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## **Complex Trauma in Childhood and its Relationship to Emotion Regulation and Distress Tolerance in College Students**

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**Complex Trauma in Childhood and its Relationship to  
Emotion Regulation and Distress Tolerance in College Students**

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**By**

**Elizabeth Lombardo**

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**Abstract**

**Objective:** The influence of childhood trauma has been found to be related to difficulties in emotion regulation and distress tolerance in young adulthood (Berenz et al., 2018a, 2018b). Research has shown that childhood abuse and adversities such as neglect or emotional abuse results in impaired processes related to the development of emotion regulation and efficient interpersonal skills, while also resulting in symptoms reflecting disordered affective self-regulation (Cloitre et al., 2009; Shipman, Edwards, Brown, Swisher, & Jennings, 2005; Shipman, Zeman, Penza, & Champion, 2000). Research has examined emotional regulation and distress tolerance in the context of childhood trauma but has not extensively focused on these aspects in the context of childhood complex trauma specifically and the result of this in college students (Berenz et al., 2018a; Berenz et al., 2018b; Wright, Crawford, & Castillo, 2009). Thus, I examined the impact of childhood complex trauma experiences on emotion regulation and distress tolerance functioning in college students. Specifically, I examined the association between complex trauma in childhood, difficulties in emotion regulation and distress tolerance, and physiological arousal following exposure to an experimental task designed to elicit traumatic childhood memories.

**Method:** In the present study, participants ( $n = 39$ ) completed the Difficulties in Emotion Regulation Scale (DERS), the Distress Tolerance Scale (DTS), and the Traumatic Life Events Questionnaire (TLEQ), while also engaging in a writing task that asked participants to recall and write about their most traumatic experience in childhood and adolescence. During the writing task, participants' ( $n = 32$ ) electrodermal activity was recorded in the form of galvanic skin response using Biopac MP36R. I predicted that there would be a significant positive correlation between difficulties in emotion regulation and number of complex trauma experiences and a significant positive correlation between distress tolerance and number of complex trauma experiences. I also predicted that difficulties in emotion regulation and increased distress tolerance would significantly predict childhood complex

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

trauma experiences. Lastly, I predicted that difficulties in emotion regulation, distress tolerance, and complex trauma experiences would significantly predict mean amplitude arousal during a writing task.

**Results:** Analyses indicated a significant positive correlation between difficulties in emotion regulation and number of complex trauma experiences and a significant positive correlation between distress tolerance and number of complex trauma experiences. Results also indicated that complex trauma experiences in childhood was a significant coefficient predictor of emotion regulation and distress tolerance in later, young-adult functioning. Lastly, analyses indicated that difficulties in emotion regulation, distress tolerance, and complex trauma experiences in childhood were not significant predictors of mean amplitude EDA arousal during a writing task in which participants were asked to recall and write about their most traumatic memory in childhood and adolescence.

**Conclusion:** This study provides evidence that difficulties in emotion regulation and increased perceived distress tolerance are associated with experiences of early childhood trauma; and, experiences of complex childhood trauma significantly predicts later emotional functioning and the ability to tolerate distressing emotions. Perceived distress tolerance, childhood complex trauma experiences, and difficulties in emotion regulation were not related to increased psychophysiological activity. Future research should attempt to focus on gathering a larger sample sizes as well as gathering data from a population with more clinical experiences of trauma, while also using a trauma assessment measure that is more tailored to evaluating “complex” trauma experiences. Future research should also continue to investigate the impact of emotional and distress tolerance functioning on psychophysiological activity.

*Keywords:* emotion regulation, childhood trauma, child maltreatment, distress tolerance, EDA, galvanic skin response, arousal, complex trauma

**Complex Trauma in Childhood and its Relationship to  
Emotion Regulation and Distress Tolerance in College Students**

A traumatic incident can be described as an event in which someone experiences or observes a violation of one's own or someone else's physical or psychological integrity (Kelder et al., 2017). Individuals who report traumatic incidents rarely have a single trauma event and are likely to experience several traumatic episodes (Kessler, 2000). Multiple traumatic experiences are often reported among survivors of childhood abuse and repeated exposure to continual trauma in childhood has been associated with complex symptomatology that not only includes posttraumatic stress symptoms, but other symptoms that reflect challenges in affective and interpersonal functioning (Cloitre et al., 2009; Kisiel et al., 2009). Following traumatic experiences in childhood, positive emotional support from a parent or guardian is a key factor that allays the development of posttraumatic stress symptomatology as well as strengthens a child's adaptive coping in response to a traumatic experience (Cohen et al., 2000; Finkelhor & Kendall-Tackett, 1997; Shonkoff et al., 2012). Emotion self-regulation (i.e., ability to modulate or change emotions) and distress tolerance (i.e., ability to cope with negative internal states) are two psychological processes that help reduce emotional arousal, both of which can be impacted by severe trauma (Neacsia, Smith & Fang, 2017; Shonkoff et al., 2012).

The term complex trauma describes exposure to severe and pervasive adverse experiences resulting in persistent sequelae across a broad spectrum of functioning (Kisiel et al., 2009; Keisel et al., 2014). However, complex childhood trauma is traditionally defined as multiple adverse experiences, often interpersonal in nature, that occur within the caregiving system (Cook et al., 2005; Keisel et al., 2009; Keisel et al., 2014; National Child Traumatic Stress Network: Complex Trauma Taskforce, 2003; Spinazzola et al., 2005; van der Kolk, 2005). The caregiving environment generally serves as the child's source of safety and stability but when toxic, threatens healthy child development (John et al., 2019; National Child Traumatic Stress Network: Complex Trauma Taskforce, 2003). In a typically developing

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

child, their environment provides clues that they are stable, safe, and protected while also providing them with the tools necessary to cope with and manage distressing feelings (Goldfinch, 2009). Early traumatic experiences such as parental neglect or emotional abuse often lead to subsequent trauma exposure (National Child Traumatic Stress Network: Complex Trauma Taskforce, 2003). Further, adverse environments are often full of reminders of trauma, especially when multiple events have occurred.

Complex trauma in childhood involves chronic occurrences of maltreatment including emotional, physical, and sexual abuse, neglect, and exposure to family violence (Cook et al., 2005; Kisiel et al., 2009; Lawson, Davis, & Brandon, 2013; National Child Traumatic Stress Network: Complex Trauma Taskforce, 2003; Spinazzola et al., 2005; van der Kolk, 2005). Finzi-Dottan and Harel (2014) indicate that emotional abuse is characterized by angry or intrusive parent-child interactions and by a display of inconsistent affect such as alternating between being warm or nurturing and cold, remote, or controlling. Emotional abuse may also include actions of commission such as verbal abuse and isolating or terrorizing the child, and acts of omission such as ignoring, being psychological unresponsive, or emotionally unavailable (Wright, Crawford, & Castillo, 2009). Physical abuse involves bodily assault on a child that poses a risk of injury; while sexual abuse is defined as sexual contact or conduct with a child (Bernstein et al., 2003). Neglect can be defined as failure of caretakers to provide the child with necessities and physical needs such as food, water, shelter, safety, or health care (Bernstein et al., 2003). Finally, exposure to domestic or family violence includes children seeing, hearing, or being directly involved in or experiencing the aftermath of physical or sexual assaults that occur between caregivers (Edleson, 1999; Wolak & Finkelhor, 1998).

### **Prevalence Rates and Developmental Effects**

It is estimated that almost 70% or two-thirds of children experience a traumatic event by the age of sixteen (*Children and Trauma: Update for Mental Health Professionals*, 2011, Viana, et al., 2017, Walsh, 2015) with most incidents taking place in the home and approximately 80% of people

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

responsible for child maltreatment are the child's parent(s) (van der Kolk, 2005). In a sample of children in foster care in the U.S. in 2016, 14% with confirmed experiences of child abuse experienced at least two different types of maltreatment and 1,700 children died due to abuse or neglect (John et al., 2019). Of this sample, 90% of perpetrators in child maltreatment cases were the parents, 4.6% were non-parental relatives, and 3% were unmarried parental partners. Research has identified that children under the age of four are at the highest risk for trauma exposure, and account for approximately 80% of child abuse related deaths in the U.S. (Becker-Weidman, 2009).

Abuse in early childhood influences basic interpersonal relating and success in mastering emotion-management skills (Cloitre et al., 2005). Specifically, research has shown deficits in emotional regulation and interpersonal problems to be strong predictors of functional impairment beyond the effects of posttraumatic stress symptom severity in women with histories of childhood abuse. Further, interpersonal problems and affect regulation have shown to be equally important contributors to impairment in females with histories of child abuse (Cloitre et al., 2005).

Complex trauma exposure often results in a loss of essential capacities for self-regulation and interpersonal understanding (Cook et al., 2005). Children who experience complex trauma can develop enduring problems that put them at risk for future traumatic experiences and impairments (Cook et al., 2005; van der Kolk, 2005) including internalizing behavior problems, posttraumatic stress symptoms, and future psychopathology (Greeson et al., 2011). Consistent with other research (Ford, 2005; van der Kolk, 2005), Cook and colleagues (2005) identified seven domains that may be impaired or differ from those without a trauma history including attachment, neurobiology, affect regulation, dissociation, behavioral regulation, cognition, and self-concept. According to Cook and colleagues (2005), impairment in attachment may include interpersonal difficulties, problems with boundaries, distrust, and suspiciousness (Bowlby, 1988; Shankoff et al., 2012; van der Kolk, 2005).

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

Neurobiological differences may include decreased volume in the cerebellum affecting motor development and executive functions (McCrory, Brito, & Viding, 2010), and decreased activation in the left anterior frontal regions (Cicchetti & Rogosch, 2007; Cicchetti & Rogosch, 2009). Other structural alterations in various areas include reduction in the hippocampus, corpus collosum, and amygdala (Bick & Nelson, 2016; National Center for the Developing Child, 2005/2014); and, lasting alterations to frontolimbic circuitry (Jedd, Hunt, Cicchetti, & Hunt, 2015). These brain changes have been found to be associated with other domains of functioning listed above.

Impairment in affect regulation includes difficulty labeling and expressing feelings, knowing and describing internal states, and difficulty communicating wishes and needs (Cicchetti & Rogosch, 2007; Cloitre et al., 2005; D'Andrea et al., 2005; Ford, 2005). Dissociation may include amnesia, depersonalization or derealization, impaired memory or attention, and distinct alternations in states of consciousness (Endo, Sugiyama, & Someya, 2006; Cromer et al., 2006). Impairments in behavioral control may manifest as poor modulation of impulses, self-destructive behaviors, aggression, sleep disturbances, and/or eating disorders (Cook et al., 2005; Cicchetti & Rogosch, 2007; Cloitre et al., 2005; D'Andrea et al., 2005; Lewis, Todd, & Honsberger, 2007). Impairment in cognition may include difficulties in attention regulation and executive functioning, lack of sustained curiosity, or problems with processing novel information (Cicchetti & Rogosch, 2007; Ford, 2005; Fortenbaugh et al., 2017). Lastly, impairment in self-concept may include a poor sense of self, disturbance of body image, low self-esteem, or feelings of shame and guilt (van der Kolk, 2005).

Dunn, Brown, and Beardsall (1991) theorize that children who have emotionally charged experiences tend to have a heightened awareness of emotional cues; thus, allowing for more effective processing of this information. They point out, however, that emotional experience and emotional competence are not necessarily linearly correlated. Regardless, children exposed to trauma in the home, whether they experience abuse or neglect, tend to show poor understanding of emotions if parents



display high levels of anger or hostility (Dunn et al., 1991). In some children, early, chronic and high levels of stress can lead to hyper-alertness or hyper-vigilance to signals of threat that may produce trait-like arousal and maladaptive responses even in low stress, low threat situations (Perry, 2006).

Recognition of emotion is vital because it represents the underpinnings of future success of social emotional behavior. Pollak and colleagues (2000) examined the development of facial recognition of emotions among physically abused and neglected toddlers and found that physically abused children have difficulty recognizing sadness and disgust while neglected children have more difficulty discriminating differences between emotional expressions. However, both physically abused and neglected children tend to rate expressions of anger and sadness similarly to emotionally neutral expressions. Additionally, Pollak and others describe how an appropriate level of exposure to emotional expressiveness promotes learning of emotions and proper emotional expression in children, but high exposure to mis-modulated emotional expression can lead to impaired emotional regulation in children.

### **Deficits in Emotion Regulation**

Before exploring the concept of emotion dysregulation in youth, healthy emotional functioning must be outlined. The development of emotion regulation helps to define a sense of self that influences how we relate to others in social contexts. Three essential features of healthy emotional regulation are experiencing complete arrays of emotions, moderating emotional experiences, and appropriately exhibiting emotions (Paivio & Laurent, 2001). Children who are raised in emotionally validating environments are typically able to be confronted with different emotions such as sadness and anger and work through them via caregiver support, encouragement, and validation. Caregiver support is one of the most vital predictors for both successful functioning in childhood and later in adulthood (Scott & Copping, 2008). Research has found that children with disorganized attachment styles have problems with stress management, an elevated risk of externalizing behavior problems or disorders, and have tendencies to experience dissociation later in life (Carlson, 1998). Unlike secure, avoidant, and

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

ambivalent attachment styles in children, disorganized attachment can be defined as the disruption of a typically consistent or organized strategy of emotion regulation and is considered an insecure form of caregiver attachment (Main & Hess, 1990). Children with disorganized attachment display behaviors that indicate an experience of stress or anxiety that cannot be resolved because the caregiver is simultaneously a source of stress and fear as well as a figure of safety or security (Main & Hess, 1990).

Evidence shows that childhood abuse disturbs the acquisition of appropriate emotion regulation and interpersonal skills (Shields & Cicchetti, 1998). Youth that grow up in emotionally dysfunctional environments do not have the opportunity to appropriately process and express uncomfortable emotions. More specifically, childhood neglect and abuse having detrimental effects on the healthy development of emotion regulation (Kim & Cicchetti, 2009). Childhood trauma, specifically experiences of neglect, physical and/or sexual abuse, is related to emotion dysregulation that contributes to later internalizing and externalizing psychopathology (Kim & Cicchetti, 2009). For example, internalizing problems such as anxiety, depression, withdrawal, and somatic complaints are related to forms of emotional dysregulation that include difficulty with attention and cognitive control (Dvir et al., 2014). External behaviors include elevated delinquent and social problem behaviors which may be prominent in some children who experience maltreatment in the form of physical abuse and neglect (Maughan & Cicchetti, 2002).

Other forms of emotion dysregulation, specifically numbing and dissociation, that may be useful in the short-term to escape immediate emotional distress in youth experiencing complex trauma, may be harmful in the long-term. Van der Kolk and van der Hart define Dissociation as the compartmentalization of traumatic experiences that are stored in one's memory as isolated fragments in the form of sensory perceptions or affective states (van der Kolk & van der Hart, 1989, 1991). Van der Kolk and Fisler (1995) suggest that dissociation can serve as temporary adaptive functioning but result in long-term psychopathological development. Terr (1991) describes numbing as seeming "withdrawn"

and “occurring as an accommodation to the most extreme, long-standing, or repeated traumatic situations” (p. 16). Paivio and Laurent (2001) theorize that abused youth often learn to depend on dissociation as a coping mechanism to deal with painful affect. The frequent use of dissociation and over-control (i.e., shutting down, suppression, or minimization of emotional experience) can lead to individuals cutting themselves off to experiencing emotions that might be helpful in later adaptive functioning. Further, longstanding emotional avoidance contributes to inadequate awareness of emotional experiences, which can result in a limited ability to experience emotions that contribute to defining the self and communicating with others.

In a study assessing the relationship between childhood abuse and experiential avoidance in adults, Gratz and colleagues (2007) provide evidence that those who experienced moderate to severe sexual, physical, or emotional childhood abuse are more likely to express “nonacceptance” of their emotions. For example, they are more likely to feel guilty, ashamed, angry at themselves, and to feel weak when they are upset. Further, the experience of early trauma influences a child’s ability to navigate their world and themselves with little adult feedback. Withdrawal or detachment from a traumatic environment does not allow the child to engage with the world and thus, reduces their opportunity to learn adaptive social and emotional skills (Goldfinch, 2009). Detachment from the traumatic environment may be expressed as a “shutting down” of sensations, in an attempt to protect the body and mind from trauma (van der Kolk, 1994). To illustrate this, Krause, Mendelson, and Lynch (2003) provide evidence for a relationship between childhood emotional and psychological abuse and emotional inhibition (i.e., avoidant coping and inhibition of emotional expression). Overall, numbing and dissociative behaviors may impair a child’s ability to successfully process, moderate, and exhibit emotions, and would influence the child’s future interpersonal functioning and psychopathology.

