

The Mediating Role of Sibling Relationships and Attachment for Exposure to Multiple
Developmental Traumatic Experiences on Mental Health Outcomes

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Abstract

The Mediating Role of Sibling Relationships and Attachment for Exposure to Multiple Developmental Traumatic Experiences on Mental Health Outcomes

More than two thirds of children report experiencing at least one traumatic event by age 16 (SAMHSA, 2017). Researchers are studying children’s resilience and potential protective factors; however, the current literature is limited. The current literature focuses on the protective impact of attachment security and support from family, emphasizing primary caregivers. Around 80% of children grow up living with a sibling (Dunifon, Fomby, & Musick, 2017). Yet, the literature largely fails to examine the protective quality of positive sibling relationships. The main goal of the current study is to examine whether sibling relationships and attachment style may act as potential mediators for the effects of trauma on mental health outcomes. A sample of 490 participants was recruited through Amazon Mechanical Turk (MTurk). The mean age of participants was 32.59 years old and the mean age for the participant’s sibling was 30.53 years old. The sample consisted of 46.5% male and 52.7% female, with sibling gender consisting of 49.2% male and 49.8% female. The majority of participants identified their race/ethnicity as either “White,” 54.3% or “Asian,” 31%. The researcher conducted a multiple mediation analysis using Hayes (2018) PROCESS macro to examine the relationship between mental health outcomes and exposure to multiple developmental traumatic events, with sibling relationship quality and participant attachment style as possible mediators. As is often found, traumatic experiences in youth were associated with poorer mental health outcomes. Overall, the findings of the current study indicate support for sibling relationship quality and attachment style partially mediating the effect of exposure to

multiple developmental traumas on mental health outcomes. Attachment anxiety and sibling conflict were the most consistent and strongest mediators reducing the effect of trauma on mental health outcomes by 32% to 56%.

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Chapter I: Overview

Introduction

The DSM-5 diagnosis for Posttraumatic Stress Disorder (PTSD) neither accurately captures the developmental effects of childhood trauma, nor does it explain the experience of multiple or chronic trauma. Subsequently, the majority of traumatized children do not meet the DSM-5 diagnosis for PTSD (van der Kolk, 2005). Some researchers have acknowledged the need to better understand the experience of multiple, chronic, and prolonged developmentally adverse traumatic events. These traumatic events, often referred to as developmental or complex traumas, tend to occur early in life and are usually of an interpersonal nature (van der Kolk, 2005). While the original framework for traumatic events was child abuse, researchers have integrated additional frameworks to include domestic violence and other attachment-related traumas that occur within families and intimate relationships in general (Courtois, 2008). Childhood traumas may also include refugee status, displacement of populations due to ethnicity, and prisoner of war status (Courtois, 2008). Said traumas may be affected and/or compounded by variables within and external to the community (Dorahy et al., 2009; Murphy et al., 2014; Yearwood, Vliegen, Chau, Corveleyn, & Luyten, 2017). For example, the distinct marriage of culture, geographic location, and ethnocultural heritage within a community can uniquely impact a child's risk of exposure to multiple traumatic experiences (Cook et al., 2005; Thiago, et al., 2016; Yearwood, et al., 2017). Some researchers have found that by using a developmental framework, counselors are better able to understand the interactive effects of family systems, cultural expectations, and societal expectations (Bremness & Polzin, 2014; Denton, Frogley, Jackson, John, &

Querstret, 2017; Gregorowski & Seedat, 2013). Using a developmental framework allows for an examination of growth and change throughout one's lifespan, taking into account biological, social, emotional, and cognitive processes to better understand and optimize development (Denton, et al., 2017; Rahim, 2014). This study applies a developmental framework to explore possible mediating effects of sibling relationships on mental health outcomes for individuals with exposure to multiple developmental traumatic experiences.

Researchers have identified relationships between multiple traumatic experiences and poor mental health outcomes. This includes, for example, the relationship between exposure to violence and mental health problems such as anxiety, depression, dissociation, personality disorders, psychiatric illness, PTSD, and substance use (Briere & Scott, 2015; Courtois & Ford, 2013; Gregorowski & Seedat, 2013; Murphy et al., 2014; Yearwood, et al., 2017). Researchers have also examined risk and protective factors relating to exposure to multiple traumatic experiences. There is considerable evidence that the risk of experiencing or witnessing violence and sexual abuse is greater among poor and minority children, and individuals belonging to a marginalized ethnic or racial group (Lieberman, Chu, Van Horn, & Harris, 2011; Merrick, Ford, Ports, & Guinn, 2018; Thiago, et al., 2016; Turner, Finkelhor, & Ormrod, 2006). Research on protective factors is not as extensive; however, there is evidence that positive attachment and connection to emotionally supportive adults can improve children's resilience when they are exposed to stress (Courtois & Ford, 2013; Herman, 1997; Johnson, Elam, Rogers, & Hilley, 2018).

Secure and stable attachment can offer protection and support the cultivation of both life skills and social skills. Such attachment also supports healthy physiological and

psychological regulation, the foundation for healthy development, and provides a secure base from which to explore the world (Bowlby, 1969). Acknowledging the importance of attachment relationships when trying to understand disorders of trauma is critical, as the developmental impacts of these disorders can be lifelong (Bremness & Polzin, 2014; Denton, et al., 2017; Gregorowski & Seedat, 2013; Murphy et al., 2014; Rahim, 2014). Researchers and theorists have examined the relationship between insecure-disorganized attachment and the dissociative response, often seen in individuals who have experienced cumulative effects of trauma. Complex trauma is a term that is used to describe the occurrence of multiple, chronic, and prolonged developmentally adverse traumatic events. The majority of individuals with complex trauma form an insecure, disorganized, and dissociative attachment style (Anderson & Alexander, 1996; Liotti, 1999; Muller, Sicoli & Lemieux, 2000; Pearlman & Courtois, 2005). Even with protective caregivers, trauma can affect physiological, cognitive, social, and emotional functioning, as well as severely impact attachment (Herman, 1997). Being a child in a stressful environment can challenge and test coping mechanisms, even given the most favorable attachment circumstances (Garbarino, 1993; Johnson, et al., 2018). However, an area that much of the literature neglects is how to navigate these multiple traumatic experiences when protective caregivers are not available or when they are the source of the trauma. This study aims to examine another potential protective attachment relationship—namely, the sibling relationship. The purpose of this study is to examine the potential mediating role of attachment style and sibling relationship quality on mental health outcomes for adults who have been exposed to multiple developmental traumatic experiences.

