between trauma and recall. However, rumination about the trauma may lower the physiological stress responses. As previous research has found, higher physiological stress responses may be related to serious health outcomes later in adulthood which were explored by Hollenstein et al. (2001).

Hollenstein et al. (2011) investigated age-related changes in SNS and PSNS activity throughout adolescence by examining HRV in participants aged 12-23 in comparison to

their reported emotion regulated strategies. Because ANS functioning is closely related to emotion regulation, the aim of this study was to find if there were SNS and PSNS tonic and phasic changes during development, and if these changes could be attributed more so to environmental factors or to biological factors. Baseline measurements of both HRV and ECG were taken during a social stressor task. The social stressor consisted of asking participants to give a minute speech on any subject of choice without time to rehearse as though they were in front of a large audience. Data for tonic autonomic phases was collected during the paced breathing exercise and data for phasic autonomic phases was collected during the paced speech tasks (Hollenstein et al., 2011).

To obtain information about participant use of emotion regulation strategies, the Emotion Regulation Questionnaire was used. It contained two scales. The first scale assessed the tendency to suppress emotions, associated with task-irrelevant rumination. In relation to deliberate rumination, the second scale predicted the likelihood to reappraise situations to ease emotional discomfort. The authors found that tonic SNS activity increased from age 12 to age 23, while tonic and phasic PSNS activity decreased during this time (Hollenstein et al., 2011). These results suggest that there may be ANS changes from childhood to adulthood, during the ages of 18 and 23. The current study will explore the relationships between traumatic events occurring during this maturational period and current ANS functioning.

The preceding studies indicate a discord among the findings of rumination research. Two studies suggested that increased rumination was associated with decreases in physiological responses (Halligan et al., 2006; Glynn et al., 2007). In contrast, the study by Foster and Webster (2001) concluded that EDA increased with rumination. Other studies

have suggested that all types of rumination produces an increase in physiological stress responses (Jorgensen & Zachariae) and that rumination can also influence behavior, although it is not determined how (Pezdek & Salim, 2011). With so much inconsistency it is difficult to discern the relationship between rumination and physiological stress responses and how it can influence individual outcomes. The current study will address these inconsistencies in the research with the expectation of clarifying if ruminative coping attenuates the impact of trauma on psychological functioning, HRV, and EDA.

Posttraumatic Stress Disorder

PTSD is a disorder that may develop after exposure to complex trauma (American Psychiatric Association, 2013). There are five persistent characteristic symptoms exhibited for at least one month for a diagnosis of PTSD. Individuals with PTSD **re-experience** the trauma by replaying it when dreaming or having dissociative states that can last for a few seconds to a few days. It is important to note that these recollections are different than rumination in that they are involuntary and often intrusive. In addition, an individual with PTSD **avoids** any stimuli that may cause them to have memories of the trauma. Avoidance may include specific activities, talking about particular subjects, and even people that are reminders of the trauma. A persistent **negative mood** state may be experienced that consists of an inability to feel positive emotions such as happiness and joy. **Negative cognitions** also frequently occur such as forgetting important aspect of the trauma or persistent self-blaming trauma. Alteration in **arousal** and activity may also occur, that may result in irritability and reckless behavior that may lead to unprovoked outbursts of anger. Though the criterion differs slightly for those under the age of 6; individuals of any age can display PTSD symptoms after exposure to trauma. Delayed expression can also occur, with these

characteristic symptoms not occurring until six months or longer after exposure to the trauma (American Psychiatric Association, 2013).

Because of an increase in deployed military, PTSD is becoming a more recognized diagnosis (Ouimette, Read, Wade, & Tirone, 2010). However, children who experience trauma can be diagnosed with PTSD as young as 6 years old (American Psychological Association, 2013). Children who suffer from PTSD are more at risk for negative life outcomes. These children are not only at risk for emotional and physical abuse, but also for imposing abuse on others. In adulthood, unemployment is often common among those diagnosed which can be associated with drug and alcohol abuse as well as criminal behavior. If those with PTSD do not receive the treatment needed, suicide may occur as a means of escaping the debilitating effects of this disorder (Breslau, 2001).

The study previously discussed by Halligan et al. (2006) suggested that individuals who had PTSD symptoms but deliberately ruminated about a trauma were more likely to have decreased physiological responses when later discussing the trauma than those who did not ruminate. Taking the results of Halligan et al.'s (2006) study and the increase in negative risk factors in those with PTSD, the current study addresses whether PTSD exacerbates the relationship between childhood trauma and outcomes. Other factors such as a child's relationship with parental caregiver may influence psychological and physiological functioning, therefore, parental care and protection measures were included.

The Present Study

Children who are maltreated (Paivio & Pascual-Leone, 2010), have parents who abuse substance (Nicholson et al., 2006) or have parents with a mental disorder (Aldridge, 2006) are most at risk to experience trauma. Experiencing trauma has been associated with

developing long-term health and psychological consequences (Felitti et al., 1998).

However, not all children who have experienced trauma have negative consequences; some children are resilient to the adverse effects of trauma (Cicchetti & Rogosch, 2009). Previous findings have suggested that both PTSD and deliberate rumination may moderate psychological and physiological functioning. Optimal adaptation to childhood trauma may be inferred from self-reports of functioning and from physiological measures of ANS arousal under stressful conditions.

Hypotheses

The current study explored the relationship between childhood trauma and physiological responses elicited while discussing early memories during a semi-structured interview. More specifically, the present study focused on deliberate rumination in relation to ratings of distress, interpersonal functioning, role competence, EDA, and HRV. The main goal of the current study was to determine if the relationship between childhood trauma and psychological functioning, EDA, and HRV were moderated by deliberate rumination.

Hypothesis 1

Childhood maltreatment will be associated with worse psychological functioning, indicative of greater distress, lower interpersonal functioning, and role disruption. In addition, participants who reported more maltreatment during childhood were expected to have higher EDA and lower HRV while describing memories of childhood than participants who reported less maltreatment.

Children who experience chronic stress, such as maltreatment, often have difficulties in emotion regulation and emotion cues. Research suggests that many children who experience trauma have less direction for life goals and have more issues maintaining

relationships (Cook et al., 2003). Chronic stress during childhood can cause the ANS, which can be measured by EDA and HRV, to be activated at even the slightest stressor. Studies have shown that although ANS arousal can be beneficial to the individual in preparation for trauma, it can have negative long term health consequences such as consistently higher EDA and lower HRV (Felitti et al., 1998).

Hypothesis 2

Deliberate rumination was expected to be associated with PTSD symptoms, as well as negatively correlated with a high endorsement of items on the PCL-5. The study by Halligan et al. (2006) suggested that individuals who had PTSD symptoms but deliberately ruminated about a trauma were more likely to have decreased physiological responses when later discussing the trauma than those who did not ruminate. Having better physiological responses after ruminating suggests that deliberate rumination is beneficial and may lower risk of PTSD after a trauma.

Hypothesis 3

The relationship between childhood maltreatment and psychological functioning will be moderated by PTSD symptoms.

Participants who reported childhood maltreatment and who experienced PTSD symptoms were expected to have worse psychological functioning, indicative of greater distress, lower interpersonal functioning, and role disruption than participants who reported maltreatment but did not experience symptoms of PTSD. Children who experience maltreatment are more at risk to have mental illness, difficulties controlling stress responses and with interpersonal relationships (Cicchetti and Valentino, 2006). Further, it was expected that PTSD symptoms may exacerbate the impact of trauma from childhood

maltreatment on psychological functioning from previous research findings (Roisman, Tsai, & Chiang, 2006; Breslau, 2001).

Hypothesis 4

The relationship between maltreatment and psychological functioning will be moderated by deliberate rumination.