According to Dvir and colleagues (2014), deficits in emotion regulation in childhood can have lasting effects through the lifespan and can contribute to the development of ineffective emotion

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

regulation strategies and coping mechanisms in adulthood. Studies have shown that deficits in emotional regulation are related to complex childhood trauma exposure which often have a negative impact on information processing, some forms of externalizing problems in children, reactive aggression, and self- and relational dysregulation in adulthood (Andersen et al., 1999; Eisenberg, Spinrad, & Eggum, 2010).

### **Associated Psychopathology**

Although many abused and neglected children do not develop trauma related disorders, those that experience repeated trauma are at a heightened risk for developing numerous psychiatric disorders in adulthood as opposed to those without childhood trauma experiences (Andersen et al., 1999). These psychiatric disorders may include Post-Traumatic Stress Disorder (PTSD), depression, anxiety disorders (Ford et al., 2009), conduct or oppositional disorders (Ford, Connor, & Hawke, 2009; Kerig et al., 2009), personality disorders (Ford, 2005), and/ or a dissociative variant of PTSD (Lanius, 2010). Findings by Cloitre and colleagues (2005) suggest that childhood abuse-related PTSD symptoms in women are “long-lasting, detrimental and generalized, affecting multiple domains of functioning (p. 122).” Other data from The Adverse Childhood Experiences (ACE) Study indicated long-term negative effects of childhood trauma on behavioral outcomes such as physical inactivity, smoking, alcohol or substance abuse, risky sexual activity, and certain mental health outcomes including depression, anxiety, suicidality, issues with anger control, and engaging in intimate partner violence (Felitti et al., 1998). Traumatized children are at risk for self-harm, oversexualized behavior, poor impulse control, anger, and attentional difficulties (Ford, 2005) as well as re-victimization (Macdonald et al., 2010).

In adulthood, those who reported retrospective accounts of emotional abuse were found to have an increased likelihood of lifetime and current depressive disorders, even years after the occurrence of trauma. Further, adults who reported adverse childhood experiences with severe mood disorders were found to exhibit higher rates of behaviors such as substance abuse, re-victimization,

PTSD, and more severe psychiatric illnesses that presented at younger ages compared to those without a history of adverse experiences (Dvir et al., 2014).

### **Psychological and Physiological Functioning**

Those who encounter early traumatic events appear to be at greater risk for adverse outcomes in adulthood compared with individuals who did not experience early life trauma (Ogle & Rubin, 2013). Continued exposure to a high-stress, traumatic environment not only contributes to reduced behavioral and affective regulation in children (Lawson & Quinn, 2013), but also produces feelings of uncertainty about the predictability of their environment, building trustful relationships, and their own self-concept (Cook et al., 2005). In order to adjust to their chaotic environment, some children develop stress-intolerant avoidant coping mechanisms for the sake of their immediate functioning.

As previously outlined in the discussion on deficits in emotional regulation, the utilization of dissociative behaviors and emotional numbing may allow children to obtain temporary relief from the trauma experience; but over time, they do not develop more effective coping strategies to manage stress (Paivio & Laurent, 2001; van der Kolk, 1994). Children who tend to emotionally disconnect as a means to protect themselves from the emotional pain of trauma and continue to utilize avoidance mechanisms of coping typically develop inflexible strategies for managing stress in adulthood. For example, research with female college students who experienced childhood maltreatment found that they developed maladaptive coping strategies in an effort to cope with effects of past abuse (Gipple, Lee, & Puig, 2006). Specifically, avoidance coping was found to have a positive, significant relationship with dissociative behaviors and those who reported utilizing avoidant coping styles that also experienced physical abuse in childhood reported high levels of dissociation (Gipple et al., 2006). Further, a longitudinal study assessing emotional consequences of sexual abuse in children and adolescents found that those who avoided discussion of their trauma were more likely to show nonverbal indicators of shame such as avoiding eye contact and covering the face. They also tended to

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

avoid self-exposure and were reluctant to process their traumatic experiences (Feiring & Taska, 2005). Talbot and colleagues (2004) reported that greater shame proneness was associated with higher levels of dissociation in women who experienced early sexual trauma.

Recent literature in neurobiological research suggests that childhood psychological trauma influences the same physiological response systems as physical trauma (Danese & Harmelen, 2017). The initiation of emotion occurs as a product of the interaction between bottom-up and top-down neurological processes. Based on findings of neuroimaging data, emotional regulation involves numerous brain regions, across a broadly dispersed functional network with bidirectional links among emotion-relevant and self-regulatory brain regions (Kober et al., 2008; Ochsner et al., 2009; Ochsner et al., 2002). For example, Kober and others (2008) identified bottom-up regions including the amygdala, ventral striatum, thalamus, hypothalamus, and periaqueductal gray as key areas of activation during the processing of emotions. Significant childhood adversity is associated with overactivity in the amygdala and orbitofrontal cortex, which may lead to “loss of neurons and neural connections in the hippocampus and medial PFC” (Shonkoff et al., 2012, p. e236). The amygdala activates the stress response that stimulates the sympathetic nervous system (SNS) and hypothalamus for the release of hormones that mediate fear and anxiety. While the hippocampus can turn off stress hormones, hypersensitivity and chronic physiological arousal of the amygdala interferes with this process. Disruption of these interactive systems may also result in memory and mood-related impairments. According to Shonkoff et al. (2012), the prefrontal cortex (PFC) serves as the top-down regulator of the amygdala, and mediates executive functions involved in the self-regulation of behaviors and impulse control.

In a typically developing child, maturation of neural and neuroendocrine systems is related to less emotional lability and increased self-control. However, these processes also depend on the maturation of parasympathetic regulation in early childhood and development of the hypothalamic-pituitary-adrenocortical axis, which are shaped by positive early experiences and caregiver receptiveness

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

(Kober et al., 2008). Therefore, home environments that do not foster healthy maturation in brain systems may interfere with the development of language as a method of comprehending and communicating emotions effectively (Thompson, 2011). Overall, early life trauma appears to alter brain development, specifically limbic reactivity, and may change the ability to assess appropriately threatening stimuli (Andersen et al., 1999; Thompson, 2011).

Electrodermal activity (EDA) is a useful biological marker of physiological responses stimulated by novel and perceived threats, or aversive conditions (Dodson, 2014; Erath, El-Sheikh, & Cummings, 2009). EDA is represented through skin conductance level reactivity (SCLR), which refers to electrodermal reactivity caused by increased activity of the sweat glands. Skin conductance reactivity is solely innervated by the sympathetic nervous system (SNS), which is a factor of the autonomic nervous system (ANS; Erath, El-Sheikh, & Cummings, 2009).

A variety of theories have been developed in an attempt to explain patterns of physiological reactivity resulting from exposure to traumatic early-life environments. The Biological Sensitivity to Context theory (BSC) and the Adaptive Calibration Model (ACM), an extension of the biological sensitivity to context theory (BSC), are just a few. BSC posits that increased physiological activity develops in the context of intense adverse environments (Boyce & Ellis, 2005) and the ACM argues that male-typical patterns of stress responsivity correspond to low or blunted physiological responses following severe traumatic stress (Giudice, Ellis, & Shirtcliff, 2011).

Interestingly, in a study assessing maltreated youth, Gordis and colleagues (2009) found that low skin conductance levels indicate poor inhibition of aggressive impulses in males while higher skin conductance responses were more commonly related to aggression in females. In a study of women with a history of early life sexual and physical abuse, Heim and colleagues (2000) found that severe stress in early life is associated with continual sensitization of the autonomic stress response, which escalates the risk for the development of psychopathology in adulthood. Therefore, continued exposure

to adverse early life experiences may result in children having continued, heightened autonomic stress responses and increased threat reactivity, which in turn may lead to dysregulation of physiological responses even in safe contexts (Heim et al., 2000; Mclaughlin et al., 2014).

### **Emotion Regulation**

Previous literature on emotional regulation has focused on conceptualizing the control of emotional experiences and expressions and the reduction of emotional arousal as a key aspect of emotion regulation. However, there is a body of literature suggesting that emotional regulation is not necessarily the same as emotional control and does not involve the immediate reduction of negative affect (Gratz & Roemer, 2004). Gratz and Roemer (2004) suggested that adaptive emotion regulation actually involves calculating and monitoring emotional experiences while modifying, understanding, and emphasizing the importance of the emotions (Thompson & Calkins, 1996). In addition, attempts to suppress negative emotions is considered maladaptive and associated with more difficulties in emotional regulation when confronted with new experiences in the future (Gratz & Roemer, 2004).

Gratz and Roemer (2004) conceptualized emotional regulation as a process involving alterations in the intensity or duration of an emotion rather than changing the emotion itself. Namely, effective regulation of emotions involves modulating the emotional experience rather than complete elimination of the emotion. Research suggests that modulation rather than elimination of distressing emotions allows the individual an opportunity to control his or her behavior related to the distressing emotion rather than the emotion itself (Gratz & Roemer, 2004; Thompson, 1994; Thompson & Calkins, 1996).

Problems related to emotional regulation play an important role in the development, maintenance, and treatment of many psychiatric disorders. Difficulties regulating emotion arousal and effectively coping with challenging emotions is common in mood disorders (Berking & Wupperman, 2012), personality disorders such as borderline personality disorder (Berking & Wupperman, 2012; Ford, 2005), and anxiety and post-traumatic stress disorder (Althoff et al., 2010; Ford et al., 2009;



## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

McLaughlin et al., 2011). In children, externalizing behavioral problems have been specifically linked to difficulties with emotional regulation (Dvir et al., 2014; Eisenberg, Spinrad, & Eggum, 2010).

According to Dvir et al. (2014), the development of effective emotion regulation is influenced by one's ability to form appropriate, secure attachments. In other words, healthy emotional regulation develops in the context of receptive caregiving and peer connections in early life (Ford, 2005). Successful development of emotional regulation is not only fostered in environments where a child's immediate needs are met, but in an environment that nurtures interpersonal interaction necessary for the growth of self-regulation (Ford, 2005). Repeated trauma in early environments disrupts the development of appropriate emotional regulation and interpersonal skills (Burns, Jackson, & Harding, 2010; Cicchetti & Rogosch, 2009). This disturbance may occur as a result of psychological experiences that have neurobiological effects, such as molecular changes to stress-hormone response systems (Cicchetti & Rogosch, 2009; De Bellis, 2001).

In two studies, Shipman and colleagues (2000, 2005) attempted to classify differences in emotional processes between maltreated and non-maltreated children. Females who were sexually abused were less able to regulate and understand their emotional experiences. Specifically, sexually abused females expected to receive less emotional support and to experience more interpersonal conflict in response to expressing negative emotional states, especially when communicating sadness to parents or anger to peers (Shipman et al., 2000). Further, when compared to children without a history of significant maltreatment, both males and females who experienced neglect had a reduced ability to understand their negative emotions such as anger or sadness and had fewer adaptive emotional regulation skills. In addition, these children expected their parent to respond negatively which led to them "holding back" their display of negative emotions (Shipman et al., 2005). Overall, in both studies, Shipman and colleagues found that children who experienced childhood trauma showed deficits or

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

delays in understanding and regulating emotions in addition to anticipating negative reactions to their own displays of distressing emotions.

In another study, Pollak and others (2000) assessed the development of emotion recognition in maltreated children and found that specific types of trauma may have a differential impact on emotion processing. Specifically, neglected preschool children were found to have more difficulty discerning emotional expressions and recognizing distinct emotions, while physically abused children were found to display a response bias for angry facial expressions. In a later study, Pollak and Tolley-Schell (2003) found that physically abused 8- to 11-year-old children found it challenging to disengage their attention from angry facial expressions. In a subsequent study, Pollak and colleagues (2009) found that children who experienced repeated trauma, specifically physical abuse, were more precisely able to recognize early indications of angry facial expressions in the absence of other physiological cues, which may suggest a readiness to perceive subtle behavioral signs of anger. That is, children with a history of physical abuse may be hypersensitive to potential threats (Shonkoff et al., 2011).

Rogosch and Cicchetti (2005) conceptualize behavioral and emotional dysregulation as irritability, impulsivity, affective negativity, suicidal/self-harm behavior, and extreme conflict in interpersonal relationships with peers. In a longitudinal study investigating the relationship between child maltreatment, emotion regulation, and peer acceptance and rejection, Kim and Cicchetti (2009) found that emotion dysregulation is associated with a history of neglect, physical, and sexual abuse. These researchers found that emotion regulation deficits were related to externalizing behaviors that contributed to peer rejection and inversely, while emotional regulation was positively associated with peer acceptance and fewer internalizing problems (e.g., depression, anxiety, withdrawal).

Interestingly, numerous studies provide evidence of the relationship between trauma history and emotional dysregulation in college-aged individuals, specifically a correlation between post-traumatic stress (PTS) symptom severity and emotional dysregulation (Dvir et al., 2014). Several

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

measures of emotional dysregulation outlined by Tull and colleagues (2007), including difficulty accepting and recognizing emotions, difficulties utilizing strategies to regulate negative emotions, and impulsivity were correlated with Post Traumatic Stress (PTS) and PTSD. In a study conducted by Ford and others (2006) assessing the association of early childhood interpersonal trauma and the risk of developing disorders of extreme stress not otherwise specified (DESNOS) in adult females, over 50% of participants reported at least one dysregulation symptom associated with a risk of developing PTSD, anxiety, and other affective disorders.

Burns, Jackson, and Harding (2010) posit that emotional abuse has the most severe impact on emotional regulation because it interferes with the development of successful emotional regulation skills. This is consistent with findings of Briere and Rickards (2007) that indicate that exposure to childhood trauma, specifically emotional abuse, is related to emotional dysregulation and other weakened self-capacities in adulthood. In a study examining the effect of emotional dysregulation, negative affect, and childhood trauma on clinical psychopathology, significant correlations were found between childhood trauma and drug abuse, depression, suicidality, and PTS (Bradley et al., 2011).

In summary, research suggests a complex relationship between childhood trauma and emotional dysregulation. Exposure to trauma in childhood is related to a reduced ability to regulate, understand, and modulate emotions, enhanced levels of externalizing and internalizing disorders, and impaired social functioning that begins in childhood and continues well into adulthood. Those that report experiences of childhood trauma are at risk for experiencing PTS, emotional regulation issues, functional impairment, and possible re-victimization (Dvir et al., 2014).

### **Distress Tolerance**

Distress tolerance can be defined as the ability to experience and endure negative psychological conditions (Simons & Gaher, 2005) or as the perceived or actual ability to withstand negative internal states (Brown et al., 2005). Distress may result from physical stimuli or cognitive processes but is

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

displayed by an emotional state that is characterized by action propensities to ease the negative emotional experience (Simons & Gaher, 2005). According to Simons and Gaher, distress tolerance consists of the assessment of tolerability and aversiveness, and expectation of experiencing negative emotional situations, appraisal and acceptance of emotions, the tendency to absorb attention and disrupt functioning, and regulation of emotions. Individuals with low distress tolerance often report distress as being unbearable and difficult to handle. Individual appraisal of distress may reflect a lack of acceptance of the negative emotions, feelings of shame, and identifying one's own coping skills as inferior to others (Simons & Gaher, 2005). Individuals with low distress tolerance may avoid situations that elicit negative emotional reactions. Thus, individuals with low distress tolerance often attempt to alleviate negative emotional states, may be overwhelmed by their reactions, and may become functionally impaired in these situations.

Low levels of distress tolerance have been associated with higher levels of anxiety (Bernstein, Marshall, & Zvolensky, 2011; Kramer, Luberto, & McLeish, 2013), eating disorders (Lavender et al., 2015), substance abuse (Buckner, Keough, & Schmidt, 2007), and suicidal ideation (Anestis et al., 2011; Anestis & Joiner, 2011). Berenz and colleagues (2018a) suggest that childhood trauma is a meaningful etiological factor fundamental to distress tolerance, which disrupts stress reactivity and emotional regulation on both self-report measures and laboratory tests. Previous research has found that severe childhood trauma experiences are significantly related to lower distress tolerance in both clinical and healthy samples (Arens et al., 2014). However, childhood physical, sexual, and emotional abuse are significantly associated with low distress tolerance in inpatient adult psychiatric samples (Gratz et al., 2007).