Statement of the Problem

More than two thirds of children report having experienced at least one traumatic event by age 16 (SAMHSA, 2017). The Adverse Childhood Experiences (ACEs) Study is one of the largest studies on childhood abuse and neglect. In waves one and two of the ACEs Study, of the total 17,377 participants, 26% were exposed to one adverse childhood experience, 15.9% were exposed to two, 9.5% were exposed to three, and 12.5% were exposed to four or more (Centers for Disease Control and Prevention, 2019). This means that 37.9% of these individuals were exposed to two or more adverse childhood experiences.

There is evidence that exposure to multiple traumas is usually associated with mental health problems such as depression, anxiety, PTSD, personality disorders, substance use, and many other symptoms of clinical distress (Briere & Scott, 2015; Courtois & Ford, 2013; Gregorowski & Seedat, 2013). Researchers studying the potential risk factors associated with exposure to multiple traumas have found that poor and minority children are at a greater risk (Lieberman et al., 2011; Turner, et al., 2006). Additionally, trauma exposure has been linked to poverty, community violence, and being a part of a marginalized ethnic or racial group—meaning that poor and minority children are more likely to report experiencing or witnessing violence, and they have greater lifetime exposure to sexual abuse and physical violence (Lieberman, et al., 2011; Merrick, Ford, Ports, & Guinn, 2018; Turner, et al., 2006).

There is some research addressing children’s resilience and potential protective factors; however, this research is limited. Of specific interest to this study is the protective impact of positive attachment and support from family. While research

addressing the impact of secure attachment and support from adults, specifically primary caregivers, exists, it does not address the question: what if those primary caregivers are the source of the trauma? This research finds that when the child-caregiver relationship is the source of the trauma, the attachment relationship is critically damaged (Stovall-McClough & Dozier, 2016). Around 80% of children grow up living with a sibling (Dunifon, Fomby, & Musick, 2017; U.S. Census Bureau, 2011). In spite of this large demographic, there is not much research on the protective quality of positive sibling relationships (Gass, Jenkins & Dunn, 2007). Siblings often share environments and histories; however, most of the research on sibling support fails to address the potential impacts of sibling support on the effects of multiple developmental traumatic experiences.

Statement of Potential Significance

This study will support academia, clinicians, and the wider population in many ways. Primarily, most research on developmental traumas focuses on children and adolescents, as this is the time period in which the preponderance of traumas occur (Dauber, Lotsos, & Pulido, 2015; Denton, et al., 2017; Kisiel, Summersett-Ringgold, Weil, & McClelland, 2016; Murphy et al., 2014; Johnson, et al., 2018; Thiago, et al., 2016; Yearwood, et al., 2017). However, there is a need for research that better understands the long-term impacts of developmental traumas—beyond childhood and adolescence. To meet this need, researchers must examine young adults and adults who have both survived developmental traumas and who may also still be exposed to developmental traumas. One aim of the study is to better understand the impacts of multiple developmental traumas on mental health outcomes later in life.

Additionally, research on the diagnosis, treatment, and implications of developmental traumas is evolving. Other researchers are investigating risk and protective factors for exposure to developmental trauma; however, there are still significant gaps. Specifically, this study aims to examine sibling relationships and attachment styles as potential protective factors. Research has demonstrated the effect of protective parenting relationships as well as peer support, but what if the caregivers are the source of the traumas and the child being exposed does not feel comfortable or safe relying on peer support? Sibling relationships is an area that is under-researched, specifically in relation to these developmental traumas. Not only does this have potentially large implications for future research, but there are also large potential clinical implications. Building and supporting sibling relationships as protective factors means using systems and structures that already exist in people's lives. As clinicians, being able to build upon existing relationships as potential supports for interventions can be extremely effective, as the person already has those relationships. This study will examine whether sibling relationships and attachment style can act as potential mediators for exposure to multiple developmental traumatic experiences on mental health outcomes.

Theoretical Framework

The theoretical framework for the study is attachment theory, which refers to the role of early experiences, specifically those related to parents, in the development of the parents' caregiving responses to their children (Banyard, Williams, & Siegel, 2003). Attachment theory offers an adaptable framework for understanding relationships that can be integrated with other theories to better comprehend and direct treatment for

trauma-related events and disorders (Stauffer, 2009). There are factors that make attachment theory applicable when working with trauma, violence, and abuse. Bowlby's original framework for attachment presented as a system that evolved to deal with threats and stressors, and therefore, to promote survival (1973). Bowlby discussed how these threats, or for the purpose of this study, traumas, would activate the attachment system and its behavioral outcomes, such as proximity seeking, which would increase the possibility for protection, support, and survival (Bowlby, 1973). Ein-Dor and Hirschberger (2016) state that individual differences in attachment orientations illustrate diverse responses to threat based or fight-or-flight and social-defense axes when emergency situations or traumatic experiences are presented. Some argue that using attachment theory may offer a unique perspective in understanding physiological adaptations to trauma, where both trauma and attachment use similar neurological systems (Bolen, 2000). This could mean that the physiological responses to trauma are related to the physiological adaptations to attachment stress (Bolen, 2000).

Attachment theory highlights the significance and impact of developmental traumas. Bremness and Polzin (2014) suggest that by using a developmental approach, counselors are able to recognize the interactive effects of family systems as well as cultural and societal expectations. Understanding the importance of early attachment relationships is critical because when these relationships are severely disrupted, consequences can involve lifelong developmental implications (Gregorowski & Seedat, 2013; Rahim, 2014). It is important to apply a developmental lens when examining disorders of trauma, as the individual is continuously undergoing a developmental process that can be confounded by environmental factors (Bremness & Polzin, 2014;

Rahim, 2014). Attachment theory can also be used to explain how a person's experience of their family of origin may lead to vulnerable relationships as an adult (Alexander, 2009). This study not only considers the possible disruption of the caregiver attachment relationship, but also the reparative and protective power of the sibling relationship and attachment.