Participants who reported childhood maltreatment and engaged in deliberate rumination were expected to have better psychological functioning, indicative of less distress, higher interpersonal functioning, and role competence than participants who reported maltreatment but did not engage in deliberate rumination. Maltreatment in childhood can sometimes be associated with worse psychological functioning in adulthood. However, not all children who experience maltreatment have negative consequences. Deliberate rumination is often considered a positive coping style in which the individual intentionally thinks about an event to resolve feelings about it (Stockton et al., 2011). Because of this, it is expected that if an individual deliberately ruminates about childhood trauma in order to resolve feelings, deliberate rumination may be related to better psychological functioning

Hypothesis 5

Worse psychological functioning, indicative of greater distress, lower interpersonal functioning, and role disruption would be predicted by reports of childhood maltreatment, lower deliberate rumination, higher symptoms of PTSD, lower HRV and higher EDA. Previous findings suggest that individuals who experience childhood maltreatment (Cook et al., 2003), deliberately ruminate less (Glynn et al., 2007), have more symptoms of PTSD

(Breslau, 2001), have lower HRV, and higher EDA (Felitti et al., 1998) are more at risk to have worse psychological functioning.

Method

Participants

This study utilized a convenience sample of 55 undergraduates enrolled at University of South Carolina Aiken. Each participant completed questionnaire and physiological measures, and received course credit upon completion. Data from one participant had to be discarded due to unreliable physiological data. Of the 54 participants, 77.8% were women ($n = 42$) and 22.2% were men ($n = 12$). Thirty-three participants reported their ethnicity as European American (61%), 14 reported their ethnicity as African American (26%), and 7 reported their ethnicity as Hispanic (13%). Participants ranged in age from 18 to 23 ($M = 18.69$, $SD = 1.15$). Two percent ($n = 1$) of participants reported having a father with a mental illness, and 5.6% ($n = 3$) reported a mother with a mental illness. Participants reported that 9.3% ($n = 5$) of fathers, 5.6% ($n = 3$) of mothers, and 1.9% ($n = 1$) of both parents had problems with substance abuse. Of the participants, 72.2% reported experiencing some form of maltreatment by meeting clinical cutoff scores on any of the CTQ subscales. More specifically, 38.9% met the clinical cutoff for Emotional Abuse, 37% for Physical Abuse, 11.1% for Sexual Abuse, 40.7% for Emotional Neglect, and 11.1% for Physical Neglect.

Measures

Trauma experience. The LEC-5 is a 20 item self-report developed by Weathers et al. (2013) to identify potentially traumatic events that may have occurred during an individual's life time. There are 16 events queried in addition to one item for the respondent

to complete about an event not listed. For each event, the respondent indicates how the event affected them (happened to me, witnessed it, learned about it, part of my job, not sure, or doesn't apply to me). An example of an event is the following: "Serious accident at work, home, or during recreational activity." Because the revision occurred so recently there is no data for the psychometric properties for the LEC-5 version. In addition, the only change that occurred from the DSM-IV version of the measure to the DSM-5 version is the added response of "part of my job." The authors concluded that because no serious change was made to the recent version, the psychometric properties of the LEC-IV are still applicable. Gray et al. (2004) found the measure to have a retest reliability of .82 and Cronbach's alpha of .67.

To score the LEC-5, the participants were asked to check every event that applied to them and indicate the age it happened. The participant was then asked what event they felt was the worst. After all data collection was complete the PI separated the questionnaires into the following categories related to the worst event: happened to participant, witnessed it, learned about it, or part of participant's job. For example, a questionnaire of someone who directly experienced having a life threatening illness was grouped into a different pile than someone who witnessed someone having a life threatening illness. Following this first grouping, the questionnaires were further sorted into similar categories. For example, participants who had a family member pass away from long-term illness were separated into a category while participants who had a family member suddenly pass away from suicide or transportation accident were put in another. Each group was given a number used for identification and coding for descriptive results.

Psychological functioning. The OQ 45.2 (Lambert, Kahler, Harmon, Burlingame, & Shimokawa, 2004) is a 45 item self-report questionnaire that measures overall functioning in three domains: Symptom Distress (SD), Interpersonal Functioning (IR), and Social Role (SR). The participants rated each item on a 4-point Likert scale. The SD Scale asks questions such as if the participant feels hopeless about the future or if they have thoughts about ending their life. Example items for the IR subscale included asking participants if they felt lonely or if they are feeling as though their relationship is full and complete. The SR subscale has items that assess if the participants if they were feeling as though they were not doing well at work/school or if they were having trouble at work/school because of substance use. The OQ 45.2 has been found to have high internal consistency (.90), a test reliability of .84 over 3 weeks, and has high concurrent validity with scales such as the Symptom Checklist-90 (SCL-90R-GSI, .78) and Zing's Self Rating- Rating Depression Scale (.88). Cronbach's alpha for Symptom Distress was .90, .74 for Interpersonal Relations, and .66 for Social Role in the present study.

Parental Attachment. The Parental Bonding Instrument (PBI) was developed by Parker, Tupling, and Brown (1979) to measure fundamental parenting style and attachment to parent as perceived by the child. It is a 4-point Likert scale ranging from very likely to very unlikely that is intended for those over 16 years of age to answer questions, such as "Spoke to me in a warm and friendly voice" in accordance to how they remember their parents. There are two parts to the scale, the first is questions about the mother specifically and the second is about the father. In the present study, the participant indicated the people they felt were most like a paternal and maternal caregiver, they do not have to be the biological parent. The scores indicate the amount of care the individual felt from parent as

well as the amount of overprotection perceived. The PBI is considered to be independent of mood effects and has been found to have good reliability and validity based on several studies. Russ, Heim, and Westen (2003) found an inter-rater reliability coefficient of .85 for the care scores and .69 for overprotection scores. Safford, Alloy, and Pieracci (2007) found the PBI to have Cronbach's alpha ranging from .87 of the mother's scale to .94 of the father's. Cronbach's alpha for Maternal Care was .93, .86 for Maternal Protection, Paternal Care was .96, and .82 for Paternal Protection in the present study (See Appendix A).

PTSD symptoms. The PTSD Checklist for DSM-5-Civilian (PCL-5-C) was developed by Weathers et al. (2013) to assess for PTSD symptomology. The PCL-5 is a 20 item self-report measure that asks the respondent to rank, from 0 (not at all) to 4 (quite a bit), an event that has bothered them in the past month. For example, in the last month how much has the respondent had "repeated, disturbing memories, thoughts, or images of a stressful experience from the past?" Blevins, Weathers, Witte, and Davis (2012) found that the PCL-5 has good convergent validity, good discriminative validity, and high internal consistency with an alpha coefficient of .94. Cronbach's alpha for PTSD symptoms was .94 in the present study.

Rumination. The Event Related Rumination Inventory (ERRI) is a 20-item self-report developed by Cann et al. (2011). ERRI is used to differentiate between intrusive rumination and deliberate rumination. Two subscales comprise the measure. The first subscale contains 10 statements that assess intrusive, unintentional thoughts (e.g., I could not keep images or thoughts about the event from entering into my mind). The second scale contains 10 items to measure deliberate rumination (I thought about whether I could find meaning from my experience). Both the intrusive and deliberate subscales demonstrate high

internal reliability for both intrusive (Cronbach's alpha = .94) and deliberate (Cronbach's alpha = .88) items. The deliberate subscale was only used for this study. Cronbach's alpha for deliberate rumination was .91 in the present study.

Child Maltreatment. The Child Trauma Questionnaire (CTQ;) was developed by Bernstein and Fink (1998). The CTQ is a 28-item brief self-report survey that assesses the following factors of child abuse experiences among adolescents and adults: physical and emotional abuse, emotional neglect, sexual abuse, and physical neglect. Three additional items are sensitive to minimizing or denying abuse. Respondents rate the truth of each statement from 1-5. "I didn't have enough to eat" and "People in my family said hurtful or insulting things to me" are examples of item statements. The CTQ has test-retest reliability coefficients ranging from .79 to .86 over four months and internal consistency reliability coefficients ranging from .66 to a median of .92 across samples (Bernstein & Fink, 1998). Cronbach's alpha for Child Maltreatment was .85 in the present study.