A recent study by Berenz and colleagues (2018a) assessed the relationship between childhood trauma and distress tolerance in a sample of inpatient adults. Surprisingly, results found that greater levels of abuse were associated with increased perceptions of distress tolerance while other studies

suggest meaningful associations between childhood physical abuse and an increased ability to cope (Sudbrack et al., 2015). Childhood appears to be a delicate time for experiencing the detrimental effects of stress, in that early trauma effects stress reactivity and emotion regulation as observed in self-report (Banducci, Hoffman, Lejuez, & Koenen, 2014; Burns, Fischer, Jackson, & Harding, 2012). In college students, studies have shown that more severe experiences of childhood trauma are associated with lower perceived distress tolerance (Arens et al., 2014; Banducci et al., 2014; Burns et al., 2012).

Berenz and colleagues (2018b) state that while individuals who experience physical abuse as a form of childhood trauma may believe that they are more capable of managing distress, true “cut-off” points at which increased distress tolerance is maladaptive have yet to be uncovered. Thus, it is unclear at what levels or under what conditions high distress tolerance is maladaptive (Anestis et al., 2011; Anestis et al., 2013). Studies found that emotional neglect was associated with more perceived distress tolerance, indicating that individuals who grow up in unsupportive homes with a lack of emotional support may rely on themselves for managing negative emotional experiences (Berenz et al., 2018b). Again, as previously stated, it is unclear at what point increased distress tolerance may be maladaptive and may be used as an avoidance coping mechanism. Research has also found that increased experiences of emotional abuse and physical neglect were related to lower distress tolerance, indicating that children who experienced frequent slurs or belittling comments may internalize undesirable messages, which led them to view themselves as less adept or weaker than others (Berenz et al., 2018a).

Intriguingly, previous research has found that high-perceived distress tolerance has been associated with higher suicidality due to a lessening of fear of the emotional or physical distress characteristic of suicide (Anestis et al., 2011; Anestis et al., 2013). Other studies report that lower perceived distress tolerance has been associated with higher PTSD symptoms in community, military, and psychiatric inpatient samples and low distress tolerance may play a key role in the etiology and maintenance of PTSD and related disorders (Vujanovic et al., 2017; Vujanovic, Bernstein, & Litz, 2010;

Vujanovic, Dutcher, & Berenz, 2017; Vujanovic, Litz, & Farris, 2015). Distress intolerance has also been associated with higher levels of anxiety and higher rates of childhood emotional abuse (Banducci et al., 2016).

Findings by Berenz and colleagues (2018b) confirmed that greater trauma experiences are associated with childhood sexual abuse as well as lower distress tolerance. Additionally, childhood sexual abuse is associated with lower perceived distress tolerance on the Distress Tolerance Scale (DTS) and childhood physical abuse was associated with lower distress tolerance overall. In males, increased experiences of childhood physical abuse were significantly associated with higher levels of perceived distress tolerance on the DTS. Interestingly, results found that greater physical abuse was associated with higher perceived distress tolerance, possibly because college students who have experienced severe physical trauma recognize themselves as being more emotionally resilient.

### **Electrodermal Activity**

Electrodermal activity (EDA) has been identified as a valid method for monitoring physiological arousal level due to its capacity to detect and quantify alterations in the sympathetic nervous system (Zangróniz et al., 2017). Specifically, the palms of the hands and soles of the feet are ideal locations for measuring sudomotor nerve activity (SMNA) which is responsible for activating sweat glands and has been associated with arousal states (Zangróniz et al., 2017).

The phasic (skin conductance response, SCR) and tonic (skin conductance level, SCL) components are two underlying mechanisms of EDA signals. The SCR is observed when SMNA is activated and is represented by peaks, slopes, and decays. Conversely, the SCL represents a baseline of skin conductance and is varied among individuals depending on their body's natural physiological state and autonomic regulation (Zangróniz et al., 2017). A study by Zangróniz and colleagues (2017) using EDA to classify calm and distressed emotional states reported a sensitivity, specificity, and accuracy of 93.9%, 85.36%, and 89.18% respectively.

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

In a study analyzing EDA arousal and emotion regulation, participants were asked to adhere to instructions that asked them to either suppress or accept their emotions while watching a distressing video (Dunn et al., 2009). Results found that all groups (e.g., suppress, accept, control) had significant increases in EDA arousal while watching the distressing video, but the accept group had less of an increase in arousal than other groups. This finding may suggest that those who are better able to modulate or “accept” their negative emotional experience may have less autonomic reactivity in the face of distressing emotions. Specific to those who engage in non-suicidal self-harm, research has identified that not only do these individuals have increased EDA arousal during a distressing task, they also display poor abilities to tolerate distress and deficits in social problem-solving abilities as measured by the Social Problem-Solving Skills Test (SPST; Nock & Mendes, 2008).

Gray, Lipschutz, and Scheeringa (2017) assessed children’s physiological reactivity during a memory recall task who were grouped by traumatic experience (i.e., no exposure to traumatic event, exposure to traumatic event but no diagnosis of PTSD, and exposure to traumatic event with diagnosis of PTSD). Results found that children with diagnoses of PTSD exhibited increased levels of respiratory sinus arrhythmia (RSA) reactivity than children without a diagnosis of PTSD, but only during recall of traumatic memories. To my knowledge, this is the only study to date that has assessed a physiological measure of arousal in real-time while participants are asked to recall a traumatic memory who have experienced early life trauma.

Jacques and colleagues (2020) recently designed a real-time study assessing physiological activity and emotion regulation with participants being placed into either an emotional or neutral writing group. Participants in this study who were placed in the emotional group were college students who disclosed a variety of traumatic or stressful life experiences. Results found that participants who were assigned to the emotional writing group experienced increased negative affect after engaging in

the emotional writing task. Findings from this study revealed that emotion writing tasks are related to increased autonomic nervous system arousal.

While electrodermal activity appears to be a viable method of measuring physiological arousal, there are few studies investigating EDA in college students with a childhood history of complex trauma. This study will provide a unique opportunity to measure emotional arousal in college students while negative emotional memories are recalled.

### **Current Study**

While there has been an increase in studies exploring early trauma experience and its effect on later psychological functioning, the nature of the relationship among emotion regulation, distress tolerance, and complex childhood trauma experiences and its impact on later emotional functioning is unclear. Furthermore, research has not fully investigated whether recalling memories of past childhood trauma in the form of a written task increases physiological arousal as measured by electrodermal activity (EDA). EDA has the capacity to detect and quantify alterations in the sympathetic nervous system, especially physiological arousal and autonomic regulation during and after distressed emotional states.

In this study, I measured the mean amplitude of arousal during a writing task that asked participant's to recall their most traumatic event in childhood and adolescence. I also explored the relationship among trauma, physiological reactivity, emotional regulation, and distress tolerance.

To my knowledge, this is the only study to date that has assessed both psychological functions and physiological arousal in real-time while college-aged participants were asked to recall a traumatic memory of early life trauma. Considering previous empirical findings, the present study examined the influence of childhood experiences of complex trauma on the psychological functioning of college students, specifically on self-regulation of emotions and distress tolerance. This study sought to expand



the current literature and to provide a more cohesive model for understanding both the psychological and physiological effects of childhood complex trauma on college students.

### **Hypotheses and Proposed Analyses**

*Hypothesis 1.* I predicted that an increased number of complex trauma experiences in childhood would be related to increased emotional dysregulation college students; thus, resulting in a positive correlation between the two variables. To test Hypothesis 1, a simple linear correlation analysis was conducted to explore the relationship between experiences of childhood complex trauma and emotion regulation.

*Hypothesis 2.* I predicted that an increased number of complex trauma experiences in childhood would be related to increased levels of perceived distress tolerance in college students; thus, resulting in a positive correlation between the two variables. To test Hypothesis 2, a simple linear correlation analysis was conducted to explore the relationship between childhood trauma and distress tolerance.

*Hypothesis 3a.* I predicted that an increased number of childhood complex trauma experiences would predict difficulties in emotional regulation. To test Hypothesis 3a, a linear regression analyses was conducted to explore the amount of variance accounted for by childhood complex trauma experiences on emotion regulation.

*Hypothesis 3b.* I predicted that an increased number of childhood complex trauma experiences would predict higher levels of distress tolerance. To test Hypothesis 3b, a linear regression analyses was conducted to explore the amount of variance accounted for by childhood complex trauma experiences on distress tolerance.

*Hypothesis 4.* I predicted that adding emotion regulation and distress tolerance into the model with complex childhood trauma (CCT) experiences would account for more systematic variance and would produce an overall better model to predict EDA arousal during the writing task when compared to CCT experiences alone. A hierarchical linear regression analysis was conducted to analyze Hypothesis

4, with CCT experiences (TLEQ) entered into this first block, emotion regulation (DERS) entered into the second block, and distress tolerance (DTS) entered into the third block, with outcome variable mean amplitude during the writing task (EDA).

Prior to regression analyses in Hypothesis 4, data were checked to assess for multicollinearity. If predictor variables were found to be highly correlated with each other (correlations above .8 or .9), one of the highly correlated variables was removed from the model. SPSS produces a variance inflation factor (IFV) to determine how the regression model may be biased (see Field, 2005). No variables were removed from regression analyses.

## Method

### Participants

A G\*Power analysis (Erdfelder, Faul, & Buchner, 1996) was conducted to determine the number of participants needed to produce a sufficient level of power ( $\beta = .80$ ,  $\alpha = .05$ ). This analysis concluded that 48-52 participants would be needed. However, during the period of data collection, the campus was closed due to the COVID-19 pandemic and data collection was periodically suspended before resuming at a later time. Therefore, only thirty-nine participants were recruited from the University of South Carolina Aiken through both an undergraduate participant pool and an online platform called Signup.com allowing students to sign up for study time slots. All participants that signed up for the study completed the study task and questionnaires and were given class credit for their participation. However, nine participants' electrodermal activity (EDA) during the writing task event was excluded from analyses ( $n = 29$ ). One was excluded due to computer software malfunction, four were excluded due an absence of an electrodermal response (i.e.,  $EDA < 1.0$ ), and an additional four were excluded based on lack of any specific skin conductance responses. Of the thirty-nine participants that were included in study analyses, age ranged from 18 to 44 ( $M_{age} = 21.62$ ,  $SD_{age} = 5.92$ , males = 7, females = 32). All participants were provided with an informed consent and asked to read it and ask questions prior to

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

data collection, per IRB protocol that was approved by the University of South Carolina. Five participants endorsed a past or current diagnosis of PTSD. Demographic statistics are shown in table 1.

### Measures

*Demographics Questionnaire.* A specific, research-goal oriented questionnaire was developed to obtain demographic information about participants (i.e., age, gender) and information regarding a past or current diagnosis of Posttraumatic Stress Disorder (PTSD; See Appendix A).

*Traumatic Life Events Questionnaire (TLEQ;* Kubany, Leisen, Kaplan, Watson, Haynes, Owens, & Burns, 2000). The TLEQ is a 24-item measure that assesses 23 types of traumatic events such as a natural disaster, car accident, death of a loved one, and sexual abuse. The items include follow-up questions asking whether respondents felt fear, helplessness, or horror during any event experienced and whether there was a physical injury or an immediate emotional response. Item 24 asks respondents to identify one of the 23 separate traumatic events as the most distressing and asks additional questions about the event such as when the event occurred and how much distress the event caused. Temporal validity is very strong for items assessing childhood physical abuse ( $\kappa = .63$  to  $.91$ ), witnessing family violence ( $\kappa = .60$  to  $.79$ ), and childhood sexual abuse ( $\kappa = .70$  to  $.90$ ). Therefore, five items, 12, 13, 15, 16 and 17 were used for analyses considering that they assessed for experiences of physical abuse while growing up, witnessing family violence while growing, and sexual abuse as a child or adolescent. These items were selected for analyses due to their specific assessment of “complex childhood trauma” experiences, as defined earlier. Test-retest reliability for this measure ranges from 63% to 77% (Kubany, Leisen, Kaplan, Watson, Haynes, Owens, & Burns, 2000). See appendix B.

*Distress Tolerance Scale (DTS;* Simons & Gaher, 2005). The DTS is a 15-item measure designed to assess distress tolerance, the ability to experience and withstand negative psychological states in the context of tolerability and aversiveness, appraisal and acceptability, the tendency to absorb attention and disrupt functioning, and the regulation of emotions, specifically, to either avoid or moderate the

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

experience. Each of the 15 questions asks the individual to recall a time in which they have felt upset or distressed and respond in a way that describes their feelings or beliefs about being upset such as, “Feeling upset or distressed is unbearable to me,” “I can’t handle feeling distressed or upset,” and “I am ashamed of myself when I feel upset or distressed.” Responses are given on a 5-point-Likert scale (1=Strongly agree; 2=Mildly agree; 3=Agree and disagree equally; 4=Mildly disagree; 5=Strongly disagree). Higher scores on the DTS correspond to greater levels of distress tolerance with the highest score being nineteen. Research has identified a score of 6 or higher being associated with a treatment seeking population (Tonarely & Ehrenreich-May, 2019). This measure has obtained good internal consistency with a Cronbach alpha value of .89. See Appendix C.

*Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2014).* The DERS is a 36-item measure designed to assess difficulties in emotion regulation in the following areas: awareness and understanding of emotions, acceptance of emotions, the ability to engage in goal-directed behavior and refrain from impulsive behavior, and access to emotion regulation strategies that are perceived to be affective. Each of the 36 questions addresses one’s awareness of their emotions and regulation of distressing feelings, for example, “I care about what I am feeling,” “I pay attention to how I feel,” “When I’m upset, I become out of control,” and “When I’m upset, I start to feel very bad about myself.” Responses are given on a 5-point-Likert scale (1=Almost never; 2=Sometimes; 3=About half the time; 4=Most of the time; 5=Almost always; Gratz & Roemer, 2014). Higher scores on the DERS correspond to greater difficulty with emotion regulation and a total mean score for a “healthy control” participant is approximately 64 out of 136 (Becerra et al., 2013). Items 1, 2, 6-8, 10, 17, 20, 22, 24, and 34 are reverse scored. This measure has obtained high internal consistency with a Cronbach alpha value of .93. See Appendix D.

*Physiological Reactivity.* Electrodermal activity was recorded using Biopac’s MP data acquisition system. The system contains a separate amplifier module for the physiological response of skin

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

conductance. To measure skin conductance, two electrodes were attached to the palm of the participant's non-dominant hand. The electrodes allowed information to be relayed back to the Biopac's amplifier which was run using AcqKnowledge 4.0 software. For the purpose of analyses in this study, EDA was calculated by the mean amplitude (e.g., mean peak) during the narrative task.

### **Procedure**

Upon arrival, participants were given a paper copy of the consent form, asked to read it, and were given an opportunity to ask questions about the study before participation. The consent form outlined contact information for the researcher, supervisor, and the university's ethics board. Participation was voluntary, and students were allowed to discontinue participation at any point during the experimental process. Upon signing the consent form, all electronics (i.e., smart phone, etc.) were turned off or on airplane mode to prevent interference during data collection. Electrodes were then placed on the palm of participants' non-dominant hand to measure skin conductance. In previous research, a rest period between 1 to 5 minutes has been utilized to establish a baseline reading (Gray, Lipschutz, & Scheeringa, 2017; Posada-Quintero et al., 2018); therefore, for the present study, a three-minute rest period was utilized. Once electrodes were successfully placed and skin conductance recording began, participants completed the three-minute baseline reading. Participants were then asked to complete three out of four questionnaires, through a computerized software. The order in which participants completed these questionnaires were counterbalanced to account for order effects, which was automatically generated through the Survey Gizmo computer program. The complete set of questionnaires included the following self-report measures: a demographic questionnaire, the Traumatic Life Events Questionnaire (TLEQ; Kubany, Leisen, Kaplan, Watson, Haynes, Owens, & Burns, 2000), the Distress Tolerance Scale (DTS; Simons & Gaher, 2005), and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) with completion of the demographic questionnaire at the end of the study as it was the only questionnaire in which EDA was not simultaneously measured .

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

All questionnaires were administered using Survey Gizmo and displayed on a computer screen in front of the participant.

After completing the initial three study questionnaires, participants underwent a second three-minute rest period before engaging in the study task. To complete the study task, each participant was given a piece of paper and a writing utensil and viewed instructions on a computer screen stating, "Please write about your thoughts and feelings related to what you consider to be your most traumatic experience in childhood and adolescence, specifically before the age of 18. For example, how did the experience make you feel? How do you feel about the experience now? You will have 10-minutes to write about your experience and the researcher will let you know when 10-minutes has passed." Upon completion of the 10-minute writing task, participants underwent a final 3-minute rest period to establish a recovery period. Figure 1 illustrates the anticipated pattern of arousal of participants during this study. All participants completed the writing task even if they endorsed no traumatic experience(s) in childhood. Examples of topics written about during the task were rejection from peers, receiving bad grades in school, feeling embarrassed in front of a large crowd, witnessing family violence, experiencing sexual assault by a family member, and witnessing a caregiver use drugs.