Methodology

The study uses regression analysis where the data is collected at a single time point. Participants were recruited through Amazon Mechanical Turk, a web-based recruitment tool (MTurk; Buhrmester, Kwang, & Gosling, 2011; Buhrmester, Talaifar, & Gosling, 2018). They were asked to complete web-based surveys hosted by Qualtrics. The target population for this study is adults who have been exposed to multiple developmental traumatic experiences. Additionally, because this study aims to examine the potential mediating effect of sibling relationships and attachment style, participants were required to have at least one living sibling.

The study includes three predictor variables examined through three survey measures. The predictor variables are: sibling relationships, attachment style, and exposure to multiple developmental traumatic experiences. To better understand adult sibling relationship quality, the *Adult Sibling Relationship Questionnaire-Short* (ASRQ-Short; Lanthier, Stocker, Furman, 2000) survey measure is used. To better understand attachment style, the *Experiences in Close Relationships-12* (ECR-12; Lafontaine, et al., 2016), which measures dimensions of attachment anxiety and avoidance, is used. The third survey measure is the *Trauma History Questionnaire* (THQ; Hooper, Stockton, Krupnick, & Green, 2011), which measures serious or traumatic life events, including

number of occurrences and the approximate age of occurrence. The criterion variable, mental health outcomes, is measured through use of the Depression, Anxiety, and Stress Scales 21 (DAAS-21; Lovibond & Lovibond, 1995), which measures the negative emotional states of depression, anxiety, and stress.

After closing the survey, the collected data was imported to SPSS from Qualtrics. The researcher used multiple linear regression to examine the relationship between mental health outcomes and exposure to multiple developmental traumatic events, with sibling relationship quality and participant attachment style as possible mediators.

Limitations

While this study has many advantages, it also has many limitations. First, the study is self-selection and administered via the web. These variables may impact the generalizability of findings, as not everyone has access to computers, the internet, or the ability to navigate a study like this. Also, the study recruits participants through Amazon Mechanical Turk, which provides some monetary compensation to members who complete surveys. Participants are further limited by these constraints. Additionally, the study is limited by using self-report measures exclusively. This leaves the data subject to possible interpretation errors and the potential for participants not being accurate in self-judgments. Moreover, because topics are sensitive, participants may not feel comfortable fully or accurately disclosing all relevant information. Finally, the study is long. This is one of the reasons the researcher is using a monetary incentive; however, because of the length, there may be a loss of interest and possible participant attrition.

Key Terms

This section elaborates on four key terms to support understanding. The first three—*developmental traumatic experiences*, *attachment style*, and *sibling relationship quality*—are predictor variables. Moreover, this study hypothesizes that attachment style and sibling relationship quality mediate the impact of exposure to multiple developmental traumatic experiences on *mental health outcomes*.

Developmental Traumatic Experiences

Developmental traumatic experiences are traumatic experiences that occur in childhood. These experiences are also usually chronic or experienced multiple times. Often, these traumas are interpersonal and perpetrated by primary caregivers (van der Kolk, 2005). This study will use the *Trauma History Questionnaire* (THQ; Hooper, et al., 2011) to measure multiple developmental traumatic experiences.

Attachment Style

There are four types of attachment styles that will be used in this study: secure, anxious, avoidant, and (more recently) unresolved or disorganized attachment (Ainsworth & Bell, 1970; Main & Solomon, 1990). Attachment styles are traditionally measured in two areas: avoidance and anxiety. This study will use the *Experiences of Close Relationships Short* (ECR-S; Lafontaine, et al., 2016) to measure attachment styles.

Sibling Relationship Quality

Sibling relationships are characterized by interactions that are an equal distribution of power, such as play and conflict, and also interactions that are unequal distributions of power, such as teaching, guidance, and assistance (Hinde, 1979). Additionally, sibling relationship interactions are uniquely intense and affective, partly due to siblings' shared

family history and environment. This study will use the *Adult Sibling Relationship Questionnaire-Short* (ASRQ-Short; Lanthier, et al., 2000) to collect information on sibling relationship quality.

Mental Health Outcomes

Mental health outcomes exist on a continuum with positive and negative outcomes on either side. Given the current subject matter, this study will focus on the negative mental health outcomes of exposure to trauma. Negative mental health outcomes can include, but are not limited to, psychiatric disorders, depressive disorders, personality disorders, anxiety disorders, dissociation, and substance use (Briere & Scott, 2015; Courtois & Ford, 2013; Gregorowski & Seedat, 2013). They can also include self-destructive behaviors such as suicide, self-injury, victimization, risky sexual behavior, and violence against others (Courtois & Ford, 2013; Pearlman & Courtois, 2005). This study will use the *Depression Anxiety Stress Scales 21* (DAAS 21; Lovibond & Lovibond, 1995) to measure mental health outcomes, specifically three related states of depression, anxiety, and stress.

Research Questions & Hypotheses

The following are the primary research questions with hypotheses in italics below.

1. To what extent are mental health outcomes explained by attachment style and sibling relationship quality?
 - 1a. Warmth is expected to be negatively correlated with poor mental health outcomes.*
 - 1b. Conflict is expected to be positively correlated with poor mental health outcomes.*
 - 1c. Rivalry (parental favoritism) is expected to be positively correlated with poor mental health outcomes.*

1d. Attachment avoidance is expected to be positively correlated with poor mental health outcomes.

1e. Attachment anxiety is expected to be positively correlated with poor mental health outcomes.

2. To what extent are mental health outcomes explained by exposure to multiple developmental traumatic experiences?

2. Poor mental health outcomes are expected to be positively correlated to exposure to multiple developmental traumatic experiences.

3. To what extent does attachment style and sibling relationship quality mediate the exposure of multiple developmental traumatic experiences on mental health?

3a. Warmth is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.

3b. Conflict is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.

3c. Rivalry (parental favoritism) is expected to be to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.

3d. Attachment avoidance is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.

3e. Attachment anxiety is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.