Demographics Questionnaire. (See Appendix B) A questionnaire was developed in order to document demographic information about each participant (i.e age, race, gender).

Interview Questions. (See Appendix C) Questions were divided into groups to stimulate discussion between interviewer and participant. The first group of questions were asked to build rapport in which the participant was asked basic questions, such as "Where were you born?". These questions were followed by questions about positive memories from childhood in order for the participant to begin thinking about memories from childhood. Questions included, "What was the greatest joy of your childhood? Tell me about the people you lived with as a child." The next set of questions asked were about childhood distresses. For example, "Was there ever a time when you were upset about

something as a child? The final group was intended to end positively, such as “What special events did your family celebrate?””. The questions were written so that the answers had the potential to be about childhood trauma but did not directly ask about it. Further, all questions had additional clarifying questions in case the participant did not understand the initial question or more elaboration was need to understand the response. For example, if a participant was asked their greatest joy of childhood but did not understand the question; “What was your favorite memory from childhood?” could be asked. By asking specific clarifying questions, uniformity of questions was maintained as best as possible.

Using BioPac Systems, Inc. ECG, EDA change, and HR were recorded. Data recording began when the Principal Investigator (PI) finished asking a question and ended when the participant finished their response. For physiological data calculation, only the three interview questions that were classified as a negative question type were used. To calculate EDA, the highest peak value during each of the three negative questions was selected. HR was calculated by averaging the mean HR during the data collection time period for each of the three negative questions. Lastly, HRV was summarized over the three negative questions and was calculated with the BioPac System by analyzing the sympathetic-vagal balance.

Procedure

Participants were individually brought into a laboratory room by the PI. The participant was asked to sit in the chair that allowed their dominant side to be closest to the EDA monitors. The PI reviewed and explained the informed consent document (See Appendix D), as well as explained each step of the process in nontechnical language. The participant was also informed that there would be two experimenters involved in data collection. It was explained that the additional experimenter would be watching for any

sudden movements that the participant made that could interfere with data outcomes. After the informed consent was signed, the PI connected the participant to the physiological monitors and reminded them that they would be asked to answer a series of questionnaires while the leads were attached, but not recording. The questionnaires took approximately 30 minutes to complete and were arranged in the same order for each participant: OQ 45.2, PBI, LEC-5, PCL-5, ERRI, CTQ, and demographics questionnaire. The questionnaires were ordered in such a way to encourage the participant to gradually think about potential childhood trauma. For example, the OQ 45.2 was administered first to assess for psychological functioning without thinking about trauma. However, as the participant completed each questionnaire trauma was asked about more frequently until the questionnaire that directly asked about childhood trauma. When the participant completed the questionnaires, the PI collected a 2 minute baseline. Following this, the participant was asked a series of questions in the semi-structured interview developed by the experimenters in order to collect physiological data. Upon completion of the interview, the additional experimenter turned off all recordings, detached all electrodes, and reviewed the OQ 45.2 for any critical item endorsements. If there was a critical item out of the three endorsed, the PI gave the participant an information sheet consisting of campus and community resources available (See Appendix E). Participant questions were answered before leaving the experiment.

Results

The primary purpose of the present study was to explore how childhood trauma was related to current psychological and physiological functioning; and how this relationship may be dependent on deliberate rumination and PTSD symptoms. Information about a

specific trauma experienced, witnessed, or learned about was gathered for each participant. In addition, descriptive data was collected about psychological functioning, parental attachment, PTSD symptoms, rumination, and childhood maltreatment. Childhood trauma reported was a specific potentially traumatic life event, child maltreatment, or having a parent with a substance abuse or mental disorder. Findings of predicted hypotheses are reported following descriptive values of traumas and measures. Psychometric properties of these variables can be found in Table 1.

Descriptive Information

Childhood trauma was measured by self-reports of specific traumatic events that may have occurred, types of maltreatment, and whether a parent abused substances or had a mental illness. Ninety-eight percent ($n = 53$) of participants had directly experienced, witnessed, or learned about a traumatic event. The worst thing that ever happened to 16.2% ($n = 11$) of participants was the loss of a family member or close friend to non-normal circumstances (sudden accidental or violent death). Twelve percent ($n = 8$) had lost a close friend or family member under normal circumstances (illness). Nine percent ($n = 6$) of participants indicated direct emotional trauma (unstable environment), 5.9% ($n = 4$) had witnessed someone they cared for experiencing emotional trauma, and 4.4% ($n = 3$) learned someone they cared for had experienced emotional trauma. Of the participants, 20.6% ($n = 14$) had experienced physical trauma (physical or sexual assault) directly, while 2.9% ($n = 2$) had witnessed physical trauma. Seven percent ($n = 5$) of participants had learned of someone close to them experiencing physical trauma. Thirty-six percent ($n = 20$) of participants reported physical abuse, 26% ($n = 14$) experienced emotional abuse, and 6% reported sexual abuse ($n = 3$). Of the participants, 11% ($n = 6$) indicated they had been

physically neglected, while 13% ($n = 7$) reported being emotionally neglected. Fifteen percent ($n = 8$) of participants reported having a parent who abused substance, .06% ($n = 3$) indicated having a parent diagnosed with a mental illness, and .04% ($n = 2$) had a parent with both. There was no difference in race and gender in regards to types of trauma, maltreatment, and whether a parent abused substances or had a mental illness.

Psychological functioning. The OQ 45.2 was utilized to determine psychological well-being based on three categories of psychological functioning. Beckstead et al. (2003) found undergraduates had a mean of 22.96 ($SD = 10.48$) for Symptom Distress, a mean of 8.78 ($SD = 4.97$) for Interpersonal Relations, and a mean of 10.40 ($SD = 3.62$) for Social Role. Compared to the findings of Beckstead et al. (2003), participants in the current study indicated somewhat higher Symptom Distress ($M = 29.59$, $SD = 13.80$), more difficulties in Interpersonal Relations ($M = 10.39$, $SD = 5.74$), and more problems related to their Social Roles ($M = 11.85$, $SD = 4.40$).

Parental attachment. Participants in the current study reported slightly higher levels of Maternal Care and Maternal Protection, and Paternal Care and Paternal Protection on the PBI as compared to data reported by undergraduates in a study in 1990 by Wilhelm and Parker ($M = 26.3$, $SD = 7.24$ for Maternal Care; $M = 13.8$, $SD = 7.72$; for Maternal Protection; $M = 21.4$, $SD = 10.72$ for Paternal Care; and $M = 11.9$, $SD = 7.38$ for Paternal Protection).

PTSD symptoms. The PCL-5 was utilized to assess symptoms of posttraumatic stress disorder among participants. Participants in the current study had a mean of 42.63 ($SD = 16.32$) on the PCL-5, consistent with the mean of 42.01 ($SD = 17.55$) reported by Contractor, Armour, Wang, Forbes, and Elhai (2014).

Rumination. The ERRI was utilized to determine whether participants engaged in deliberate rumination after experiencing a potentially traumatic event. Undergraduates in the current study had a mean of 1.55 and a standard deviation of 0.80; consistent with the 2011 study of Cann et al. ($M = 1.63, SD = 0.76$).

Child maltreatment. The CTQ was utilized to gather information about potential maltreatment experienced in childhood. Participants reported similar rates of childhood trauma ($M = 36.04$) as undergraduates in the study of Paivio and Cramer (2004) who had a mean of 36.16.