After the final rest period, electrodes were removed from participants' hands and they were asked to complete the demographics questionnaire. All participants were made aware of free on-campus psychological services provided at the USCA Counseling Center should study tasks produce extended or delayed distress or discomfort and contact information for the principal researcher was provided on participant copies of the consent form in the event that participants had questions. Participants also received a handout of local mental health resources in case they did not want to seek services at the University Counseling Center. Completion of this study took approximately 45 minutes.

### **Data Processing of EDA Activity**

EDA analysis included transformations and filtering of EDA data through use of

AcqKnowledge 4.4 software. Proprietary data analysis subroutines available with this software were used to locate SCRs after removing baseline levels of EDA during each phase of the study (e.g., baseline, questionnaire 1, questionnaire 2, questionnaire 3, rest phase, writing task, recovery phase).

### Results

Prior to statistical analysis, data were checked for parametric assumptions, including examining normality with the Kolmogoriv-Smirnov test, histograms, boxplots, skewness, and kurtosis of each variable. Histogram distributions for each variable (DERS, DTS, TLEQ, EDA) can be found in figures 2-5. Parametric assumptions were met for all data sets except the trauma measure (TLEQ). Regression assumptions were also tested, such as multicollinearity, homoscedasticity, normality of errors, and linearity. Despite the finding that DERS and DTS were highly correlated, multicollinearity was not violated because VIF < 10, and tolerance >.2.

### Descriptive Characteristics of Data

All participants ( $n = 39$ ) completed the DERS, DTS, and TLEQ questionnaires in addition to the writing task, during which aspects of each participants' electrodermal activity was recorded (i.e., count, mean amplitude, time, maximum amplitude, standard deviation). However, due to nine participants not having a skin conductance response during the writing task event, only twenty-nine participants' data was included in analyses. A spearman's correlation matrix of these variables can be found in table 3. A significant positive correlation was found between TLEQ and DTS, DERS and DTS, and TLEQ and DERS. A significant negative correlation was found between TLEQ and EDA.

Traumatic experiences that were "complex trauma" in nature that were endorsed on the TLEQ include witnessing family violence while growing up (item 13), experiencing physical abuse while growing up (item 12), sexual assault prior to age 13 by an older assailant such as a family member or caregiver (item 15), sexual assault prior to age 13 by an assailant similar in age (item 16), and sexual assault prior to age 18 but after age 13 (item 17).

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

Overall, twelve participants reported physical abuse, with 40 instances of physical abuse occurring collectively for these students. Thirteen participants reported sexual abuse, with 41 instances of sexual abuse occurring collectively; and, fifteen participants reported witnessing family violence, with 49 instances occurring collectively. Of the total sample ( $n = 39$ ), five reported experiencing at least one complex trauma experience in all three trauma domains (i.e., physical abuse, sexual abuse, and witnessing family violence), with 64 instances of trauma occurring collectively. Also, six participants out of the total sample reported experiencing at least one complex trauma experience in two of three trauma domains, with 29 instances occurring collectively. While it is important to note that 11 out of 39 participants endorsed experiencing at least one traumatic incident in two or more domains of complex trauma (i.e., sexual abuse, physical abuse, witnessing family violence), 15 out of 39 participants reported experiencing no trauma experiences (see table 2). Descriptive statistics for each questionnaire measure (DERS, DTS, TLEQ) and EDA mean amplitude data are also provided in table 2.

### **Hypothesis Testing**

To test hypothesis 1, that there would be a positive correlation between increased complex trauma experiences in childhood and emotional dysregulation in college students, I conducted a simple correlation analysis using a Spearman's correlation considering that TLEQ data was non parametric, which yielded a significant positive correlation,  $r_s = 0.421$  ( $n = 39$ ),  $p = 0.008$ , with an effect size of 0.2 in support of my hypothesis (see table 3). A scatterplot of the relationship between TLEQ and DERS can be found in table 6. This relationship was in the predicted direction, whereas students with more trauma experiences reported higher levels of emotion dysregulation.

To test hypothesis 2, that increased complex trauma experiences in childhood would be related to greater levels of perceived distress tolerance, I conducted a simple correlation analysis using a Spearman's correlation, which also yielded a significant positive correlation result,  $r_s = 0.388$  ( $n = 39$ ),  $p = 0.015$ , with an effect size of 0.2 in support of my hypothesis (see table 3). A scatterplot of the



relationship between TLEQ and DTS can be found in figure 7. On average, students who reported more trauma experiences also reported higher levels of perceived distress tolerance.

To test hypothesis 3a, that childhood complex trauma experiences would predict emotional regulation functioning, a linear regression analysis was conducted with DERS as the outcome variable and TLEQ as the predictor variable. The overall model was significant,  $F(1,37) = 13.227$ ,  $p = 0.001$ ,  $R^2 = 0.263$ . This result was in support of my hypothesis and suggests that trauma experiences accounted for approximately 26% of the variance in difficulties in emotional regulation (see table 4).

To test hypothesis 3b, that childhood complex trauma experiences would predict distress tolerance, a linear regression analysis was conducted with DTS as the outcome variable and TLEQ as the predictor variable. The overall model was significant,  $F(1,37) = 8.776$ ,  $p = 0.005$ ,  $R^2 = 0.192$ . This result was in support of my hypothesis and suggests that trauma experiences accounted for approximately 19% of the variance in distress tolerance (see table 5).

To test hypothesis 4, that adding emotion regulation (DERS) and distress tolerance (DTS) into the model with CCT experiences would account for more systematic variance and would overall produce a better model to predict EDA mean amplitude during the writing task when compared to CCT experiences alone, a hierarchical regression analysis was conducted. TLEQ was entered into the first block, DERS into the second block, and DTS entered into the third block with EDA as the outcome variable. The model did not significantly predict EDA mean amplitude during the writing task when using CCT experiences alone (TLEQ),  $F(1, 27) = 0.483$ ,  $p = 0.493$ ,  $R = 0.133$ ,  $\beta = -0.133$ ,  $R^2 = 0.018$ . The model did not significantly account for more systematic variance when including DERS scores,  $F_{change}(1, 26) = 0.283$ ,  $p = 0.599$ ,  $R = 0.168$ ,  $\beta = 0.119$ ,  $R^2 = 0.028$ . As such, the model incorporating the TLEQ and DERS score did not significantly predict EDA,  $F(2, 26) = 0.377$ ,  $p = 0.690$ . When DTS scores were added into the third block and all three predictor variables were included into the model (e.g., TLEQ, DERS, DTS), still no significant systematic variance was accounted for,  $F_{change}(1, 25) = 0.001$ ,  $p = 0.982$ ,  $R = 0.168$ ,  $\beta = -0.007$ ,

$R^2 = 0.028$ . This final model also did not significantly predict EDA mean amplitude during the writing task,  $F(3, 25) = 0.242$ ,  $p = 0.866$ . This hypothesis was not supported, see table 6 .

### Post-Hoc Analyses

I performed three post-hoc analyses to further explore the relationship between trauma experiences and psychophysiological activity (EDA) in my data, given the lack of significant results in my fourth hypothesis. Additionally, I performed one post-hoc analysis to explore the relationship between PTSD diagnoses and complex trauma experiences in childhood. Four total post-hoc analyses were conducted.

First, I conducted an independent samples t-test in an attempt to explore the mean difference in EDA activity in those who identified their “most distressing event” (TLEQ, item 24) as occurring in childhood/adolescence ( $n = 17$ ) versus in adulthood ( $n = 12$ ). Homogeneity of variance was not violated according to Levene’s Test for Equality of Variances,  $p > .05$ . For this analysis, trauma items that were indicated to have occurred before the age of eighteen were coded as “childhood/adolescence” and trauma items that were indicated to have occurred after the age of eighteen were coded as “adulthood.” Trauma was not coded as “complex” or “non-complex” as the purpose of this analysis was solely to explore the impact of trauma happening in childhood/adolescence or adulthood on current EDA activity. Results showed that there were no significant mean differences in EDA activity for those who experienced their most distressing traumatic event in childhood/adolescence ( $M = 12.807$ ,  $SD = 3.856$ ) versus those who experienced their most traumatic event in adulthood ( $M = 12.677$ ,  $SD = 4.984$ ),  $t(30) = 0.079$ ,  $p = 0.937$ ,  $CI [-0.709 - 0.769]$ . See figure 8 for comparison of histogram results.

Second, in an attempt to explore the difference in EDA activity in those who identified their “most distressing event” (TLEQ, item 24) as “complex” ( $n = 10$ ) versus “non-complex” ( $n = 19$ ) in nature, I conducted a Mann-Whitney U Test as homogeneity of variance was violated according to Levene’s Test for Equality of Variances,  $p > .05$ . Endorsed items such as a natural disaster, motor vehicle accident,

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

combat or warfare, physical assault by a partner, experiencing a miscarriage, or abortion were coded as “non-complex” while items such as growing up physically punished, growing up witnessing family violence, sexual contact before 13-years-old by someone older, unwanted sexual contact before 13-years-old, and unwanted sexual contact as a teen were coded as “complex.” Results found that there was no significant differences in EDA activity for those who reported “complex” trauma versus those who reported “non-complex trauma as their most distressing event traumatic event ( $U = 83.000, p = 0.582$ , two-tailed). See figure 9 for comparison of histogram results.

Third, I explored the difference in EDA activity in those who wrote about, prior to the age of eighteen, a “complex” trauma experience ( $n = 5$ ) during the written narrative task versus those who wrote about a “non-complex” trauma experience ( $n = 19$ ). A Mann-Whitney U Test was conducted as homogeneity of variance was violated according to Levene’s Test for Equality of Variances,  $p > .05$ . Examples of narrative topics that were coded as “complex” are experiences of domestic or family violence, sexual assault by a family member, or verbal, emotional, or physical abuse by a caregiver, while examples of topics that were coded as “non-complex” are immigration, motor-vehicle accidents, natural disasters, serious illness of a loved one, death of a family member, or intimate partner violence. Results found that there was no significant difference in EDA arousal for those who wrote about “complex” versus “non-complex” traumatic experiences prior to the age of eighteen ( $U = 46.000, p = 0.915$ , two-tailed). See figure 10 for comparison of histogram results.

In an attempt to explore the difference in complex childhood trauma experiences in those who endorsed a PTSD diagnosis ( $n = 5$ ) versus those who did not endorse a PTSD diagnosis ( $n = 31$ ), I conducted a Mann-Whitney U Test as homogeneity of variance was violated according to Levene’s Test for Equality of Variances,  $p > .05$ . Given that three participants did not respond to the item assessing a past or current diagnosis of PTSD, only thirty-six participant responses were included in this analysis. Results found that there was no significant difference in complex childhood trauma experiences for

those with a PTSD diagnosis versus those without a PTSD diagnosis ( $U = 54.500$ ,  $p = 0.272$ , two-tailed).

See figure 11 for comparison of histogram results.

### Discussion

The purpose of this study was to further investigate the relationship between the number of experiences of complex trauma in childhood, emotion dysregulation, distress tolerance, and psychophysiological reactivity using electrodermal activity measures and self-report questionnaires. I wanted to examine the influence of childhood experiences of complex trauma on the psychological functioning of college students, specifically on self-regulation of emotions and distress tolerance. Further, I wanted to explore whether an increased number of complex trauma experiences combined with emotion dysregulation and distress intolerance predicted mean amplitude of arousal during a writing task that asked participants to recall negative childhood experiences.

To my knowledge, this is the first study to date that has assessed both psychological functions and physiological arousal in real-time while college students were asked to recall and write about a traumatic childhood experience. There are related associations described in the literature that support the current study's premise. Emotion self-regulation (i.e., ability to modulate or change emotions) and distress tolerance (i.e., ability to cope with negative internal states) are two psychological processes that help reduce emotional arousal that appear to be impacted by severe trauma (Neacsia, Smith & Fang, 2017; Shonkoff et al., 2012). Additionally, continued exposure to adverse early life experiences may result in children having continued, heightened autonomic stress responses and increased threat reactivity, which in turn may lead to dysregulation of physiological responses even in safe contexts (Heim et al., 2000; Mclaughlin et al., 2014). Given previous research findings, it was hypothesized that chronic traumatic experiences in childhood would impact an individual's current ability to regulate emotions and to tolerate distressing situations; thusly, impacting one's ANS arousal when presented with unpleasant stimuli.

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

The present study had four main hypotheses. I hypothesized that an increased number of complex trauma experiences in childhood would be related to increased emotional dysregulation, as measured by the Difficulties in Emotion Regulation Scale, in college students. The number of complex childhood trauma experiences were assessed by items 12, 13, 15, 16, and 17 on the TLEQ (i.e., physical abuse, witnessing family violence while growing up, sexual assault prior to age 13 by an older assailant, sexual assault prior to age 13 by an assailant similar in age, and sexual assault prior to age 18 but after age 13, respectively). Additionally, I hypothesized that an increased number of complex trauma experiences in childhood would be related to increased levels of distress tolerance, as measured by the Distress Tolerance Scale, in college students. Further, I hypothesized that increased numbers of childhood complex trauma experiences would predict later distress tolerance and emotion regulation functioning in college students.

Finally, I hypothesized that adding emotion regulation (DERS) and distress tolerance (DTS) into the model with complex childhood trauma experiences (TLEQ) would account for more systematic variance and would overall produce a better model to predict EDA mean amplitude during the writing task when compared to complex childhood trauma experiences alone.

### **Trauma, Emotion Regulation, and Distress Tolerance**

Complex trauma experiences that were evaluated in this study were based on specifically endorsed items on the TLEQ, which assessed for histories of physical abuse, sexual abuse, and witnessing family violence in childhood and adolescence. Results from this study indicated a significant, positive correlation between current emotion dysregulation and complex trauma experiences in childhood. Additionally, complex childhood trauma experiences were found to be a significant coefficient predictor of emotion dysregulation in college students. These findings provide evidence to corroborate long-standing research about the influence of childhood trauma on later emotion

regulation difficulties (Briere & Rickards, 2007; Burns et al., 2010; Cloitre et al., 1997; Ehring & Quack, 2010; Kim & Cicchetti, 2009; van der Kolk et al., 1996).

Results from this study revealed a significant, positive correlation between perceived levels of distress tolerance and experiences of complex trauma in childhood. Additionally, complex trauma experiences were found to be a significant coefficient predictor of perceived level of distress tolerance in college students. These findings add to the literature to help clarify inconsistencies reported in past research. While some studies have found that increased trauma can lead to low distress tolerance (e.g., as expressed by an inability to handle negative or aversive psychological experiences, Arens et al., 2014); other studies have reported the opposite (Berenz et al., 2018b; Vujanovic, Bernstein, & Litz, 2010; Vujanovic, Litz, & Farris, 2015). In the present study I found that those who experienced greater instances of complex childhood trauma had increased perceptions of distress tolerance. Some theoretical models indicate that early trauma may increase one's ability to tolerate distress and may serve as a protective factor for children growing up in emotionally aversive environments, but may become maladaptive over time (Vujanovic, Bernstein, & Litz, 2010; Vujanovic, Litz, & Farris, 2015).

The findings related to distress tolerance and emotion regulation in this study have several clinical implications. The current literature purports that distress intolerance or low levels of distress tolerance can influence and maintain several forms of psychopathology such as substance abuse, anxiety, mood, and personality disorders. Longstanding research has also indicated that those low in emotion regulation skills often report higher levels of depression, anxiety, and PTSD (Eftekhari et al., 2009) and are more likely to use suppression and avoidance as maladaptive responses to stressful situations (Carver et al., 1989). However, for those that have high levels of perceived distress tolerance and emotion regulation skills, they may be more able and willing to "approach" situations that might result in negative or aversive emotional experiences. Additionally, they may also be better able to restrain from engaging in negative reinforcement opportunities such as escape or avoidance (Leyro et

al., 2010). This could prove beneficial for engaging in psychotherapy that encourages resilience from negative internal states and emotional willingness, such is the case in treatments such as Acceptance and Commitment Therapy (Hayes et al., 1999), Dialectical Behavioral Therapy (Linehan, 2003), and acceptance-based emotion regulation group therapy (Gratz & Gunderson, 2006).