Chapter II: Literature Review

The purpose of this chapter is to provide a literature review of relevant perspectives to identify points of contention and research gaps. The literature review helps contextualize the need for academia to further understand the potential mediating role of attachment style and sibling relationship quality on mental health—particularly, where subjects have incurred multiple developmental traumatic experiences. First, the chapter reviews research on multiple developmental traumatic exposures and complex trauma, a term used to describe the result of the exposure to multiple developmental traumatic events. Second, the chapter reviews the mental health outcomes of people who have experienced developmental traumas and discussed potential risk and protective factors. Third, the chapter describes attachment, including links between attachment and traumatic experiences. Fourth, the chapter reviews research on sibling relationships and support, focusing on developmental impacts and the risks and protections that sibling relationships may provide. Following a review of the literature, the chapter provides thoughts on inferences for the forthcoming study.

Developmental Traumatic Exposures

Researchers have noted that the criteria for PTSD originated from the stories of adult male combatants exposed to war trauma (Briere, 1987; Herman, 1992). The impacts of war trauma on adult male combatants are likely distinct from the impacts of interpersonal and familial relationship trauma on younger individuals (Courtois, 2008). According to Courtois (2008), individuals with exposure to multiple traumas over different developmental periods presented with psychological problems that were not included in the diagnosis of PTSD in the DSM-III. Some clinicians realized that the

complex conditions following developmental traumas were challenging to treat and varied depending on multiple factors. Complex conditions include the age and stage when the trauma occurred, the relationship to the perpetrator, the victim's role in the trauma, the duration of the trauma, and the support received (Courtois, 2008).

Some researchers argue that the DSM-5 constructs do not highlight the developmental, continuous, strength-based, and resilient contexts that children require (Bremness & Polzin, 2014). They find that the diagnosis of children must distinctly consider developmental psychopathology, attachment, neuropsychology and plasticity, and resiliency factors (Carrey & Gregson, 2008). Bremness and Polzin (2014) suggest that having a developmental lens when trying to understand disorders of trauma is critical, as there are constant changes within the individual that can be further complicated when taking into account an individual's interaction with their environment. Using this developmental lens recognizes the interactive effects of family systems as well as cultural and societal expectations. The impact of these ongoing traumas from caregivers over developmental periods is more severe and apparent across a range of developmental domains in children than in adults (Bremness & Polzin, 2014; Rahim, 2014).

When a child is exposed to multiple chronic traumatic experiences, traumatic expectations become standard. This leads to generalized traumatic responses such as hypervigilance; reexperiencing the trauma in the form of nightmares, traumatic play, and distress at reminders of the trauma; restriction of play, exploration, and motivation to learn; and new symptoms (Lieberman et al., 2011; Yearwood, et al., 2017). Even after

children have apparently recovered from an event, reminders of the trauma can trigger strong negative emotions and reactions (Pynoos, Steinberg, & Piacentini, 1999).

The Adverse Childhood Experiences (ACE; Centers for Disease Control and Prevention, 2019) study by Kaiser Permanente and the Centers for Disease Control and Prevention has shown that adverse childhood experiences are immensely more common than recognized and that these experiences impact adult health (Felitti et al., 2019; van der Kolk, 2005). Research confirms highly significant links between adverse childhood experiences and depression, suicide attempts, substance abuse, risky sexual behavior, sexually transmitted diseases, domestic violence, obesity, and cigarette smoking (Felitti et al., 2019; van der Kolk, 2005). Additionally, individuals with developmental trauma are more likely to acquire medical problems including heart disease, cancer, stroke, diabetes, liver disease, and skeletal fractures (Felitti et al., 2019; van der Kolk, 2005).

Chronic trauma impedes neurobiological development as well as the ability to integrate sensory, emotional, and cognitive data into a cohesive whole (van der Kolk, 2005). Children who are persistently traumatized usually suffer from unique changes in consciousness, such as amnesia, hypermnesia, dissociation, flashbacks, nightmares of specific events, depersonalization and derealization, trouble with attention regulation, time and space disorientation, and sensorimotor developmental disorders (van der Kolk, 2005). These children are frequently disconnected from their feelings and normally have no language to explain their internal states (van der Kolk, 2005).

Children learn to regulate their behavior by predicting their caregivers' responses to them, a concept Bowlby called "internal working models" (Bowlby, 1980; van der Kolk, 2005). This internal working model is defined by the internalization of affective and

cognitive features of their primary relationships (van der Kolk, 2005). In order for a child to learn how to categorize experiences and develop a good sense of causality, predictability and continuity are crucial (van der Kolk, 2005). When children are exposed to uncontrollable stress and family dysfunction or violence where the caregiver cannot help the child modulate their arousal, then they will be unable to organize and sort experiences in a logical way (van der Kolk, 2005).

Complex trauma is used to explain the occurrence of multiple, chronic, and prolonged developmentally adverse traumatic events. These events usually take place in early developmental periods and are often of an interpersonal nature, sometimes perpetrated by primary caregivers (van der Kolk, 2005). The original framework for understanding complex trauma was child abuse or neglect. Since then, this framework was expanded to include: domestic violence and other family and relationship-based attachment-related traumas; refugee status; displacement of populations due to ethnicity; prisoner of war status; and acute and chronic illness (Courtois, 2008; Courtois & Ford, 2013). Researchers suggest that such exposures to violence can originate both inside and outside of the community (Courtois & Ford, 2013; Dorahy et al., 2009; Herman, 1997; Yearwood, et al., 2017). A child's ethnocultural heritage, community, and location can each and/or collectively affect their risk of exposure to multiple developmental traumas (Courtois & Ford, 2013; Herman, 1997). Complex trauma is used to describe both a group of causal risk factors involving multiple interpersonal traumas, and the resulting dysregulation that occurs over a range of areas including emotional, interpersonal, behavioral, psychological, and cognitive functioning (Courtois & Ford, 2013; Greeson et

al., 2011; Herman, 1997; Kliethermes, Schacht, & Drewry, 2014; Yearwood, et al., 2017).