Participants in the current study reported similarly to participants of previous studies on some measures but not all. Although participants reported worse psychological functioning, they indicated more parental care and protection. Participant reports in the current study were consistent with previous studies in regards to symptoms of PTSD, rumination, and child maltreatment.

Hypothesis Testing

Hypothesis 1. Relationship among child trauma, psychological functioning, and physiological functioning. To measure current functioning, four measures including three physiological measures (EDA, HRM, and HRV) and one self-report measure (OQ 45.2) were utilized. In addition, child trauma was measured by four trauma measures (child maltreatment reported on the CTQ, traumatic life event reported on the LEC-5, reporting a parent with mental illness, and reporting a parent with substance abuse). Table 2 shows Pearson's r correlations between current functioning measures and child trauma.

The most consistent significant relationships were between self-reported psychological functioning and childhood maltreatment. Childhood maltreatment and

psychological functioning yielded a significant correlation of $r(53) = .60, p < .01$. Further, all three subscales on the psychological functioning questionnaire (symptom distress, interpersonal relationships, and social role confusion) yielded significant correlations. The significant correlation between maltreatment and the following subscales of psychological functioning were as follows: symptom distress scores was $r(53) = .57, p < .001$, the correlation between interpersonal relationships and maltreatment was $r(53) = .63, p < .001$, and the significant correlation between social roles and maltreatment was $r(53) = .33, p < .001$. Further, all subscales of the CTQ were found to be significantly correlated with worse psychological functioning (Table 3). Additional analyses were conducted to assess the relationship among childhood maltreatment and physiological functioning but no significance was found. However, a significant relationship was found between psychological functioning and having a parent with substance abuse, $r(54) = .32, p < .05$. HRM was also found to be correlated with having a parent with substance abuse, $r(54) = .36, p < .001$, but no significance was found for EDA and HRV. Finally, testing for a parent with a mental illness and HRV yielded a significant correlation of $r(53) = .29, p < .05$, but no other significance was found.

Overall, our hypothesis was partially supported. Growing up with a parent with a mental illness and experiencing a traumatic life event were the only measures not associated with worse psychological functioning. No trauma measures were associated with EDA change, but having a parent with a substance abuse was associated with having higher HRM and having a parent with a mental illness was associated with higher HRV.

Hypothesis 2. Relationship between deliberate rumination and PTSD symptoms. It was hypothesized that deliberate rumination would be negatively correlated

with PTSD symptoms. This hypothesis was tested using a Pearson's r correlation coefficient, yielding a significant positive correlation of $r(53) = .60$, $p < .001$ between deliberate rumination and PTSD symptoms scores. Thus, suggesting that deliberate rumination and PTSD symptoms appear to be positively correlated in the present study as opposed to negatively as expected.

Hypothesis 3. PTSD will moderate the relationship between childhood maltreatment, and psychological and physiological functioning. PTSD symptoms were expected to moderate the relationship between childhood maltreatment and HRV, EDA, and psychological functioning. Participants were separated into high symptoms of PTSD and low PTSD symptom groups by calculating the median score of the PTSD measure. The same was done to separate participants who had high reports of maltreatment from those with low reports. A 2 by 2 ANOVA was utilized to compare the effect of childhood maltreatment on HRV, EDA, and psychological functioning dependent upon reports of PTSD symptoms (see Figure 1).

There was a main effect of PTSD symptoms on psychological functioning, $F(1,50) = 12.66$, $p < .001$, such that participants who reported high amounts of PTSD symptoms also reported worse psychological functioning ($M = 63.11$, $SE = 3.88$) than those who did not ($M = 44.10$, $SE = 3.67$). There was also a main effect of child maltreatment, $F(1,50) = 8.43$, $p = .01$, such that participants who reported high maltreatment also had worse psychological functioning ($M = 61.36$, $SE = 3.60$) than those who did not ($M = 45.85$, $SE = 3.95$). There was not a significant interaction between PTSD symptoms and child maltreatment, $F(1,50) = .78$, $p = .38$ on psychological functioning.

There was not a main effect of PTSD symptoms on EDA, $F(1,50) = 1.41, p = .24$, nor child maltreatment, $F(1,50) = .23, p = .63$, nor was there an interaction between PTSD symptoms and child maltreatment, $F(1,50) = .39, p = .53$, on EDA. There was not a main effect of PTSD symptoms on HRV, $F(1,50) = .74, p = .40$, nor child maltreatment, $F(1,50) = .37, p = .55$, nor was there an interaction between PTSD symptoms and child maltreatment, $F(1,50) = .66, p = .42$, on HRV. Results suggest that those who experienced PTSD symptoms, as well as those who reported high maltreatment, had worse psychological functioning (see Figure 1). Thus, the hypothesis was partially supported; results suggest that individuals who experienced PTSD symptoms had worse psychological functioning than those who did not experience symptoms of PTSD. Further, as much as PTSD was related to psychological functioning as expected, it still did not moderate the relationship.

Hypothesis 4. Deliberate rumination will moderate the relationship between childhood maltreatment, psychological and physiological functioning. Deliberate rumination was expected to moderate the relationship between childhood maltreatment, HRV, EDA, and psychological functioning. Participants were separated into high ruminators and low ruminator groups by calculating the median score of the deliberate rumination measure. The same was done to separate participants who had high reports of maltreatment from those with low reports. A 2 by 2 ANOVA was utilized to compare the effect of childhood maltreatment on HRV, EDA, and psychological functioning dependent upon reports of deliberate rumination (see Figure 2).

There was not a main effect of deliberate rumination on psychological functioning, $F(1,50) = 1.91, p = .17$. There was not a significant interaction between deliberate rumination and childhood maltreatment, $F(1,50) = .49, p = .49$, on psychological

functioning. There was not a main effect of deliberate rumination on EDA, $F(1,50) = .90, p = .35$, nor child maltreatment, $F(1,50) = .64, p = .43$, nor was there an interaction between deliberate rumination and child maltreatment, $F(1,50) = .11, p = .75$, on EDA. There was not a main effect of deliberate rumination on HRV, $F(1,50) = .88, p = .35$, nor child maltreatment, $F(1,50) = .19, p = .67$, nor was there an interaction between PTSD symptoms and child maltreatment, $F(1,50) = 1.07, p = .31$, on HRV. Deliberate rumination did not moderate or have a main effect; therefore, results suggest that the hypothesis was not supported.

Hypothesis 5. Relationship among psychological functioning, childhood maltreatment, deliberate rumination, PTSD symptoms, and physiological functioning.

It was hypothesized that worse psychological functioning would be associated with childhood maltreatment, lower deliberate rumination, higher PTSD symptoms, lower HRV and higher EDA. A stepwise linear regression analysis was performed using the variables of psychological functioning, maltreatment, deliberate rumination, HRV, and EDA to determine if variables were related to psychological functioning. All predictor variables were entered simultaneously. The stepwise process selected the individual variable with the highest F statistic, in each successive steps until no further variable explained additional significant variance.. Regression results indicated that childhood maltreatment significantly predicted psychological functioning, $b = .40, t(53) = 3.60, p < .001$. In addition, child maltreatment explained a significant proportion of variance in psychological functioning, $R^2 = .47$. PTSD symptoms significantly predicted psychological functioning, $b = .42, t(53) = 3.72, p < .001$. In addition, PTSD symptoms explained a significant proportion of variance in psychological functioning, $R^2 = .35$. Results indicated there was no significance among

psychological functioning and deliberate rumination, psychological functioning and HRV, nor was there significance among psychological functioning and EDA. The values of this final hypothesis can be found within Table 4. Thus, the hypothesis was only partially supported since results suggest that childhood maltreatment and PTSD symptoms predict worse psychological functioning, but deliberate rumination and physiological functioning did not.