The relationship between emotional regulation and distress tolerance appears to be complex, as this study found a significant, strong positive correlation between the two variables which indicates that as reported difficulties in emotion regulation increased, perceived levels of distress tolerance also increased. Previous studies have also found strong associations between these variables (McHugh et al., 2012). This relationship makes sense in light of the fact that participants in this study with more trauma experiences appeared to report more emotion dysregulation; while at the same time, they appeared to report more tolerance and a perceived ability to better handle their distress in the face of emotions that may be overwhelming.

In ad hoc analyses, the current study also attempted to evaluate the impact of increased complex trauma experiences in childhood on a self-report diagnosis of past or current PTSD. However, results found that there was no significant difference in complex childhood trauma experiences for those with a PTSD diagnosis versus those without a PTSD diagnosis. Considering that only five of thirty-six participants endorsed a diagnosis of PTSD and the current population was not clinically based, these results are not altogether surprising. Further research is needed, ideally using a clinically based sample or by using a PTSD symptom questionnaire such as the PCL-5 (Weathers et al., 2013), on the impact of complex childhood trauma experiences on later diagnoses of PTSD in college students. It should be noted that PTSD diagnoses were not verified using clinical interviews or rating scales and relied solely on the self-report of the diagnosis. Thus, this relationship warrants further study with participants who have been carefully diagnosed by trained professionals.

### **Electrodermal Activity**

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

When analyzed together, difficulties in emotion regulation (DERS), distress tolerance (DTS), and complex trauma experiences in childhood (TLEQ) did not significantly predict electrodermal activity mean amplitude during the writing task (EDA); thus, my fourth hypothesis was not supported. This finding was surprising, given that a Spearman correlation analysis revealed a significant correlation between TLEQ and EDA. Thus, at the very least, the first model between TLEQ and EDA was expected to be significant. However, when investigated further, the same relationship between TLEQ and EDA was not significant when running a Pearson's instead of a Spearman's correlation analysis (Pearson:  $r = -0.133$ ,  $p = 0.493$ ). Considering that the hierarchical regression analysis in hypothesis 4 utilized values from a Pearson's correlation to run the regression analysis, this difference in p-values explains model 1's nonsignificant result as well as influences the subsequent nonsignificant results in model 2 and model 3. Considering that a Pearson correlation evaluates the linear relationship between two continuous variables, it is likely that the non-linear nature of the TLEQ data as well as the multiple outliers influenced the non-significant Pearson correlation result. However, when considering a Spearman correlation, which evaluates two continuous or ordinal variables based on rank values rather than raw data, it is likely that the Spearman correlation accounted for the non-linearity of the TLEQ data which resulted in a significant correlation between TLEQ and EDA. Future research using this data set or like-nonlinear data sets may consider utilizing an ordinal variable to represent trauma in an attempt to better account for the variability that is typical of participants reporting trauma experiences.

Moreover, emotion regulation and distress tolerance were not significantly correlated with EDA arousal. However, it should be noted that there appeared to be a significant, negative relationship between complex trauma experiences and EDA arousal. Therefore, as the number of trauma experiences increased, EDA arousal decreased. This relationship could be partially explained by the Adaptive Calibration Model (ACM), which posits that patterns of stress responsivity correspond to low or blunted physiological responses following severe traumatic stress (Giudice, Ellis, & Shirtcliff, 2011).



## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

Therefore, those who experience increased complex trauma experiences in childhood may have developed a blunted, but adaptive, physiological response in an effort to cope with their distressing environment that has continued into their “typical” adult functioning.

Upon further analysis, there seemed to be no significant differences in EDA arousal in those who identified experiencing their most traumatic event in childhood/adolescence versus in adulthood. Based on this sample and overall results, it appeared that participants did not differ in their physiological arousal regardless of the time-frame during which they experienced their most traumatic event (i.e., in childhood/adolescence vs. adulthood). Likewise, individuals did not differ in their physiological arousal whether or not their most traumatic event was “complex” in nature. Finally, there also appeared to be no significant difference in physiological arousal in those who wrote about “complex” versus “non-complex” topics during the narrative task. These findings indicate that regardless of the age at which their most traumatic event occurred and the nature of the event (i.e., non-complex vs complex), there was no significant difference in electrodermal activity. The lack of significant findings in post-hoc analyses between EDA arousal and complex versus non-complex trauma exposure may be due in part to the limited variety of trauma experiences reported by participants overall. It should also be noted that EDA data were collected on fewer participants ( $n = 32$ ) than the overall sample size ( $n = 39$ ).

### **Strengths and Limitations**

This study is the first of its kind to evaluate real-time arousal using electrodermal activity while young adult participants were asked to recall and write about a traumatic experience in their childhood or adolescence. Moreover, this study used a variety of assessment measures, including both self-report and psychophysiological methods. As such, this study evaluated both perceived levels of distress tolerance via a self-report measure and also a biological measure of distress through electrodermal activity (e.g., galvanic skin response). This study is unique in that it focused on evaluating experiences of retrospective trauma that are “complex” in nature and the impact on current emotional functioning in

college students.

Although this study expands on the understanding of the relationship among emotion regulation, distress tolerance, and childhood complex trauma, it is not without limitations. The sample size of the study was smaller than anticipated, which was a result of the COVID-19 pandemic and the shut-down of the university campus due to social distancing guidelines. Therefore, it is likely that this study's results are less generalizable than projected. Additionally, of the already limited sample size that was obtained, even more participant data, specifically EDA data, had to be excluded from analyses which also contributed to possible underpowered findings. The sample utilized is also a potential limitation that should be noted. College students are commonly used in psychological research, which was done in this study; however, with the use of college students one risks limiting generalizability of the results to the general public. Future research would benefit from use of participants recruited from the general population, as opposed to just university students. It is important to note that fifteen of thirty-nine participants (38.4%) reported no trauma experiences while five of thirty-nine participants (13%) reported eight or more traumatic experiences; thus, a select few students affected these results disproportionately. It should be noted that during recruitment, this study was advertised to be about childhood trauma experiences. Therefore, students who may have experienced aversive childhood experiences and were still experiencing a great deal of distress and discomfort may have been reluctant to sign up for participation.

Lastly, it should be noted that the measure to assess for traumatic experiences used for this study, the Traumatic Life Events Questionnaire (TLEQ), asked about traumatic experiences that were not necessarily "complex" in nature or specific to experiences of trauma in childhood or adolescence. Therefore, by only using few certain questions from this measure, it is possible that the construct of "complex childhood trauma" was not thoroughly assessed with this chosen measure. However, of the complex childhood trauma experiences reported in this study, five participants reported multiple

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

experiences of early complex trauma in all three domains (i.e., physical abuse, sexual abuse, witnessing family violence). Of these five participants, they experienced 64 collective experiences of early complex trauma. Additionally, six participants reported multiple experiences of complex childhood trauma in two domains, resulting in 30 collective experiences of complex trauma in childhood. Therefore, only 11 out of 39 participants, approximately 28% of the sample, provided the majority report of trauma experiences that fit the theoretical definition of having experienced “complex” trauma or multiple traumatic events. In other words, much of the complex childhood trauma data that was gathered in this data set came from a few select individuals (e.g., 11) who experienced multiple types of trauma.

Lastly, considering that the writing task was ten minutes long and some participants did not continuously write for the entire ten minutes (e.g., some participants wrote for 5 minutes and stopped while others wrote for 8 minutes and stopped despite instructions asking them to write for the entire time), it is possible that their skin conductance reactivity began to decrease near the end of the task given that some participants sat quietly after they finished writing. It should also be considered that participants’ arousal may have begun to habituate by the end of the ten-minute task; therefore, their true arousal during the task may not be truly represented by the entire ten-minute period.

### **Future Directions**

Future studies should attempt to re-evaluate the relationship among EDA arousal, distress tolerance, emotion regulation, and complex trauma experiences in childhood with a larger clinical sample size. Future studies may also want to reassess the method of evaluation for childhood trauma by possibly using other measures that are geared specifically toward aspects of trauma “complex” in nature. Given that the majority of reported complex childhood trauma data gathered in this sample came from a few select individuals who experienced CCT, future studies should aim to use a clinical population to more thoroughly evaluate the effects of complex early trauma on emotion regulation, distress tolerance, and psychophysiological functioning.

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

Given that this study solely measured distress tolerance in terms of perceived levels of distress tolerance using self-report measures, future studies may want to consider incorporating multi-method assessments of distress tolerance (i.e., behavioral or biobehavioral) to further investigate the impact of childhood complex trauma experiences on distress tolerance since the literature highlights two comprehensive, conceptually distinct forms of tolerance (i.e., perceived ability to bear negative emotional states and the behavioral act of enduring negative internal states; Leyro et al., 2010; McHugh et al., 2011).

There are numerous avenues for future analyses utilizing this data set given that various aspects of EDA arousal (e.g., mean amplitude, count, time, maximum amplitude, standard deviation) were measured for each phase of the study (e.g., baseline, DERS, DTS, TLEQ, rest phase, writing task, recovery phase). Future analyses using this data set may investigate the difference in arousal during baseline versus the recovery phase, or the difference in baseline at the beginning, middle, or end of the writing task.

Additionally, given the wide array of trauma experiences that were assessed in the TLEQ, future studies may want to evaluate the effect of other types of trauma experiences such as exposure to natural disasters, military operations and war zones, community violence, or interpersonal violence on emotion regulation, distress tolerance, and EDA arousal. Finally, it would be important to utilize other forms of psychophysiological reactivity, such as brain wave activity using electroencephalography (EEG) and/or heart rate using electrocardiography (ECG), to explore affective states, emotional regulation and distress tolerance in individuals with numerous instances of early complex trauma.

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**Table 1*****Participant Demographics***

			<i>n</i>
	<u>Age</u>	<u>Sex</u>	
<i>M</i>	21.62	Male	7
<i>SD</i>	5.92	Female	32
Minimum	18		
Maximum	44		
PTSD Self-Report			5

*Note.* *N* = 39. PTSD = Posttraumatic Stress Disorder.

**Table 2*****Descriptive Statistics of Questionnaires***

	(N)	Range	Min	Max	<i>M</i>	<i>SD</i>
DERS	39	83	53	136	91.46	24.54
DTS	39	56	18	74	46.26	13.78
TLEQ	39	16	0	16	3.30	4.52
EDA	29	16.60	3.70	20.30	12.75	4.27

	<i>n</i>	Frequency of Collective Events	Percentage (%)
TLEQ: Physical Abuse	12	40	-
TLEQ: Sexual Abuse	13	41	-
TLEQ: Family Violence	15	49	-
TLEQ: Two Domains	6	30	-
TLEQ: All 3 Complex Trauma Domains	5	64	-
TLEQ: No Events	15	-	38
TLEQ: 1 Trauma Event	7	-	18
TLEQ: 2-4 Trauma Events	5	-	13
TLEQ: 5-7 Trauma Events	7	-	18
TLEQ: 8+ Trauma Events	5	-	13

*Note.* DERS = Difficulties in Emotion Regulation Scale; DTS = Distress Tolerance Scale; TLEQ=Traumatic Life Events Questionnaire, number of complex trauma experiences in childhood as reported on items 12, 13, 15, 16, and 17; EDA = Electrodermal Activity, mean amplitude during writing task. *M* = mean, *SD* = standard deviation. Two Domains = participants endorsed two out of three domains of complex trauma on the TLEQ. All Domains = participants endorsed three out of three domains of complex trauma on the TLEQ. Note that 11 out of 39 participants, endorsed experiences in two or more domains of trauma (i.e., sexual abuse, physical abuse, and/or witnessing family violence).

**Table 3*****Spearman's Correlations***

	DTS	TLEQ	DERS	EDA
DTS				
$r_s$	-	-	-	-
$p$	-	-	-	-
TLEQ				
$r_s$	0.388*	-	-	-
$p$	0.015	-	-	-
DERS				
$r_s$	0.753*	0.421*	-	-
$p$	0.001	0.008	-	-
EDA				
$r_s$	-0.005	-0.372*	-0.026	-
$p$	0.981	0.047	0.894	-

\*. Correlation is significant at the 0.05 level (2-tailed).

*Note.* DTS = Distress Tolerance Scale. TLEQ = Traumatic Life Events Questionnaire, number of complex trauma experiences in childhood. DERS = Difficulties in Emotion Regulation Scale. EDA = Electrodermal Activity, mean amplitude during writing task.

**Table 4*****Simple Linear Regression Coefficients Table with Predictor TLEQ and Outcome DERS***

Coefficient	Unstandardized B	Coefficient Std. Error	Standardized Coefficient Beta ( $\beta$ )	t	Sig. ( $p$ )
DERS	2.786	0.776	0.513	3.637	0.001

Dependent Variable: DERS

*Note.* DERS = Difficulties in Emotion Regulation Scale. TLEQ = Traumatic Life Events Questionnaire, number of complex trauma experiences in childhood.

**Table 5*****Simple Linear Regression Coefficients Table with Predictor TLEQ and Outcome DTS***

Coefficient	Unstandardized B	Coefficient Std. Error	Standardized Coefficient Beta ( $\beta$ )	t	Sig. ( $p$ )
DTS	1.335	0.451	0.438	2.962	0.005

Dependent Variable: DTS

*Note.* DTS = Distress Tolerance Scale. TLEQ = Traumatic Life Events Questionnaire, number of complex trauma experiences in childhood.

**Table 6**

***Hierarchical Linear Regression Coefficients Table with Predictor TLEQ, DERS, DTS, and Outcome EDA Mean Amplitude during Writing Task***

Coefficient	Unstandardized B	Coefficient Std. Error	Standardized Coefficient Beta ( $\beta$ )	t	Sig. ( $p$ )
TLEQ	-0.167	0.198	-0.192	-0.841	0.408
DERS	0.021	0.051	0.124	0.404	0.690
DTS	-0.002	0.086	-0.007	-0.023	0.982

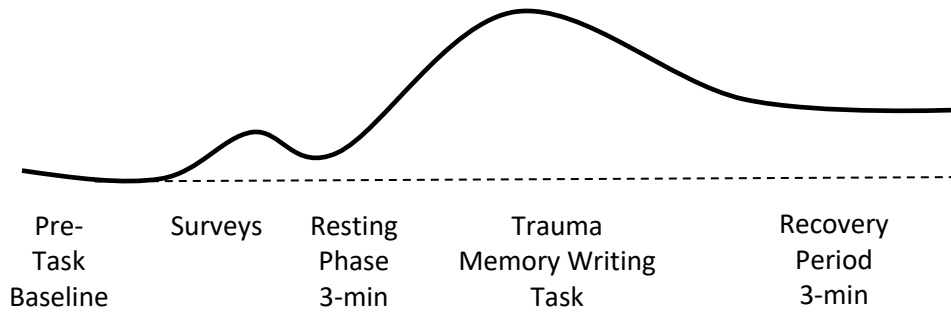
Dependent Variable: EDA Mean Amplitude during Writing Task

*Note.* DERS = Difficulties in Emotion Regulation Scale. DTS = Distress Tolerance Scale. TLEQ = Traumatic

Life Events Questionnaire, number of complex trauma experiences in childhood.