Courtois and Ford (2013) discuss three primary domains of complex trauma and stress disorders: emotion dysregulation, dissociation, and attachment to others. First, children are already prone to emotional self-regulation challenges, which may explain behavioral outcomes such as labeling and expressing feelings, identifying and describing internal states, and communicating needs (Courtois & Ford, 2013; Herman, 1997; van der Kolk, 2005). While children are susceptible to emotional self-regulation challenges, complex trauma can exacerbate those challenges. Secondly, both children and adults with complex trauma can experience a loss of self-integrity and self-integration, or dissociation; specifically, amnesia, distinct alterations in states of consciousness, depersonalization and derealization, impaired memory for state-based events, and two or more separate states of consciousness (Courtois & Ford, 2013; Herman, 1997; Steele, Boon, & van der Hart, 2017). Children in particular can show impairment in self-concept, including a lack of a constant predictable sense of self, low self-esteem, disturbances of body image, poor understanding of separateness, and shame and guilt (Courtois & Ford, 2013; Herman, 1997). Thirdly, for both children and adults, complex trauma can result in compromised relationships or attachment. Impaired attachment can manifest as trouble with boundaries, distrust and suspiciousness, interpersonal challenges, social isolation, challenges in being aware of other's emotional states, and challenges with perspective taking (Cook et al., 2005; Courtois & Ford, 2013; Herman, 1997).

There are additional domains of complex trauma and stress disorders. An additional domain is behavior control. For example, people can show poor modulation of impulses,

aggression towards others, self-destructive behaviors, sleep disturbances, eating disorders, substance abuse, oppositional behavior, excessive complaints, pathological self-soothing behaviors, difficulty understanding and following rules, and reenactment of trauma behavior in play (Cook et al., 2005; Courtois & Ford, 2013). Children can also show difficulties in: attention regulation and executive functioning; focusing on and finishing tasks; processing new information; object permanence; planning and anticipating; sustained curiosity; understanding responsibility; learning; language development; and orientation in time and space (Cook et al., 2005; Courtois & Ford, 2013; Herman, 1997). Some biological impairments may include sensorimotor developmental problems; problems with balance, body tone, and coordination; somatization, inability to feel pain; and other increased medical problems (Cook et al., 2005; Courtois & Ford, 2013).

The literature has consistently recognized that the impact of complex trauma is distinct from the impact of acute trauma (Courtois & Ford, 2013; Herman, 1997; Kliethermes, et al., 2014). Exposure to complex trauma can result in a deficit of fundamental capacities for self-regulation and interpersonal relatedness (Courtois & Ford, 2013). Children who experience these traumas often encounter lifelong problems increasing their risk of exposure to additional trauma and collective impairment, such as psychiatric and addictive disorders, chronic mental illness, and family, vocational, and legal problems (Cook et al., 2005; Courtois & Ford, 2013). Research has shown that caregiver support is a crucial mediating factor in determining how children adapt to victimization. Family support and parental emotional functioning strongly alleviate the

development of PTSD symptoms and augment the child's ability to resolve the symptoms (Courtois & Ford, 2013; Herman, 1997; Johnson, et al., 2018).

Much of the existing research focuses on children, as they are most likely to encounter multiple developmental traumas. But this research largely does not account for the long-term effects of chronic developmental traumatic experiences. The current study will help clinicians and researchers better understand the mental health outcomes of adults who have experienced multiple developmental traumatic experiences earlier in life, as well as some potential mediating factors to these outcomes. Specifically, this study will provide insight into how sibling relationships could be both positive and negative influences in managing developmental trauma.

Mental Health Outcomes

While some believe that young children are not affected by traumatic experiences because of their resilience, research has shown that there is a strong association between number of stressors experienced and the probability of a psychiatric disorder (Lieberman et al., 2011). These experiences have adverse effects on young children's emotional wellbeing. Marx, Heidt, and Gold (2005) conducted a literature review comparing outcomes for adults with repeated childhood victimizations, to adults with only one or no childhood victimizations. They found that adults with repeated childhood victimizations had more severe and negative outcomes. Research has established associations between exposure to violence and mental health problems such as PTSD, both clinical and subclinical, depression and anxiety, and other symptoms of clinical distress such as suicidal ideation and increased risk for psychiatric illness (Courtois & Ford, 2013; Gregorowski & Seedat, 2013). Exposure to multiple traumas are often associated with

reduced affect regulation capacity, depressive disorders, personality-level disorders, impulsivity, premorbid or comorbid anxiety, dissociation, substance use, and a history of insecure parent-child attachment (Briere & Scott, 2015).

Greeson et al. (2011) state that youth with a history of complex trauma are at greater risk for internalizing behavior problems, posttraumatic stress, and having at least one clinical diagnosis. In addition, exposure to complex trauma increases health risks such as: smoking, obesity, alcoholism, drug abuse, exposure to sexually transmitted infections, and suicide attempts (Lawson, 2017). Some health problems that may increase in adulthood are heart disease, cancer, stroke, diabetes, and hepatitis (Lawson, 2017). Lastly, exposure to complex trauma increases the likelihood for dissociation and consequently revictimization (Lawson, 2017). Researchers have found that the more children are physically abused, the more mental health problems they report as children and as adults (Coley, Kull, & Carrano, 2014; Taillieu & Brownridge, 2013). There is also some evidence that early exposure to maltreatment, trauma, and other adversities can affect the immune system, which can lead to chronic inflammation and magnified immune responses to stressors (Harden et al., 2016; Miller & Chen, 2010; Slopen, Kubzansky, McLaughlin & Koenen, 2013). Physical abuse can also lead to more notable outcomes such as head trauma, physical injuries, impaired motor skills, and/or death (Harden et al., 2016).

There is considerable research that connects poor and minority children to a greater risk of exposure to violence (Lieberman et al., 2011; Turner, et al., 2006). This research also connects trauma exposure to poverty, community violence, and belonging to a marginalized ethnic or racial group (Lieberman, et al., 2011; Turner, et al., 2006). Poor

and minority children are more likely to report experiencing or witnessing violence at home, and they have greater lifetime exposure to physical violence and sexual abuse (Turner, et al., 2006). Gomez, Johnson, Selva, & Sallis (2004) define inner-city youth as groups of adolescents and young adults who live in urban communities in low-income families and are usually members of racial minorities. Research has shown that inner-city youth are more affected by exposure to violence than higher income, suburban White populations (Cooley-Strickland et al., 2009; Kaufman, Hall & Zagura, 2012). Similarly, there is evidence that inner-city youth are at greater risk of exposure to multiple traumas (Lieberman et al., 2011). The overlap between poverty and health issues starts in early childhood; exposure to persistent physical and emotional risk factors can mediate this overlap (Lieberman et al., 2011). Unfortunately, risk factors often far outweigh protective factors within inner-city youth. The implications of this physical violence and sexual abuse go beyond mental health problems. A majority of U.S. prisons are composed of people with childhood histories of trauma, abuse, and neglect (van der Kolk, 2005). While the literature highlights the connection between patterns of exposure to multiple traumas in poor and minority children, this pattern is also found in the general population (Lieberman et al., 2011).