Discussion

The purpose of the present study was to explore the relationship between psychological functioning, PTSD symptoms, deliberate rumination, childhood maltreatment, and physiological functioning. Previous literature has suggested that children who are maltreated (Paivio & Pascual-Leone, 2010), have parents who abuse substance (Nicholson et al., 2006) or have parents with a mental disorder (Aldridge, 2006) are more at risk to experience trauma. Further, those who experience trauma are more likely to have more interpersonal difficulties and long term negative health consequences (Felitti et al., 1998). However, not all children who have experienced trauma have negative consequences (Cicchetti & Rogosch, 2009) and the reason for this is unclear. Studies have suggested PTSD may exacerbate, and ruminative coping may attenuate the impact of complex trauma on psychological and physiological functioning. However, findings in regards to the role of deliberate rumination have been inconsistent (Halligan et al., 2006; Glynn et al., 2007; Foster & Webster, 2001).

As expected, experiencing childhood maltreatment was associated with worse psychological functioning. Further, just as previous research suggested (Paivio & Pascual-Leone, 2010), maltreatment was associated with having more difficulty in social roles and

having symptoms consistent with certain types of disorders such as anxiety disorders, affective disorders, and adjustment disorders (Aldridge, 2006; Cook, Blaustein, Spinazzola, & Kolk, 2003). Previous findings also suggested that many children who experience trauma have more issues with have difficulty maintaining interpersonal relationships (Paivio & Pascual-Leone, 2010), and this was supported in the current findings as well. Further, not only was child maltreatment associated with worse psychological functioning but so was having a parent with substance abuse. These results suggest that experiencing childhood trauma is related to having worse psychological functioning in early adulthood. It should be noted, it is possible that participants who have current psychological functioning difficulties may have inaccurately reported more maltreatment. Meaning, their responses may not be a true indication of the level of child maltreatment experienced. The findings of the present study support previous research suggesting that individuals who experience maltreatment are more likely to have difficulty with psychological functioning.

Neither of the hypotheses regarding deliberate rumination were supported. It was expected that deliberate rumination would be a moderator and be beneficial, however; it was neither. Although it was expected that deliberate rumination would moderate the relationship between childhood maltreatment and functioning, it did not. In addition, deliberate rumination and PTSD symptoms appeared to be positively related in the present study as opposed to negatively. This positive correlation suggests that individuals who deliberately ruminate about trauma actually have more symptoms of PTSD. More specifically, it suggests that individuals who deliberately ruminate about trauma actually have more symptoms of PTSD; inferring that it may actually be harmful for those who have experienced childhood maltreatment to deliberately ruminate because they in turn report

more symptoms of PTSD. Although the results of the current study suggest that deliberate rumination is associated with having more PTSD, there are many other alternatives as to why the results were different than expected.

Posttraumatic growth (PTG) is the idea that individuals can grow in a positive way after experiencing a traumatic event (Lindstrom, Cann, Calhoun, & Tedeschi, 2013). There are different factors that allow individuals to grow, deliberate rumination being one of these. Typically, rumination is thought of negatively, however, research related to PTG distinguishes a difference between deliberate and intrusive which is most often associated with PTSD (Lindstrom et al., 2013). Intrusive rumination primarily refers to unwanted pervasive thoughts that cause distress. In contrast, deliberate rumination is purposeful, directive thoughts, intentionally aimed for meaning making of an event. The ERRI used in the current study was specifically designed to assess for this type of positive deliberate rumination. It is possible that the individual was thinking negatively about trauma, however, research has shown consistently that the ERRI is reliable in assessing for the deliberate cognitive processing that occurs with deliberate rumination and that often indicates PTG (Cann et al., 2011; Tennen & Affleck, 1998; Taku, Calhoun, Cann, & Tedeschi, 2008; Taku, Cann, Tedeschi, & Calhoun, 2009; Cann, Calhoun, Tedeschi, & Solomon, 2010). It is possible that the measure was not effective in assessing for deliberate rumination; however, even if the measure was ineffective there are many other reasons as to why deliberate rumination may not have appeared beneficial in the current study (Lindstrom et al., 2013).

For instance, the participants in this study may have been engaging in deliberate rumination by thinking about the experience but some of the trauma reported had been as recent as the previous year. Therefore, some participants may have been deliberately

ruminating in order to process emotions but since the trauma happened recently, the participants may not have had time to come to a resolution. It is important to note again the deliberate rumination is intentional rumination about an event to collect thoughts about what happened, not unwanted intrusive rumination. By not resolving emotions, deliberate rumination may actually cause the individual to have symptoms similar to those of PTSD because of thinking about the experience without resolution.

Another reason the results may have been different is that the individual is still processing the event. Meaning it is possible that participants with PTSD had experienced more traumatic experiences, and therefore, had more to ruminate about and were still trying to resolve trauma. Further, deliberate rumination has been assessed many different ways. For example, deliberate rumination can be measured immediately following a traumatic event but can also be measured much later after the trauma has occurred. More specifically, if the trauma occurs in early childhood, deliberate rumination can be assessed in adolescence or even in to adulthood. Research has not suggested a specific time period that is best to deliberately ruminate following a childhood trauma so it is unclear if the timing of deliberate rumination may or may not have an impact on functioning. In addition, deliberate rumination has been assessed by other measures besides the ERRI used in the current study, such as the Rumination Scale (Lindstrom et al., 2013). Lastly, deliberate rumination can be assessed following not only traumatic events but also stressful experiences. The results of the study revealed that participants who endorsed a high amount of PTSD symptoms also had worse psychological functioning than those who did not experience many symptoms of PTSD. However, there was no main effect for PTSD on physiological measures. Further, even though PTSD was strongly related to psychological functioning as expected,

surprisingly it still did not moderate the relationship. The lack of significance may be a result of a lack of power for the sample. The PTSD measure was a self-report so the lack of significance could be attributed to the nature of self-reports.

Overall, there were very few associations between self-report measures and physiological measures; growing up with a parent with substance abuse was associated with higher HRM and higher HRV was associated with having a parent with a mental illness. There are several possible interpretations for the non-significant findings. First, previous research has suggested that molecular changes can occur that influence physiological functioning as a result of trauma during early development (Felitti et al., 1998). The allostasis and allostatic load model is one of many stress models proposed to explain how the body reacts to stress over time (Seeman, Singer, Rowe, Horwitz, & McEwen, 1997). The model explains that there are two factors that have a role in chronic or repeated stress response. Allostasis is how the body maintains stability during physiological and environmental change, or homeostasis, by the cardiovascular system and hormones. Allostatic load refers to how the body's efficiency in adapting to stress decreases in controlling the responses after repeated allostasis. The greater the allostatic load, the greater likelihood the individual will have long term negative health consequences. These two work together as the individual experiences stress over a lifetime. There are four main contributors that can increase allostatic load leading to adverse health consequences. Too much repeated stress or trauma that causes repeated elevations of stress responses over time. For example, if a participant experienced complex trauma such as repeated physical abuse during childhood, the repeat of stress response could cause an increase of allostatic load leading to adverse consequences. A second contributor is a failure to adapt physiological or

psychologically to the same stressor. Meaning, if a participant experienced repeated trauma but had difficulty adapting to physiological responses this could lead to allostatic overload. Third, the inability to turn off the body's stress response after the stressful event is finished. This suggests that if an individual's physiological responses persist long after trauma this could lead to overload. Finally, over time the increase in allostatic load can cause an inadequate hormonal stress response meaning the participant's body would struggle regulating responses to stressors no matter the severity. These contributions to allostatic load can lead to a difference in how each of the participants of the current study responded physiologically (Seeman, 1997).