**Figure 1**

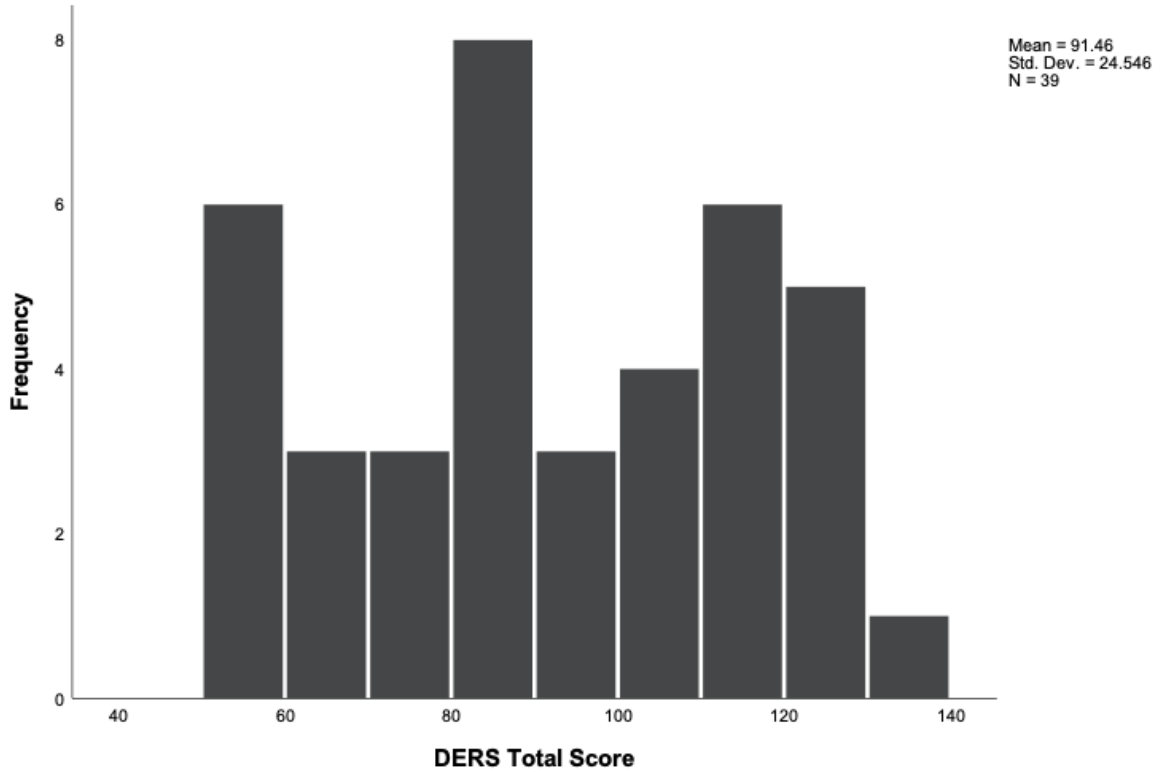
**Anticipated Pattern of Participant Arousal**



*Note.* This figure illustrates the anticipated pattern of arousal of participants during this study in all phases.

**Figure 2**

*Histogram of Distribution of DERS Data Set*

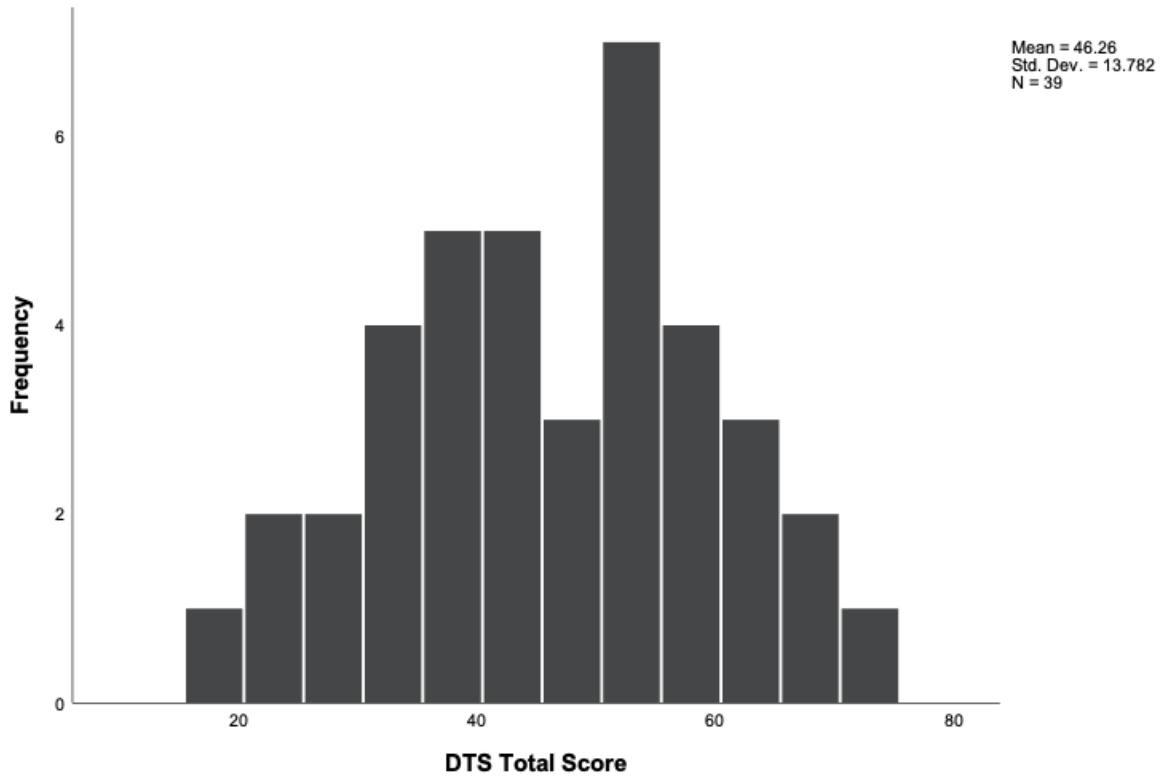


*Note.* DERS = Difficulties in Emotion Regulation Scale. Note that higher scores on the DERS indicates a greater difficulty with emotion regulation.



**Figure 3**

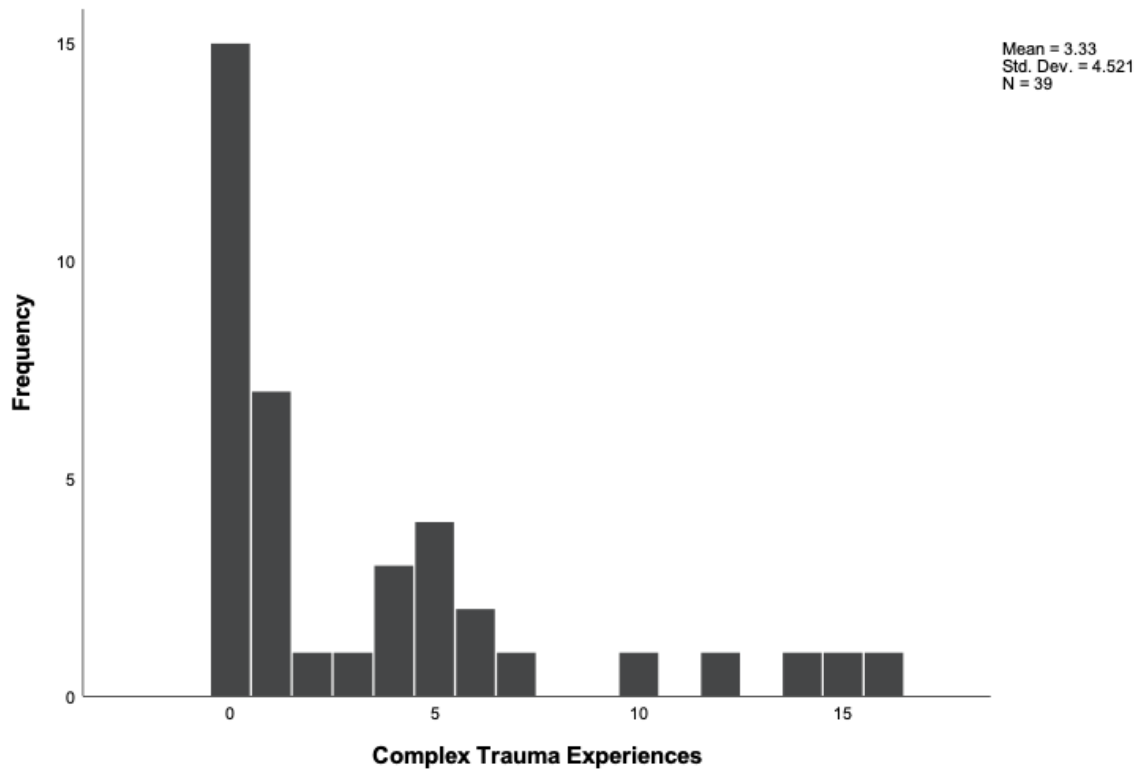
*Histogram of Distribution of DTS Data Set*



*Note.* DTS = Distress Tolerance Scale. Note that a higher score on the DTS indicates a higher level of distress tolerance.

**Figure 4**

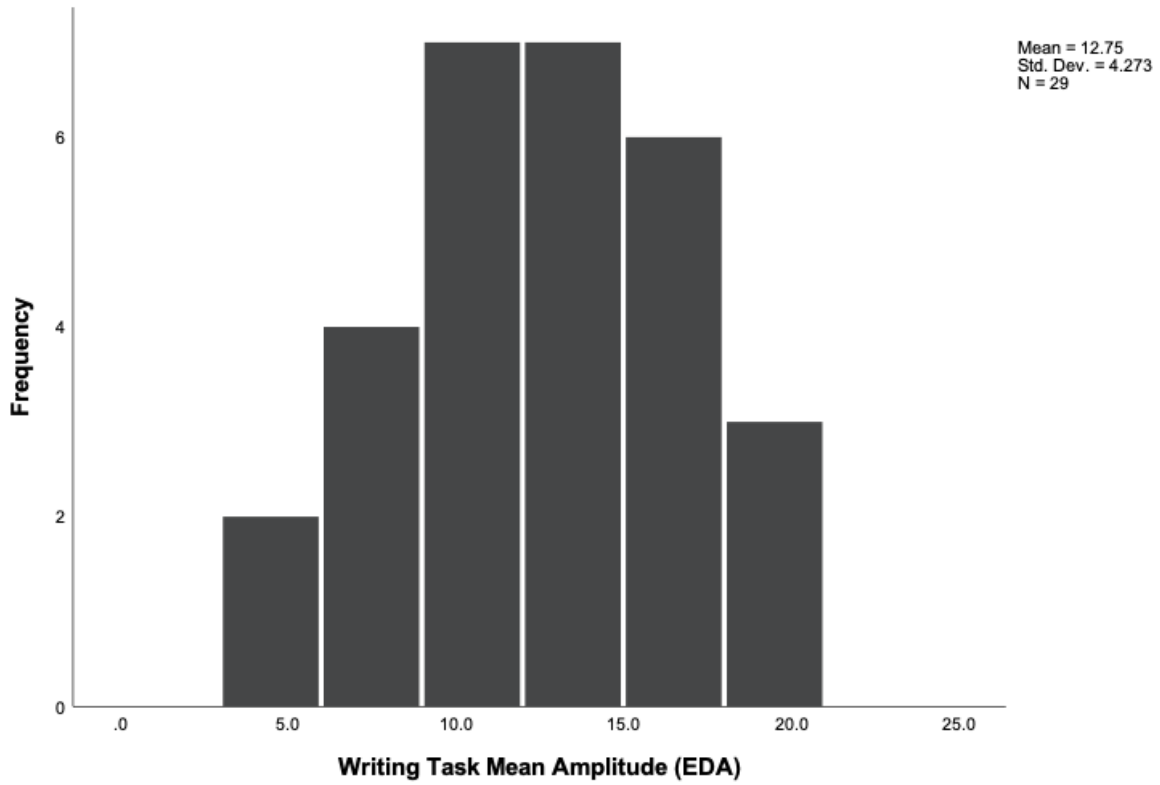
*Histogram of Distribution of TLEQ Data Set*



*Note.* TLEQ = Traumatic Life Events Questionnaire, number of complex trauma experiences as outlined in questions 12, 13, 15, 16, 17. Note that distribution of data set is right skewed, with more participants reporting no experiences of trauma.

**Figure 5**

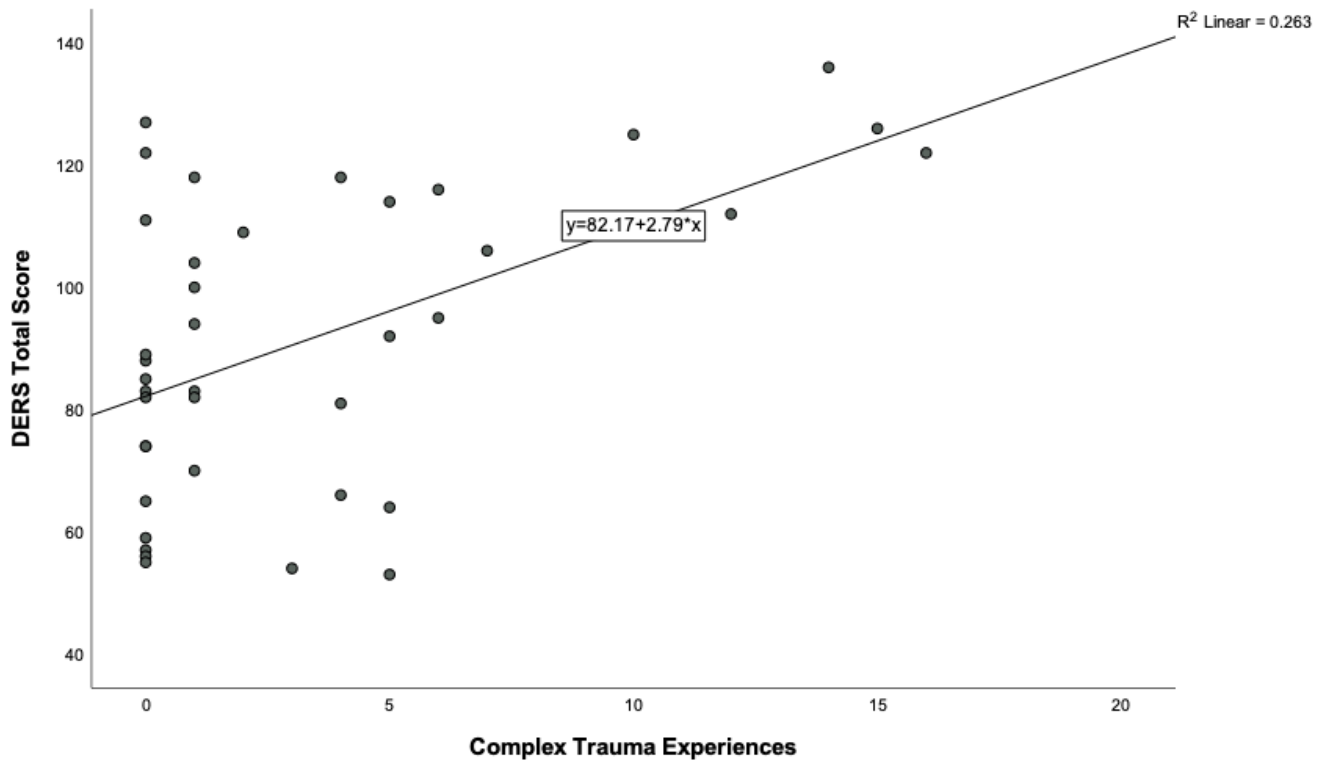
*Histogram of Distribution of EDA Data Set*



*Note.* EDA = Electrodermal Activity, mean amplitude during writing task event. Note that for skin conductance responses, approaching 20 micro-siemens ( $\mu S$ ) is associated with “high arousal.”

Figure 6

Scatterplot Relationship Between DERS and TLEQ

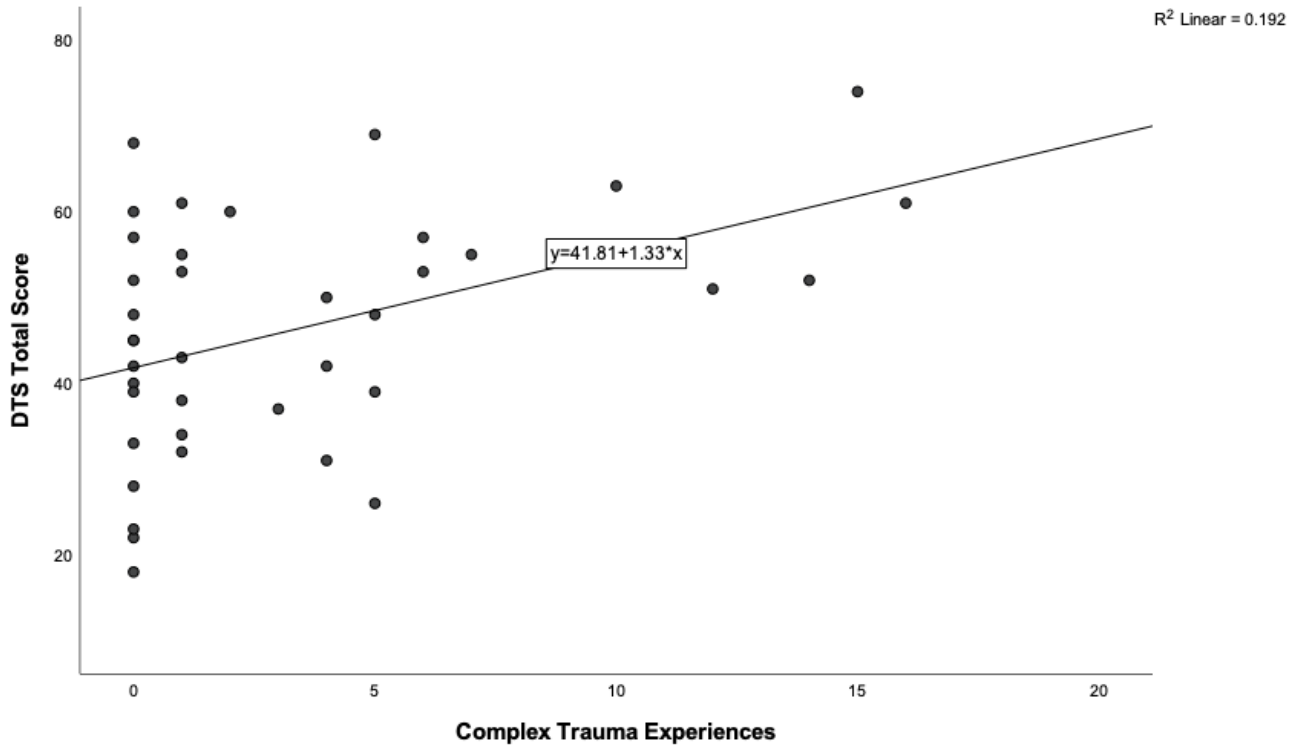


Note. Complex Trauma Experiences = experiences endorsed on items 12, 13, 15, 16, 17 on the TLEQ.