Children can be resilient in response to stress exposure. This resilience may be explained by positive attachment and connection to emotionally supportive and capable adults within family or community; development of cognitive and self-regulation capabilities; positive beliefs about oneself; and motivation to behave effectively (Courtois & Ford, 2013; Herman, 1997). Other resilience-related factors may include a relaxed and positive disposition, friendly demeanor, internal locus of control, effective coping

strategies, special talents, creativity and spirituality, and a level of mastery and autonomy (Cook et al., 2005).

Some define resilience as a set of processes that reflect the positive adaptations that individuals, families, and communities make in spite of the presence of dysfunctional thoughts, feelings, and behaviors (Ungar, 2013). Ungar defined resilience as the capacity of the individual to interact with environments in ways that optimize developmental processes. Resilience is observed when individuals engage in behaviors to help them obtain resources they need in situations of adversity. However, these actions can only occur when the individual's social ecology has the ability to provide these resources in culturally meaningful ways (Ungar, 2013). By using an ecological definition, Ungar purposefully avoids placing blame on the individual when there are few opportunities to access resources (Unger, 2013).

Researchers have also explored the possible protective effects of creative outlets (Meyers, 2016). Meyers (2016) found that some children reported that creative outlets gave them an emotional release and a sense of purpose with others. More research is required to confirm these findings. Meyers (2016) also examined the positive effect therapy has on resiliency in adulthood. While not all participants agreed, most considered therapy a crucial experience that helped facilitate a trusting relationship (Meyers, 2016). The therapist was able to help individuals with their internalized view of self, self-efficacy, and their cognitive and emotion regulation, which have been found to act as further protective factors (Meyers, 2016; Pat-Horenczyk, Kenan, Achituv, & Bachar, 2013). Additionally, Meyers (2016) evaluated the use of coping strategies and defense

mechanisms. Meyers (2016) found that while some of these defense mechanisms may act as protective factors in childhood, they may be considered risk factors in adulthood.

Researchers have also examined the protective effects of parent and school connectedness (Gallus, Shreffler, Merten, & Cox, 2015). They found that greater school and parent connectedness are correlated with lower depressive symptoms; however, at high levels of traumatic exposure, the protective effect of parent connectedness diminishes (Gallus et al., 2015). It is crucial to remember that in these developmental traumatic experiences, the parents and family are sometimes at the root of the trauma, and therefore would not act as protective factors. Meyers (2016) discusses how some youth may take refuge in homes of friends, and that these relationships can provide stability and support. However, when relationships are insufficient in some way, and are not able to be repaired, negative beliefs about relationships are reinforced (Pearlman & Courtois, 2005). Individuals lacking positive early attachment experiences may not have the skills to regulate their inner states. Survivors of trauma may attempt to manage emotions by dissociation or other psychological mechanisms and defenses. These mechanisms and defenses can unfortunately lead to self-destructive behaviors such as suicide, self-injury, substance abuse, victimization, risky sexual behavior, and violence against others (Courtois & Ford, 2013; Pearlman & Courtois, 2005).

There is a clear need to develop a larger knowledge base that helps to predict, explain, and describe how trauma and other adversities experienced at young ages accumulate and affect adjustment and development (Layne, Briggs, & Courtois, 2014). This study hopes to gather information to better understand how these traumatic experiences that occurred during young ages have impacted the mental health of adults.

Additionally, while there are well-documented risk factors for exposure to multiple traumas, there is still a lack of research on other risk and protective factors. The research on protective factors, while still growing, has shown that social support can help mitigate the effects of trauma (Banyard, et al., 2003; Gallus, et al., 2015; Glass, Perrin, Campbell, & Soeken, 2007; Meyers, 2016). Glass et al. (2007) found that with enhanced social support the risk of repeat victimization decreased. The outcomes of this study have the potential to help researchers and clinicians further examine how support, specifically attachment style and sibling relationships, could act as a protective factor, or mediator, for the effects of exposures to multiple traumas.

Attachment

Forming stable and secure attachment early in life may guard against the negative mental health outcomes of complex trauma. Often, this attachment is formed vis-à-vis the responsiveness and availability of primary caregivers. Secure and stable attachment can offer protection, as well as teach life skills and how to interact socially. It allows for physiological and psychological regulation and development, the foundation for healthy physical development, and a secure base from which to explore the world (Bowlby, 1969). While our first attachment relationships form early in life, these bonds continue to form through the rest of development to adulthood. Attachment bonds have four distinct features: proximity maintenance, separation distress, safe haven, and secure base (Zeifman & Hazan, 2016). As stated, these attachment bonds originally form with primary caregivers. By late childhood or early adolescence, there is a shift where the child or adolescent is able to tolerate longer separations. One reason for this shift is because of growth in the child's cognitive ability. They are able to produce mental

representations of their attachment figure as well as understand the reasons for their absence and imagine an impending reunion (Zeifman & Hazan, 2016). Adults are able to begin relationships with a well-developed ability to mentally represent others, which causes critical differences between infant and adult attachment dynamics.

Two other big changes in attachments across the developmental trajectory are the degree of mutuality and the integration of sexuality with the other features of the emotional bond. The asymmetrical attachments early in life are thought to be replaced by more reciprocal attachments later in life. In adulthood, there is a mutual need for safety and security in these attachment relationships, not to mention the integration of intimacy and sexual attraction. Bowlby's hypothesis, which has been supported, was that attachment behavior usually becomes focused on a sexual partner in adulthood (Zeifman & Hazan, 2016).