Further, the model holds that everyone responds differently to chronic stress. The capacity to adapt is different everyone, as well as the capacity of allostatic overload, as well as how the brain coordinates the behavioral and neuroendocrine responses in addition to the other individual differences mentioned before such as genetic and specific trauma experienced. Overall, the model suggests that there are many factors as to why individuals have varying physiological responses and that it is difficult to pinpoint a specific factor. Therefore, identifying many reasons such as those listed above as to why there were not many physiological difference found among the participants is the best explanation for this study (Seeman et al., 1997). In addition to the model explained about there are other factors involved in the study that may have contributed to a lack of significant results. First, not all trauma reported in the study happened in early childhood. The range for the trauma was from age 4-17. Previous studies conclude that early childhood trauma can cause an immediate physiological change in the individual but the studies regarding adolescent physiological change after trauma is inconclusive (Taieb, Moro, Baubet, Revah-Levy, &

Flament, 2003; Heim, Newport, Mletzko, Miller, & Nemeroff, 2008; Heim et al., 2000; Olf, Langeland, Draijer, & Gersons, 2007; Perry, Pollard, Blaicley, Baker, & Vigilante, 1995). More specifically, research indicates that trauma can have serious biological consequences if it occurs during a critical stage when the child is most vulnerable (Perry et al., 1995). Therefore, some participants of the current study may have experienced trauma too late, particularly a solitary trauma, for it to have an effect great enough to alter physiological response. However, this does not mean that these participants will not have later change it is just possible that the change has not occurred yet.

The final explanation as to why some of the results were not found is related to the centrality of an event and the relation to the individual's core beliefs (Groleau, Calhoun, Cann, & Tedeschi, 2013). Centrality of a traumatic event can have a significant impact on an individual's psychological functioning, and in turn, impact physiological functioning. If the trauma changes how the individual views the world or changes their core beliefs; this can have a greater impact than if the individual's ideas and expectancies about the world. Altered expectancies can cause them to have psychological difficulties such as anxiety that they may not have had otherwise. Difficulties such as these can impact physiological stress responses (i.e., physiological preparedness). Meaning, if the trauma challenged the participant's core beliefs, this would impact their psychological and physiological functioning greater than if the trauma did not challenge the core beliefs (Groleau et al., 2013).

In summary, the findings of the current study suggest that having a trauma in childhood including being maltreated and having symptoms of PTSD predicted worse psychological functioning in adulthood. In addition, results suggest that there is a

relationship between deliberately ruminating and having PTSD symptoms. It was surprising that some of the variables were not more related to physiological functioning. However, perhaps the most surprising finding is that although the relation between trauma and psychological functioning were so strong, PTSD was associated with worse functioning but did not moderate the relationship between trauma and current functioning. Although the results were not as expected, the current study exemplifies the need for more research in this area. Having clearer ways to measure and classify deliberate rumination can decrease issues in the discrepancies.

Limitations

Despite the findings revealed in the present study, there are a number of limitations that need to be addressed in future studies of the relationship between childhood maltreatment, deliberate rumination, psychological and physiological functioning. First, only 54 participants from the same university completed the study. The small sample size provided limited power to the study, and the narrow diversity may have been associated with a lack of findings.

Secondly, because participants were young adults when recalling childhood trauma it is possible that trauma was not remembered and reported accurately. In future studies, having a participant verify with a care provider or family member the accuracy of the trauma may be beneficial. Further, participants answered all measures by self-report so there is the possibility that responding may have been socially desirable, exaggerated, or purposely false.

In addition, because some of the hypotheses are correlational, it makes it impossible to determine the direction of effects. Correlational studies determine whether or not the

variables change on average. Meaning, correlation does not mean causation, just association.

Finally, interview questions were not asked in such a way to press a participant if answering briefly or attempting to avoid answering. All questions were the same for each participant and were not altered. Therefore, some participants may have answered a question so briefly that physiological data was not able to be collected and accurately analyzed. Further, the method of analyzing the interview questions may not have been the most beneficial. In the present study, only data from answers about childhood distresses were analyzed. In future studies, it may be better to compare data from positive answers (e.g., favorite childhood memory) to negative answers (e.g., childhood distresses) as opposed to just one type of question.

Future Directions

The purpose of this study was to determine if deliberate rumination is harmful or helpful to those with childhood trauma in order to give direction to therapists about whether to allow clients to ruminate or to challenge as a part of treatment. Further, it was expected that the results may also shed light as to why some people who experience childhood trauma develop resiliency when others do not. Results suggest that deliberate rumination is not helpful after childhood trauma. Individuals who reported ruminating after a trauma had worse psychological functioning and more symptoms of PTSD. For studies in the future, self-report measures should be utilized less and PI questions more. Further, during an interview the PI should be able to ask more questions to encourage the participant to share about childhood and feelings surrounding it. Hopefully, by doing this the time frame for the participant eliciting physiological response will be increased. Finally, in future studies the

participants need to be more diverse by going out in to the community for the sample, such as in facilities. All participants were full time undergraduate students so they can be considered as already functioning better than others who have experienced childhood trauma (e.g., those in correctional facilities or institutions). Even if deliberate rumination is not beneficial for those who have experienced trauma, this study increases the evidence that deliberately ruminating about childhood trauma may not be helpful.

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Table 1

Psychometric Properties of the Major Study Variables

Variable	<i>M</i>	<i>SD</i>	α	Range		Skew
				Potential	Actual	
Psychological Functioning						
Symptom Distress	29.60	13.76	.90	0-100	2-59	0.24
Interpersonal Relations	10.65	5.67	.74	0-44	2-29	0.78
Social Role	11.85	4.40	.66	0-36	3-21	0.22
Parental Attachment						
Maternal Care	29.76	7.21	.93	0-40	6-36	-2.02
Maternal Protection	15.63	7.69	.86	0-39	1-39	0.98
Paternal Care	24.00	10.73	.96	0-36	1-36	-0.66
Paternal Protection	14.28	7.39	.82	0-39	4-30	0.53
PTSD Checklist	22.63	16.32	.94	0-100	0-65	0.54
Rumination Inventory	15.94	7.87	.91	0-30	0-29	-0.28
Child Maltreatment	36.04	11.69	.85	25-125	25-80	2.11
Physiological Functioning						
Mean Heart Rate	84.99	12.67	.96		58-125	0.39
Peak EDA	1.59	1.52	.88		-0.21-6.40	1.06
HR Variability	0.58	0.23	.58		0.26-1.22	1.08

Note. PTSD Checklist: Posttraumatic Stress Disorder Checklist; Peak EDA: Peak Electrodermal Activity; HR Variability: Heart Rate Variability

Table 2

Correlations Between Trauma and Functioning

Measure	OQ	EDA	HRM	HRV
CTQ Total	.60**	.04	.08	.07
Emotional Abuse	.61**	.11	.14	.03
Physical Abuse	.30*	.08	.07	.08
Sexual Abuse	.41**	-.20	-.19	-.01
Emotional Neglect	.52**	.05	.10	.05
Physical Neglect	.29*	-.07	.03	.12
LEC-5	.19	.13	-.20	.16
Parent Mental Illness ^a	.21	.05	-.12	.29*
Parent Substance	.32*	.10	.36**	.11

Note. ^a= point-biserial correlation; OQ: Outcome Questionnaire 45.2; EDA: Electrodermal Activity; HRM: Heart Rate Mean; HRV: Heart Rate Variability; CTQ: Childhood Trauma Questionnaire; LEC-5: Life Events Checklist, 5th version

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table 3

Psychometric Properties of Child Trauma Questionnaire (CTQ) Variables

Variable	M	SD	Potential	Actual
Emotional Abuse	8.59	4.10	5-25	5-23
Physical Abuse	7.30	3.00	5-25	5-21
Sexual Abuse	5.56	1.88	5-25	5-15
Emotional Neglect	9.07	4.41	5-25	5-21
Physical Neglect	5.70	1.50	5-25	5-13

Table 4

Summary of Regression Analysis for Predictors of Psychological Functioning

Variable	Model 1 <i>B</i>	Model 2	
		<i>B</i>	95% CI
Childhood Trauma	1.18***	.40***	[.36, 1.25]
PTSD Symptoms	.83***	.42***	[.27, .89]

Note. $N = 53$. CI: Confidence Interval.