DERS = Difficulties in Emotion Regulation Scale. Note that as complex trauma experiences increased, total scores on the DERS increased.

**Figure 7**

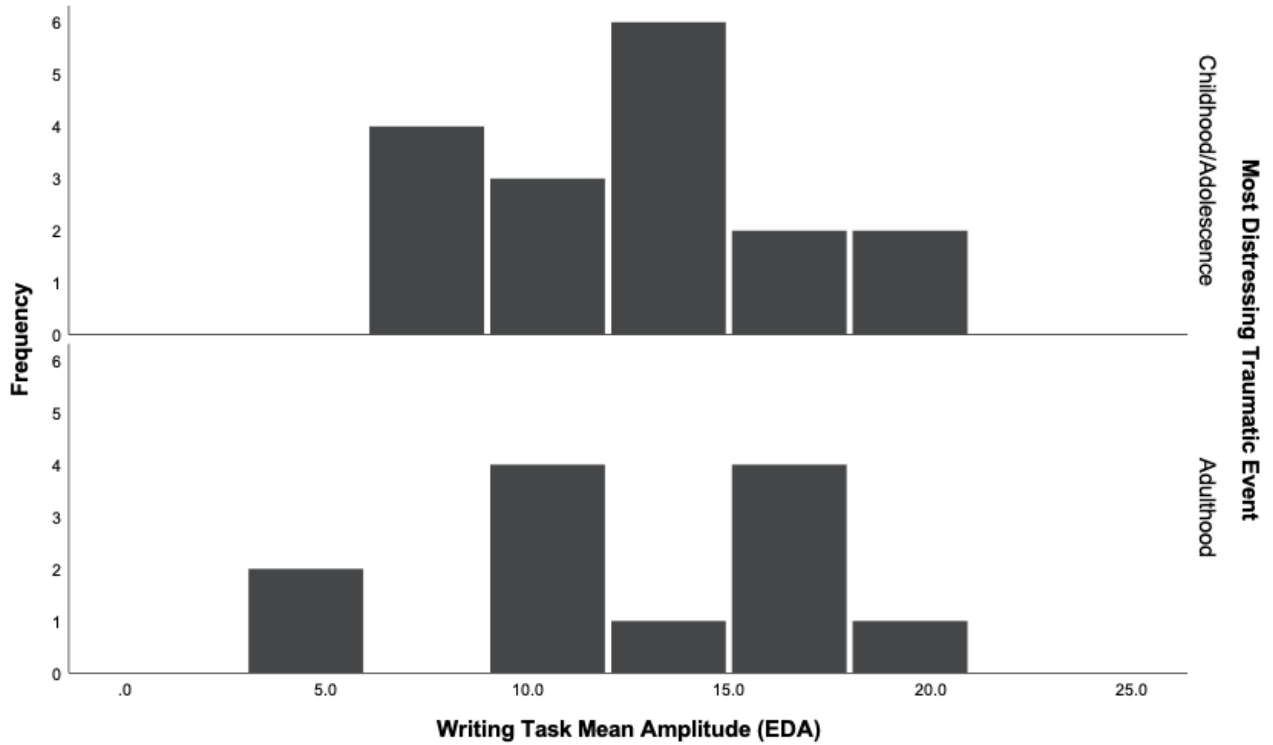
*Scatterplot Relationship Between DTS and TLEQ*



*Note.* Complex Trauma Experiences = experiences endorsed on items 12, 13, 15, 16, 17 on the TLEQ. DTS = Distress Tolerance Scale. Note that as complex trauma experiences increased, scores on the DTS increased.

**Figure 8**

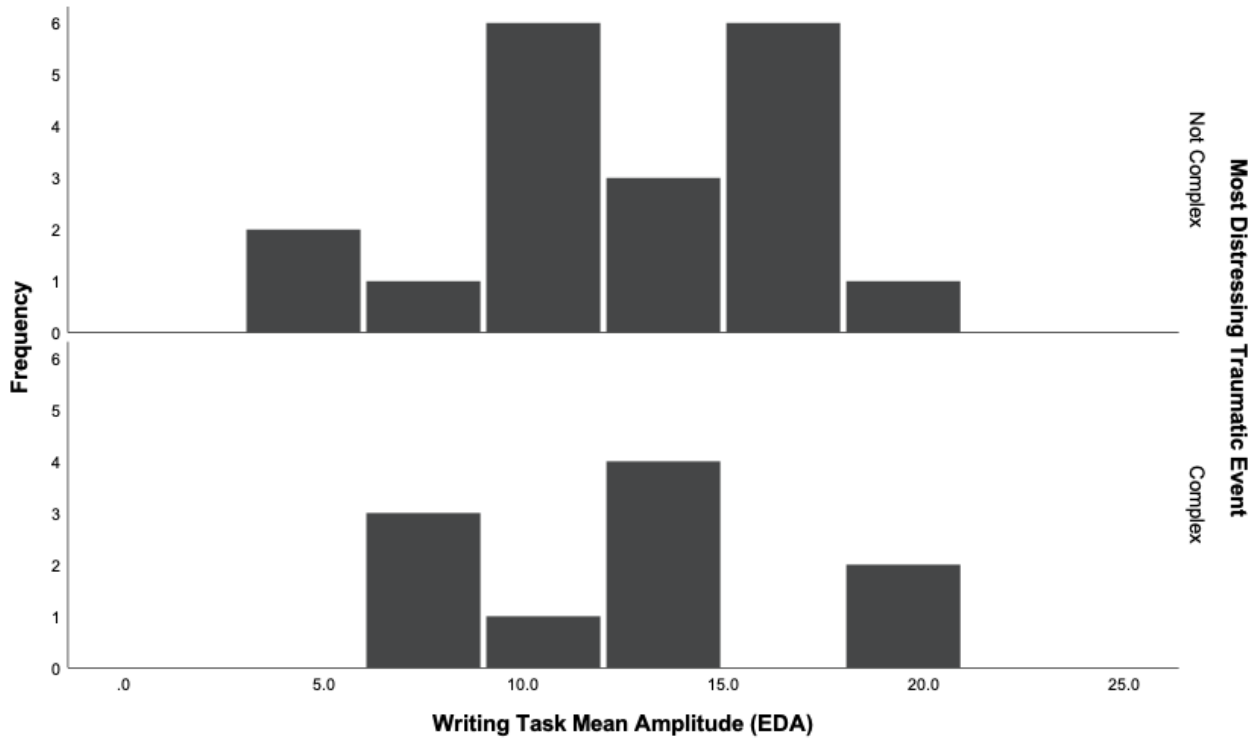
*Histogram of EDA Arousal and Age During Traumatic Event*



*Note.* EDA = Electrodermal Activity, mean amplitude during writing task. This figure depicts mean amplitude of EDA arousal in those who indicated their “most distressing” experience (Traumatic Life Events Questionnaire, TLEQ, item 24) as happening in childhood/adolescence versus adulthood.

**Figure 9**

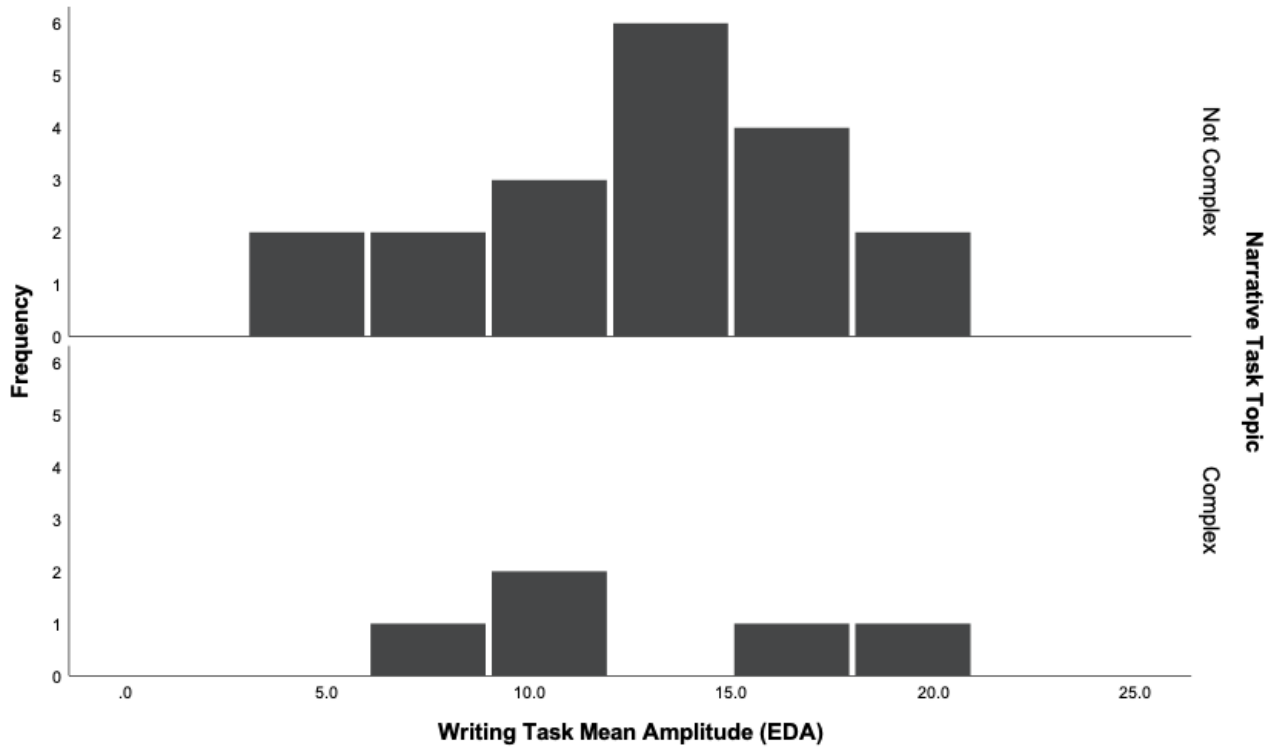
*Histogram of EDA Arousal and Type of Traumatic Event*



*Note.* EDA = Electrodermal Activity, mean amplitude during writing task. This figure depicts mean amplitude of EDA arousal in those who indicated their “most distressing” experience (Traumatic Life Events Questionnaire, TLEQ, item 24) as being “complex” versus “non-complex” in nature.

**Figure 10**

*Histogram of EDA Arousal During Narrative Task*

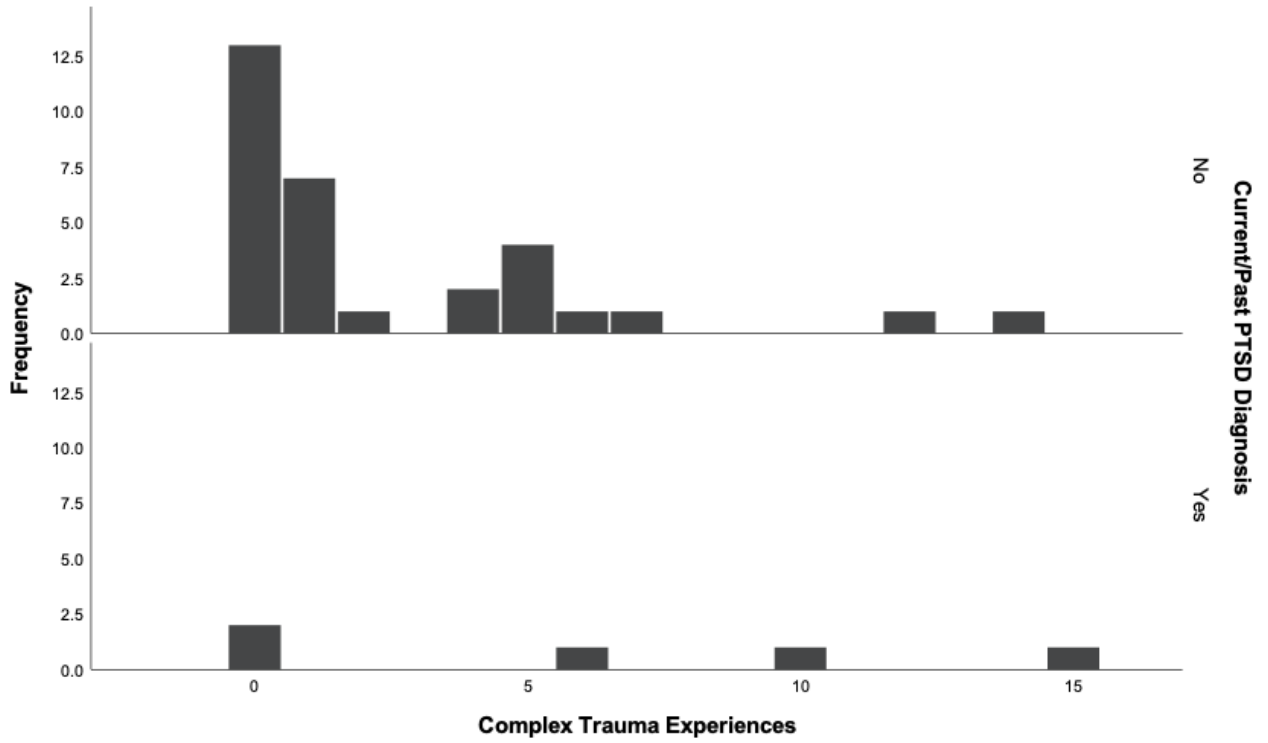


*Note.* EDA = Electrodermal Activity, mean amplitude during writing task. This figure depicts mean amplitude of arousal in those who wrote about, prior to the age of eighteen, a “complex” trauma experience during the written narrative task versus those who wrote about a “non-complex” trauma experience.



**Figure 11**

*Histogram of Trauma Experiences and PTSD Diagnosis*



*Note.* This figure depicts complex childhood trauma experiences (as assessed on TLEQ items 12, 13, 15, 16, and 17) in those with and without past or current PTSD diagnoses.

**Appendix A**

Demographics Questionnaire

**Part A:** Please answer the following questions about *yourself*.

1. What is your age? \_\_\_\_\_

2. What is your gender? \_\_\_\_\_

**Part B:** Please answer the following questions about *yourself*.

1. Have you ever been diagnosed with Post-Traumatic Stress Disorder (PTSD)?

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, at what age were you diagnosed? \_\_\_\_\_

2. Are you currently taking any medication for PTSD or symptoms associated with PTSD?

\_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, please list the PTSD related medication: \_\_\_\_\_

3. Have you taken PTSD related medication in the past? \_\_\_\_\_ YES \_\_\_\_\_ NO

If yes, at what age did you start taking PTSD related medication? \_\_\_\_\_

**Appendix B**

The Traumatic Life Events Questionnaire (TLEQ)

The purpose of this questionnaire is to identify important life experiences that can affect a person's emotional well-being or later quality of life. The events listed below are far more common than many people realize. I will read each question carefully and mark down the answers that best describe your experience.