Throughout development, when negative experiences and disruptions interfere with secure attachment, this interference often results in psychological difficulties—*anxiety, depression, anger, and emotional detachment*—culminating in social and relational challenges (Kobak, Zajac, & Madsen, 2016). Specifically, insecure attachment and trauma have been shown to have an impact on neurophysiological development, specifically *identity formation, affective emotional and somatic competence and regulation, and the ability to relate to others* (Kobak, et al., 2016). Understanding the importance of attachment relationships is critical because when these relationships are severely disrupted, developmental consequences can be lifelong (Gregorowski & Seedat, 2013).

Early caregiving relationships create the relational context where children develop their first psychological representations of self, other, and self in relation to others (Cassidy, 2016). These working models create the foundation of children's developmental capabilities such as distress tolerance, curiosity, self-efficacy, and communication (Cassidy, 2016). However, when the child-caregiver relationship is the origin of the trauma, this attachment relationship is critically damaged, often leading children to develop insecure attachment patterns (Stovall-McClough & Dozier, 2016). Of the insecure attachment patterns, disorganized attachment is the most difficult for children's adjustment. Disorganized attachment presents itself in survival-based behaviors, consistent with the erratic, and oftentimes abusive, behaviors children experience from caregivers (Muller, et al., 2000). These survival-based behaviors can be rigid, extreme, and dissociative. In addition, these attachment behaviors often involve either helplessness or coercive control. When attachment is seriously disrupted this can cause long-term risk of physical disease and psychosocial dysfunction, such as greater vulnerability to stress, inability to regulate emotions without help from others, and altered help-seeking (Courtois & Ford, 2013; Herman, 1997; Kobak, et al., 2016).

Researchers and theorists have examined the relationship between insecure-disorganized attachment and the dissociative response often found in individuals who have experienced complex traumas. Specifically, the majority of individuals who are chronically abused form an insecure, disorganized or dissociative attachment style (Anderson & Alexander, 1996; Liotti, 1999; Muller, et al., 2000). Research has shown that trauma and insecure attachment can have a serious impact on development, particularly identity formation, affective emotional and somatic competence and

regulation, and as stated, the ability to relate to others (Muller, et al., 2000; Pearlman & Courtois, 2005).

Herman (1997) notes that trauma affects physiological, cognitive, social, and emotional functioning, and this can severely impact attachment, even with protective caregivers. Being a child in a very stressful environment can challenge and test the coping mechanisms, even when having a caregiver who offers protection, which is not always the case (Garbarino, 1993). Caregiver support is an important factor in deciding how children adapt to victimization or attachment disruptions (Kobak, et al., 2016). Since some cases of child maltreatment are perpetrated by parents or caregivers, the parent or caregiver who has harmed the child cannot be utilized as a resource for the child to cope with the stress and regulation from the experience (Gershoff, 2016; Liu, Jager-Hyman, Wagner, Alloy, & Gibb, 2012). Not only can physical abuse and punishment undermine the attachment between the parent and child, but it can also decrease a child's motivation to learn from their parents (Straus & Paschall, 2009). In addition, child abuse severity can also predict higher emotion dysregulation that later obstructs adult romantic attachment (Espelta, Palasciano-Barton, & Messman-Moore, 2017).

Traumatic stress reactions are more prevalent in traumatized children with insecure attachments. This indicates that traumatized children may have trouble obtaining support from a parent who otherwise may have lessened or buffered the impact of trauma (Lynch & Cicchetti, 1998). The quality of the child-caregiver relationship may affect the magnitude of the child's response to the traumatic event. The caregiver's accuracy and sensitivity to recognizing and responding to the child's needs may worsen or lessen the effect of the traumatic event on the child's functioning (Lieberman et al., 2011). Compared

to insecurely attached infants, securely attached infants are able to regulate their physiological stress response, and infants with disorganized attachment are correlated to even more physiological dysregulation (Gunnar & Quevedo, 2007).

The goal of the current study is to contribute further understanding surrounding the effects of trauma on attachment—specifically, the effects of multiple developmental traumatic events on attachment styles in adulthood. Much of the existing research focuses on attachment disruptions due to developmental traumatic events occurring earlier in life, such as childhood. It is important to advance this literature enabling a more comprehensive, clinical understanding of adult manifestations of trauma incurred earlier in life.

Sibling Relationship Support

Attachment research suggests that the parent-child relationship is the most important relationship when it comes to the protective nature of relationships and their impact on children's adjustment (Bowlby, 1982). As discussed, parents or primary caregivers act as a secure base providing support and comfort when the child experiences distress, fear, or anxiety (Bowlby, 1982). Different from parents, siblings are considered to meet the social needs of children, meaning they are sought out for fun and play versus support and comfort (Circirelli, 1995). In order to fully understand sibling relationship dynamics, it is critical to recognize that these interactions occur within a broader family system, composed of other relationships (Dirks, Persram, Recchia, & Howe, 2015). Thus, sibling relationships can be intertwined with parent relationships.

There are several characteristics that make sibling relationships unique in a developmental context. One is that sibling relationships consist of two kinds of

interactions, reciprocal interactions and complementary interactions (Howe & Recchia, 2005). Reciprocal interactions are typical in peer relationships and are characterized by equal and repeated exchanges evident in play or conflict (Hinde, 1979). Complementary actions are characteristic of parent-child relationships where there is an unequal distribution of power, evidenced by guidance, instrumental assistance, and teaching (Hinde, 1979). Sibling relationships are special in that they can consist of both types of interactions. An additional characteristic that makes sibling relationships distinct from others is that unlike friendships, sibling relationships are involuntary and last a lifetime (Hartup, 1979). Another aspect that makes the sibling relationship unique is that because of the amount of time spent together, siblings are able to co-construct a common and intimate history (Dirks, et al., 2015; Dunn, Slomkowski, & Beardsall, 1994).