*** $p < .001$, two-tailed.

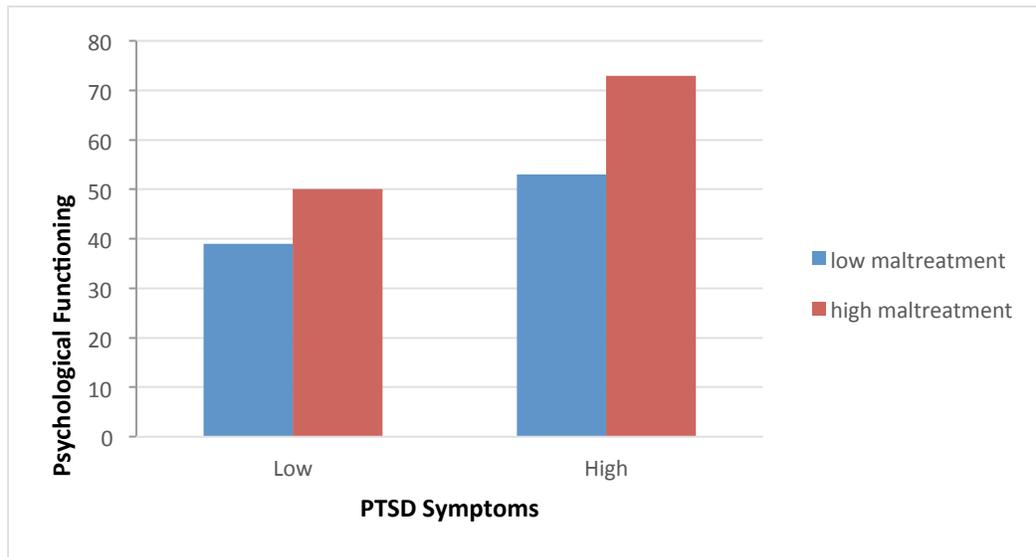


Figure 1. Mean psychological functioning, dependent on symptoms of PTSD and maltreatment.

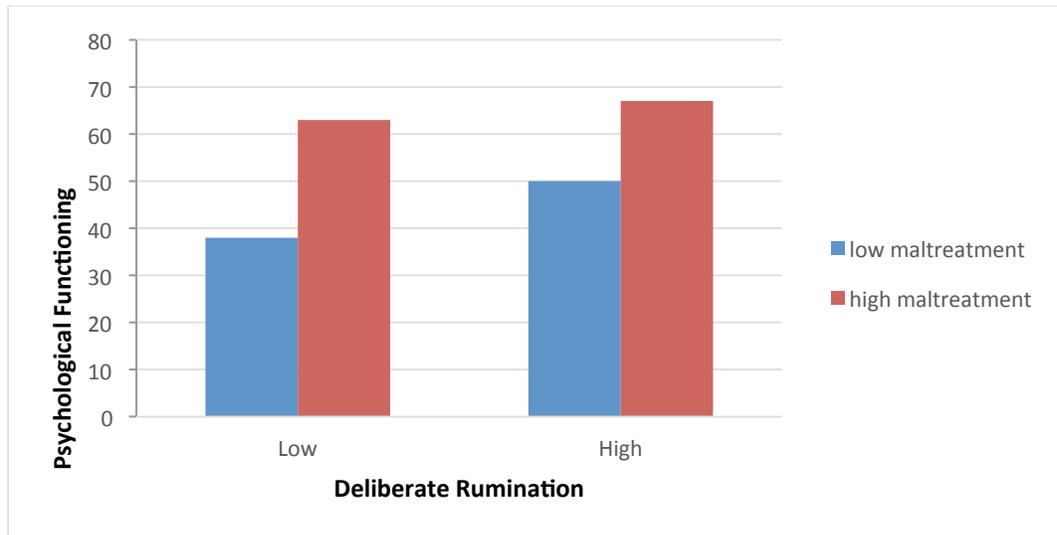


Figure 2. Mean psychological functioning dependent on deliberate rumination and maltreatment.

Appendix A

The Parental Bonding Instrument is used to measure closeness to an individual's maternal and paternal caregiver.

PBI

MOTHER FORM: This questionnaire lists various attitudes and behaviors of parents. Please answer the statements according to who you remember acted most like a maternal figure in your first 16 years. The person you consider most like a maternal figure does not have to be your biological mother. She can be your grandmother, stepmother, or another individual who had guardianship of you. Relation to you:

For example: Mother, Stepmother or My father's sister

	Very likely	Moderately likely	Moderately unlikely	Very unlikely
1. Spoke to me in a warm and friendly voice	3	2	1	0
2. Did not help me as much as I needed	0	1	2	3
3. Let me do those things I liked doing	0	1	2	3
4. Seemed emotionally cold to me	0	1	2	3
5. Appeared to understand my problems and	3	2	1	0
6. Was affectionate to me	3	2	1	0
7. Liked me to make my own decisions	0	1	2	3
8. Did not want me to grow up	3	2	1	0
9. Tried to control everything I did	3	2	1	0
10. Invaded my privacy	3	2	1	0
11. Enjoyed talking things over with me	3	2	1	0
12. Frequently smiled at me	3	2	1	0
13. Tended to baby me	3	2	1	0
14. Did not seem to understand what I needed or wanted	0	1	2	3
15. Let me decide things for myself	0	1	2	3
16. Made me feel I wasn't wanted	0	1	2	3
17. Could make me feel better when I was upset	3	2	1	0
18. Did not talk with me very much	0	1	2	3
19. Tried to make me feel dependent on her/him	3	2	1	0
20. Felt I could not look after myself unless she/he was around	3	2	1	0
21. Gave me as much freedom as I wanted	0	1	2	3
22. Let me go out as often as I wanted	0	1	2	3
23. Was overprotective of me	3	2	1	0
24. Did not praise me	0	1	2	3
25. Let me dress in any way I pleased	0	1	2	3

FATHER FORM: This questionnaire lists various attitudes and behaviors of parents. Please answer the statements according to who you remember acted most like a paternal figure in your first 16 years. The person you consider most like a paternal figure does not have to be your biological father. He can be your grandfather, stepfather, or another individual who had guardianship of you. Relation to you:

For example: Father, Stepfather, or My mother's brother

	Very likely	Moderately likely	Moderately unlikely	Very unlikely
1. Spoke to me in a warm and friendly voice	3	2	1	0
2. Did not help me as much as I needed	0	1	2	3
3. Let me do those things I liked doing	0	1	2	3
4. Seemed emotionally cold to me	0	1	2	3
5. Appeared to understand my problems and	3	2	1	0
6. Was affectionate to me	3	2	1	0
7. Liked me to make my own decisions	0	1	2	3
8. Did not want me to grow up	3	2	1	0
9. Tried to control everything I did	3	2	1	0
10. Invaded my privacy	3	2	1	0
11. Enjoyed talking things over with me	3	2	1	0
12. Frequently smiled at me	3	2	1	0
13. Tended to baby me	3	2	1	0
14. Did not seem to understand what I needed or wanted	0	1	2	3
15. Let me decide things for myself	0	1	2	3
16. Made me feel I wasn't wanted	0	1	2	3
17. Could make me feel better when I was upset	3	2	1	0
18. Did not talk with me very much	0	1	2	3
19. Tried to make me feel dependent on her/him	3	2	1	0
20. Felt I could not look after myself unless she/he was around	3	2	1	0
21. Gave me as much freedom as I wanted	0	1	2	3
22. Let me go out as often as I wanted	0	1	2	3
23. Was overprotective of me	3	2	1	0
24. Did not praise me	0	1	2	3
25. Let me dress in any way I pleased	0	1	2	3

Authors: Gordon Parker, Hilary Tupling and L.B. Brown

Appendix C

Interview questions asked to stimulate discussion between interviewer and participant. Some of the questions are written so that the answers have the potential to be about childhood trauma.