**1. Have you ever experienced a natural disaster (a flood, hurricane, earthquake, etc.)?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no  
Were you seriously injured? yes / no  
Was someone you cared about or close by seriously injured or killed? yes / no  
Did you think you or a loved one was in danger of being killed by the disaster? yes / no

**2. Were you involved in a motor vehicle accident for which you received medical attention or that badly injured or killed someone?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no  
Were you seriously injured? yes / no

**3. Have you been involved in any other kind of accident where you or someone else was badly hurt? (examples: a plane crash, a drowning or near drowning, an electrical or machinery accident, an explosion, home fire, chemical leak, overexposure to radiation or toxic chemicals)**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no  
Were you seriously injured? yes / no

**4. Have you lived, worked, or had military service in a war zone? yes / no**

**If yes, were you ever exposed to warfare or combat?** (for example: in the vicinity of a rocket attack or people being fired upon; seeing someone get wounded or killed)

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no  
Were you seriously injured or wounded? yes / no

**5. Have you experienced the unexpected and sudden death of a close friend or loved one?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

due to **accident?** yes / no **illness?** yes / no **suicide?** yes / no **murder?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

**6. Has a loved one ever survived a life threatening or permanently disabling accident, assault, or illness?**

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

(examples: spinal cord injury, rape, cancer, life threatening virus)

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

**7. Have you ever had a life-threatening illness?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

**8. Have you been robbed or been present during a robbery--where the robber(s) used or displayed a weapon?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no  
Were you seriously injured? yes / no

**9. Have you ever been hit or beaten up and badly hurt by a stranger or by someone you didn't know very well?** never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes/no  
Were you seriously injured? yes / no

**10. Have you seen a stranger (or someone you didn't know very well) attack or beat up someone and seriously injure or kill them?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? Yes/no

**11. Has anyone threatened to kill you or cause you serious physical harm?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

Was this person a...

**stranger?** yes / no **friend or acquaintance?** yes / no **relative?** yes / no **intimate partner?** yes/no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

**12. While growing up: Were you physically punished in a way that resulted in bruises, burns, cuts, or broken bones?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

**13. While growing up: Did you see or hear family violence?** (such as your father hitting your mother; or

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

any family member beating up or inflicting bruises, burns or cuts on another family member)  
never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

14. **Have you ever been slapped, punched, kicked, beaten up, or otherwise physically hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

Has more than one intimate partner physically hurt you? yes / no\*\*

If yes, how many hurt you? \_\_\_\_\_

15. **Before your 13th birthday: Did anyone--who was at least 5 years older than you-- touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

Was the person a...

**stranger?** yes / no

**friend or acquaintance?** yes / no

**parent or caregiver?** yes / no

**other relative?** yes / no

**Was threat or force used?** yes / no

**Was there oral, anal, or vaginal penetration?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

16. **Before your 13th birthday: Did anyone - close to your age - touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

Was the person a ...

**stranger?** yes / no

**friend or acquaintance?** yes / no

**relative?** yes / no

**Was threat or force used?** yes / no

**Was there oral, anal, or vaginal penetration?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

17. **After your 13th birthday and before your 18th birthday: Did anyone - close to your age- touch sexual parts of your body or make you touch sexual parts of their body--against your will or without your consent?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

Was this person ...

**A stranger?** yes / no

**friend or acquaintance?** yes / no

**relative?** yes / no

**intimate**

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

**partner?** yes / no

**Was threat or force used?** yes / no **Was there oral, anal, or vaginal penetration?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

18. **After your 18th birthday: Did anyone –close to your age - touch sexual parts of your body or make you touch sexual parts of their body--against your will or without your consent?**

never\_\_\_ once\_\_\_ twice\_\_\_ 3 times\_\_\_ 4 times\_\_\_ 5 times\_\_\_ more than 5 times\_\_\_

Was this person a...

**stranger?** yes /no **friend or acquaintance?** yes / no **relative?** yes / no **intimate partner?** yes / no

**Was threat or force used?** yes / no **Was there oral, anal, or vaginal penetration?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

19. **Were you ever subjected to uninvited or unwanted sexual attention? (other than sexual contact covered by items 15, 16, 17 or 18) (examples: touching, cornering, pressure for sexual favors, verbal remarks)?**

never\_\_\_ once\_\_\_ twice\_\_\_ 3 times\_\_\_ 4 times\_\_\_ 5 times\_\_\_ more than 5 times\_\_\_

Was this person a...

**stranger?** yes /no **friend or acquaintance?** yes / no **relative?** yes / no **supervisor/co-worker?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

20. **Has anyone stalked you – in other words: followed you or kept track of your activities – causing you to feel intimidated or concerned for your safety?**

never\_\_\_ once\_\_\_ twice\_\_\_ 3 times\_\_\_ 4 times\_\_\_ 5 times\_\_\_ more than 5 times\_\_\_

Was this person a...

**stranger?** yes /no **friend or acquaintance?** yes / no **an intimate partner?** yes / no

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

21. **Have you or a romantic partner ever had a miscarriage?**

never\_\_\_ once\_\_\_ twice\_\_\_ 3 times\_\_\_ 4 times\_\_\_ 5 times\_\_\_ more than 5 times\_\_\_

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Did it (ever) happen after you were physically injured? yes / no

22. **Have you or a romantic partner ever had an abortion?**

never \_\_\_ once \_\_\_ twice \_\_\_ 3times \_\_\_ 4times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

23. **Have you experienced (or seen) any other events that were life threatening, caused serious injury, or were highly disturbing or distressing?** (examples: lost in the wilderness; a serious animal bite; violent death of a pet; being kidnapped or held hostage; seeing a mutilated body or body parts)

never \_\_\_ once \_\_\_ twice \_\_\_ 3 times \_\_\_ 4 times \_\_\_ 5 times \_\_\_ more than 5 times \_\_\_

Please

describe: \_\_\_\_\_

\_\_\_\_\_

*If this happened:* Did you experience intense fear, helplessness, or horror when it happened? yes / no

Were you seriously injured? yes / no

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

24. **The events below correspond to items #1 to #23 on this questionnaire. If any of these events happened to you, please choose the circle of the ONE event (only 1) that CAUSES YOU THE MOST DISTRESS.**

1. Natural disaster
2. Motor vehicle accident
3. Other kind of accident
4. Combat or warfare
5. Sudden death of friend/loved one
6. Life-threatening/disabling event to loved one
7. Life threatening illness
8. Robbery/weapon used
9. Assaulted by acquaintance/stranger
10. Witnessed severe assault to acquaintance/stranger
11. Threatened with death/serious harm
12. Growing up: witnessed family violence
13. Growing up: physically punished
14. Physically hurt by intimate partner
15. Before 13: sexual contact— someone 5 years older
16. Before 13: unwanted sexual contact
17. As a teen: unwanted sexual contact
18. As an adult: unwanted sexual contact
19. Sexual Harassment
20. Stalked
21. Miscarriage
22. Abortion
23. Some "other" traumatic event
- 24. None of these events happened to me**

(a) When did this event (first) occur? (write in your age, year or both):

\_\_\_\_\_and/or \_\_\_\_\_ year

(b) When did this event last occur? (try to be precise):

\_\_\_\_\_ (mm/dd/yyyy)

(c) **How much distress** (anxiety, worry, sadness, frustration or grief) **does this event cause you?**

(0)	(1)	(2)	(3)	(4)	(5)
None happened to me	No Distress	Slight Distress	Moderate Distress	Considerable Distress	Extreme Distress



**Appendix C**

Distress Tolerance Scale (DTS)

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1 = Strongly agree; 2 = Mildly agree; 3 = Agree and disagree equally;  
4 = Mildly disagree 5 = Strongly disagree

1. Feeling distressed or upset is unbearable to me \_\_\_\_\_
2. When I feel distressed or upset, all I can think about is how bad I feel \_\_\_\_\_
3. I can't handle feeling distressed or upset \_\_\_\_\_
4. My feelings of distress are so intense that they completely take over \_\_\_\_\_
5. There's nothing worse than feeling distressed or upset \_\_\_\_\_
6. I can tolerate being distressed or upset as well as most people \_\_\_\_\_
7. My feelings of distress or being upset are not acceptable \_\_\_\_\_
8. I'll do anything to avoid feeling distressed or upset \_\_\_\_\_
9. Other people seem to be able to tolerate feeling distressed or upset better than I can \_\_\_\_\_
10. Being distressed or upset is always a major ordeal for me \_\_\_\_\_
11. I am ashamed of myself when I feel distressed or upset \_\_\_\_\_
12. My feelings of distress or being upset scare me \_\_\_\_\_
13. I'll do anything to stop feeling distressed or upset \_\_\_\_\_
14. When I feel distressed or upset, I must do something about it immediately \_\_\_\_\_
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels \_\_\_\_\_

**Appendix D**

Difficulties in Emotion Regulation Scale (DERS)

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1-----2-----3-----4-----5  
 almost never      sometimes      about half the time      most of the time      almost always  
 (0-10%)            (11-35%)            (36-65%)            (66-90%)            (91-100%)

- \_\_\_\_\_ 1) I am clear about my feelings.
- \_\_\_\_\_ 2) I pay attention to how I feel.
- \_\_\_\_\_ 3) I experience my emotions as overwhelming and out of control.
- \_\_\_\_\_ 4) I have no idea how I am feeling.
- \_\_\_\_\_ 5) I have difficulty making sense out of my feelings.
- \_\_\_\_\_ 6) I am attentive to my feelings.
- \_\_\_\_\_ 7) I know exactly how I am feeling.
- \_\_\_\_\_ 8) I care about what I am feeling.
- \_\_\_\_\_ 9) I am confused about how I feel.
- \_\_\_\_\_ 10) When I'm upset, I acknowledge my emotions.
- \_\_\_\_\_ 11) When I'm upset, I become angry with myself for feeling that way.
- \_\_\_\_\_ 12) When I'm upset, I become embarrassed for feeling that way.
- \_\_\_\_\_ 13) When I'm upset, I have difficulty getting work done.
- \_\_\_\_\_ 14) When I'm upset, I become out of control.
- \_\_\_\_\_ 15) When I'm upset, I believe that I will remain that way for a long time.
- \_\_\_\_\_ 16) When I'm upset, I believe that I will end up feeling very depressed.
- \_\_\_\_\_ 17) When I'm upset, I believe that my feelings are valid and important.
- \_\_\_\_\_ 18) When I'm upset, I have difficulty focusing on other things.
- \_\_\_\_\_ 19) When I'm upset, I feel out of control.
- \_\_\_\_\_ 20) When I'm upset, I can still get things done.
- \_\_\_\_\_ 21) When I'm upset, I feel ashamed at myself for feeling that way.
- \_\_\_\_\_ 22) When I'm upset, I know that I can find a way to eventually feel better.
- \_\_\_\_\_ 23) When I'm upset, I feel like I am weak.
- \_\_\_\_\_ 24) When I'm upset, I feel like I can remain in control of my behaviors.
- \_\_\_\_\_ 25) When I'm upset, I feel guilty for feeling that way.
- \_\_\_\_\_ 26) When I'm upset, I have difficulty concentrating.
- \_\_\_\_\_ 27) When I'm upset, I have difficulty controlling my behaviors.
- \_\_\_\_\_ 28) When I'm upset, I believe there is nothing I can do to make myself feel better.
- \_\_\_\_\_ 29) When I'm upset, I become irritated at myself for feeling that way.
- \_\_\_\_\_ 30) When I'm upset, I start to feel very bad about myself.
- \_\_\_\_\_ 31) When I'm upset, I believe that wallowing in it is all I can do.
- \_\_\_\_\_ 32) When I'm upset, I lose control over my behavior.
- \_\_\_\_\_ 33) When I'm upset, I have difficulty thinking about anything else.
- \_\_\_\_\_ 34) When I'm upset I take time to figure out what I'm really feeling.
- \_\_\_\_\_ 35) When I'm upset, it takes me a long time to feel better.
- \_\_\_\_\_ 36) When I'm upset, my emotions feel overwhelming.

**Appendix E**

**UNIVERSITY OF SOUTH CAROLINA  
CONSENT TO BE A RESEARCH SUBJECT**

**Complex Trauma in Childhood and its Relationship with  
Emotion Regulation and Distress Tolerance in College Students**

**KEY INFORMATION ABOUT THIS RESEARCH STUDY:**

You are invited to volunteer for a research study conducted by Elizabeth Lombardo. I am a graduate student in the Department of Psychology at the University of South Carolina. The University of South Carolina, Department of Psychology is sponsoring this research study. The purpose of this study is to explore whether the inability to identify, tolerate, or manage emotions is directly related to childhood complex trauma symptoms; or, whether childhood complex trauma affects experiencing and managing emotions independently from tolerating negative emotions. You are being asked to participate in this study because you are an undergraduate student at the University of South Carolina who is enrolled in a Psychology course in the Summer 2020 or Fall 2020 semester. This study is being done at the University of South Carolina Aiken and will involve approximately 50 volunteers.

The following is a short summary of this study to help you decide whether to be a part of this study. More detailed information is listed later in this form.

Participation in this study will last approximately 45 minutes. Taking part in this study is not likely to benefit you personally. However, this research may help researchers understand the effects of trauma experienced in childhood on later emotional functioning and distress tolerance in adulthood.

**PROCEDURES:**

If you agree to participate in this study, you will do the following:

1. Have electrodes placed on the palm of your non-dominant hand to measure galvanic skin response (sweat response)
2. Rest for three minutes to establish a baseline reading
3. Complete three questionnaires, using Survey Gizmo, asking questions related to experiencing, tolerating, and managing emotions and trauma experiences.

Samples of types of questions are indicated below:

- a. While growing up: Were you physically punished in a way that resulted in bruises, burns, cuts, or broken bones?
  - b. Before your 13th birthday: Did anyone--who was at least 5 years older than you--touch or fondle your body in a sexual way or make you touch or fondle their body in a sexual way?
  - c. When I'm upset, I feel ashamed at myself for feeling that way.
  - d. My feelings of distress are so intense that they completely take over.
4. Undergo a second 3-minute rest period before engaging in the study task
  5. Respond to a writing prompt after being given a piece of paper and a writing utensil (The prompt and further directions will be displayed on a computer screen using Survey Gizmo)
  6. Rest for three minutes
  7. Complete the demographic questionnaire

## EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

### **DURATION:**

Participation in the study involves one visit which will last about 45 minutes.

### **RISKS OR DISCOMFORTS:**

You may experience emotional distress while recalling and reflecting on past trauma(s). If you agree to take part in the study, you will receive a paper handout that outlines mental health resources that are available to you. Additionally, there is a risk of a breach of confidentiality despite the steps that will be taken to protect your identity. Specific safeguards to protect confidentiality are described in a separate section of this document.

### **PAYMENT TO PARTICIPANTS:**

You will not be paid for participating in this study. You will receive .75 hours of research participation credit upon completing the study, which will be granted to you by your instructor who will be notified of your involvement in this study.

### **USC STUDENT PARTICIPATION:**

Participation in this study is voluntary. You are free not to participate, or to stop participating at any time, for any reason without negative consequences. Your participation, non-participation, and/or withdrawal will not affect your grades or your relationship with your professors, college(s), or the University of South Carolina. If research credit is required for successful course completion, other alternative means for obtaining credit is available and you may discuss these options with your course instructor.

### **CONFIDENTIALITY OF RECORDS:**

Information obtained about you during this research study will be anonymous. Study responses will be associated with an ID number and data will be securely stored in locked files and on password-protected computers. Results of this research study may be published or presented at seminars; however, the report(s) or presentation(s) will not include your name or other identifying information about you.

### **VOLUNTARY PARTICIPATION:**

Participation in this research study is voluntary. You are free not to participate, or to stop participating at any time, for any reason without negative consequences. In the event that you do withdraw from this study, the information you have already provided will be kept in a confidential manner. If you wish to withdraw from the study, please call or email the principal investigator listed on this form.

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study, or a study related injury, I am to contact Elizabeth Lombardo at [lombare@usca.edu](mailto:lombare@usca.edu) or Anne Ellison at [AnneE@usca.edu](mailto:AnneE@usca.edu).

Concerns about your rights as a research subject are to be directed to, Lisa Johnson, Assistant Director, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414D, Columbia, SC 29208, phone: (803) 777-6670 or email: [Lisaj@mailbox.sc.edu](mailto:Lisaj@mailbox.sc.edu).

I agree to participate in this study. I have been given a copy of this form for my own records.

EMOTION REGULATION, DISTRESS TOLERANCE, AND CHILDHOOD TRAUMA

If you wish to participate, you should sign below.

\_\_\_\_\_  
Signature of Subject / Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Qualified Person Obtaining Consent

\_\_\_\_\_  
Date