Interview Questions

M Building rapport

Where were you born?

Describe the community that you lived in growing up as a child?

Tell me about the people you lived with as a child?

Did you have other family that didn't live with you? Tell me about them.

If clarification is needed: Do you have siblings or extended family that lived with you? Tell me about them.

M Positive things from childhood

What was the greatest joy of your childhood?

If clarification is needed: What was your favorite memory from childhood? Something that makes you smile when you think back about it. Tell me about it.

M Childhood distresses

Think of a time when you got into trouble at home or at school & tell me about it.

If clarification is needed: Tell me about a time you got in trouble at home or school, how did your caretaker react?

How did that make you feel?

Was there ever a time that you felt that you were punished unfairly?

If clarification needed: Do you remember a time when your caretaker(s) disciplined you and you thought it was unfair? Why did you think that it was unfair? How did you resolve this with your caretaker?

Think of a time when you upset about something as a child and tell me about it

If clarification needed: Some examples would be a family friend dying, being bullied, or not fitting in.

What was the response of your caretaker(s) to your distress? What was your response to your own feelings and to your caretaker(s) response?

M End positive

What special events did your family celebrate? Do you remember an event in particular that was celebrated? What makes it so significant?

Appendix D
Informed consent document



Department of Psychology
UNIVERSITY OF SOUTH CAROLINA AIKEN

CONSENT FORM
The Impact of Childhood Trauma as Moderated by Rumination
Aislyn M. Allen, B.S.

Introduction and Purpose

You are invited to participate in a research study conducted by Aislyn M. Allen. I am a graduate student in the Psychology Department at the University of South Carolina, Aiken. I am conducting a research study as part of the requirements for my Master of Science degree in Applied Clinical Psychology, and I would like to invite you to participate. The purpose of the study is to explore how thinking about things that happened during childhood may either make the past easier to deal with or more difficult. This form explains what you will be asked to do if you decide to participate in this study. Please read it carefully and feel free to ask any questions you like before you make a decision about participating.

Description of Study Procedures

Approximately 50, USC Aiken students who are between 18 and 29 will participate. If you agree to participate, you will take part in one session that will last approximately 1 hour and 15 minutes. During the study you will be asked to complete a series of questionnaires and asked to respond verbally to interview type questions.

Before beginning the study, you will be connected to a heart rate monitor as well as electrodermal activity leads on your non-dominant hand. Heart rate is the speed at which one's heart is beating. From this, we will obtain heart rate variability, the changes in your heart rate over time. Electrodermal activity is the amount of stress-related sweat produced in the palm of one's hand. Although these leads will be in place while you are completing the questionnaires there will be no physiological monitoring during this time; placement of the electrodes is for the sole purpose of allowing you to become accustomed to their attachment.

After this preparation, you will be asked to complete a series of questionnaires. Questionnaires will gather general information, information about your relationship(s) to your primary caregiver(s) as you were growing up, types of traumatic experiences you may have had, your reactions to those experiences and information about your current psychological well-being. The questionnaires will also give me information about rumination. Rumination can be intentionally or unintentionally thinking about an event after it occurs. After the questionnaires are complete, I will turn on the physiological monitors.

The monitors will record your physiological responses as you respond verbally to interview type questions about both good and bad memories as you were growing up. Your verbal responses will not be recorded in any way. After the interview is complete, all recordings will be turned off and all electrodes detached. You will be given contact information about where you can learn the results of the study. I will also provide a pamphlet of local resources for any student who is distressed by thinking about childhood memories.

Risks and Benefits of Participation

There are minor risks associated with participating in this research. You may become mildly distressed when thinking of memories from childhood. If this occurs, and you feel uncomfortable, please let me know at any time during the study. There is also a slight risk of breach of confidentiality, which remains despite steps that will be taken to protect your privacy. Taking part in this study is not likely to benefit you personally, but may help us understand how thinking about the past can either make the past easier to deal with or more difficult.

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University of South Carolina
IRB Number: Pro00033605
Date Approved 5/5/2014
Version Valid Until: 5/4/2015

Costs and Payments

There will be no costs to you for participating in this study. Participants will either receive research credit to compensate for their time or may opt to be entered in a drawing for a \$50 gift certificate to Amazon Market as an incentive instead of receiving research credit. Participants who elect to receive research credit will not be entered into the drawing. Psychology 101 students, who elect to receive research credit, will be awarded 1 hour and 15 minutes credit upon study completion. Participants who opt to be entered into the drawing will remain eligible for the gift certificate even if they opt out after reviewing this document.

Confidentiality of Records

Participation will be confidential. A number will be assigned to each participant at the beginning of the project. This number will be used on project records rather than your name, and no one other than the researchers will be able to link your information with your name. Study data will be stored in locked filing cabinets and protected computer files at the University of South Carolina, Aiken. The results of the study may be published or presented at professional meetings, but your identity will not be revealed. Any of your identifiers will be removed from the data that would indicate any connection to you (e.g. your name, address, e-mail, etc.). Any information that is obtained in connection with this study that could identify you will remain confidential and will not be released or disclosed without your written consent, except as specifically required by law. The USC, Office of Research Compliance may request access to this form to ensure procedures designed to protect research participants are being followed properly.

There is always slight risk confidentiality can be broken but we will do everything to ensure this does not occur. In addition, there are some limitations to confidentiality that would require me to report information from this study. If you indicate that you are being harmed, you know someone who is being harmed, or if you are causing harm to someone else, then I am required to report that information.

Voluntary Participation

Participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in the study at any time throughout the study without negative consequences to your relationship with the University of South Carolina. In the event that you do withdraw from this study, the information you have already provided will be kept in a confidential manner.

Contact Persons

Faculty and researchers of the University of South Carolina, Aiken are conducting this research. For more information concerning this research contact:

Keri Weed, PhD
Department of Psychology
Phone Number (Office): (803) 641-3220
Email Address: KeriW@usca.edu

Aislyn M. Allen, B.S.
Department of Psychology
Phone Number (Cell) 864-979-2008
Email Address: garrisam@email.usca.edu

If you have any questions about your rights as a research subject contact, Lisa Marie Johnson, IRB Manager, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414, Columbia, SC 29208, Phone: (803) 777-7095 or LisaJ@mailbox.sc.edu. The Office of Research Compliance is an administrative office that supports the USC Institutional Review Board. The Institutional Review Board (IRB) consists of representatives from a variety of scientific disciplines, non-scientists, and community members for the primary purpose of protecting the rights and welfare of human subjects enrolled in research studies.

Signatures/Dates

I have read this informed consent form and have asked questions about the research study. These questions have been answered to my satisfaction. I agree to participate in this study. I have received (or will receive) a copy of this form for my own records.

Participant _____ Date ____/____/____

Investigator _____ Date ____/____/____

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Version Valid Until: 5/4/2015

Appendix E
Campus and Community Resource Information Sheet

On Campus Resources:

USCA Counseling Center
803-641-3609
Open Monday-Friday 8:30am-5:00pm
B&E Building Suite 126

USCA Psychology Clinic
803-641-3775
By appointment only
Penland Suite 204

Community Resources:

Aiken-Barnwell Mental Health Center
803-641-7700
1135 Gregg Highway Aiken, SC 29801

Aurora Pavilion Behavioral Health Services
803-641-5900
655 Medical Park Drive Aiken, SC 29801

MCG Psychiatry and Health
706-721-6597
1515 Pope Avenue Augusta, GA 30904