Sibling relationships are usually distinguished by intense and highly affective interactions, in part due to a shared environment and family history. Subsequently, siblings are likely to create shared meanings of their worlds (Dunn, 1988). In a study conducted by Howe, Aquan-Assee, Bukowski, and Rinaldi (2001), children were more likely to share information and seek emotional support from their sibling when they reported warm and close feelings about that sibling. Given the unique reciprocal and complementary aspects of sibling relationships, as well as their shared developmental and affective history, there is an opportunity for them to become confidants of one another (Hinde, 1979). Researchers have found that siblings confiding in each other is linked to warmth in the relationship (Buhrmester & Furman, 1987; Howe, Aquan-Assee, Bukowski, Rinaldi, & Lehoux, 2000). As siblings grow older, they are less likely to live in the same location and share the same environment, thereby complicating adult sibling

support (Lanthier & Campbell, 2011). Having increased contact between siblings usually creates increased support (Lanthier & Campbell, 2011).

Previous research has concentrated on the familial variables that protect children from the stress caused by life events. It has been found that high levels of general family support, positive parent-child relationships, and consistent parent discipline have a protective effect on maladjustment for children and adolescents (Gass, et al., 2007). While there is extensive research examining the protective effects of parental support, there is not much research on the protective quality of positive sibling relationships (Gass, et al., 2007). Gass and colleagues (2007) sought to examine whether positive sibling relationships moderated the association between exposure to life events and the development of future behavioral and emotional challenges in children. These researchers also questioned how the protective nature of the positive sibling relationships could change depending on how positive the parent-child relationship was (Gass et al., 2007). Researchers found that sibling affection moderated the association between stressful life events and internalizing symptoms. However, they did not find the same moderation effect for stressful life events and externalizing symptoms (Gass, et al., 2007). Researchers also found that the protection provided by positive sibling relationships is not dependent on the quality of the mother-child relationship. This may serve as evidence that siblings can provide security and comfort to their siblings when they are experiencing stress, regardless of the quality of the parent-child relationship (Gass, et al., 2007).

Sibling relationships are a special and influential context for children's development. These relationships are characterized by positive features, like warmth and

intimacy, as well as negative features, like intense conflict. Because of this, sibling relationships have the potential to be both a protective factor and a risk factor for the development and maintenance of behavioral and emotional dysfunction (Dirks, et al., 2015). Sibling relationship quality has been related to both internalizing and externalizing symptoms in children from preschool to adolescence (Gass, et al., 2007; McElwain & Volling, 2005; Pike, Coldwell, & Dunn, 2005; Richmond, Stocker, & Rienks, 2005).

The range of positive and negative sibling interactions creates opportunity for siblings to develop social-cognitive and behavioral skills, which promote successful relationships (Kramer, 2014). The conflict and hostility seen in sibling relationships are rarely observed in children's other interactions with parents or peers (Dirks, et al., 2015). Fighting and aggression in sibling relationships may or may not cause harm. Research has shown that sibling conflict and hostility predicts increases in internalizing and externalizing symptoms, which suggests that sibling interactions uniquely contribute to the development of symptomatology (Dirks, et al., 2015). It has also been found that differential parental treatment is linked to greater sibling conflict, animosity, and controlling behaviors (Brody, Stoneman, & McCoy, 1992; Furman & Buhrmester, 1985). Additionally, research has shown that conflict in sibling relationships is associated with increased children's anxiety, depressed mood, and delinquent behavior (Stocker, Burwell, & Briggs, 2002).

Sibling conflict and aggression can be especially problematic in relationships that lack warmth (Buist & Vermande, 2014). Researchers have found that in children and adolescents, warmth may positively influence development; greater warmth is associated with reduced internalizing and externalizing problems (Buist, Dekovic, & Prinzie, 2013).

A study by Buist, Dekovic, and Prinzie (2013) found that siblings who perceived warmth in the relationship had opportunities for open, reciprocal, mutually supportive, safe exchanges of intimate information, thereby creating a secure context for these interactions (Howe, et al., 2001). Even when there is significant conflict in the relationships, the presence of warmth is associated with fewer internalizing symptoms and less aggression (Buist & Vermande, 2014).

Peltonen, Qouta, Sarraj, and Punamaki (2010) examined how war-related traumatic events impacted peer and sibling relationships, and how these relationships were associated with children's mental health. These researchers studied over 200 Palestinian boys and girls aged 10-14 living in the Gaza strip. They found that war-related trauma and PTSD, depressive, and psychological distress symptoms were mediated by rivaling sibling relationships. Moreover, siblings who had substantial intimacy and warmth, and lacked rivalry in their relationship, had less severe PTSD, depressive, and psychological distress symptoms (Peltonen, et al., 2010). These findings may support programs to reduce the war-related trauma of Palestinian boys and girls in Gaza. Given the specificity of this population and the small sample size associated with the study, said findings may or may not be generalizable.

Given that prior research finds sibling relationships have the potential to protect against stressful life events, there is a possibility that these sibling relationships could also be protective in the presence or absence of positive parent-child relationships (Gass, et al., 2007). Also, even in healthy familial dynamics, as siblings become adults, sibling support can increase while parents become less available to provide support (Lanthier & Campbell, 2011). As the current study is interested in understanding the long-term effects

of multiple developmental traumatic experiences on mental health outcomes, adult participants have answered questions about their traumas retroactively. However, adult participants have also answered questions about their sibling relationships currently. As the researcher is measuring current mental health outcomes, understanding the current role of sibling support is believed to be critical. This will provide the researcher with information on how sibling relationships may have mediated the effects of traumatic experiences both in the past and currently.

Inferences for Forthcoming Study

The Adverse Childhood Experiences (ACEs) Study is one of the largest studies reporting on childhood abuse and neglect. More than two thirds of children growing up report at least one traumatic event by 16 years old (SAMHSA, 2017). In waves one and two of the ACEs Study, of the total 17,377 participants, 26% were exposed to one adverse childhood experience, 15.9% were exposed to two, 9.5% were exposed to three, and 12.5% were exposed to four or more (Centers for Disease Control and Prevention, 2019). This means that 37.9% of these individuals were exposed to two or more adverse childhood experiences.

Most of the research available on developmental traumas focuses on children and adolescents, as this is the period in which much of this trauma occurs. However, there is a need for research that examines people in later adolescence, emerging adults, and adults, not only those who have survived, but those who are still being exposed to traumas. Additionally, the formal study of multiple exposures to developmental traumatic experiences, or complex traumas, is still evolving. To support the development of effective interventions, there is a need to develop a knowledge base that helps to predict,

explain, and describe how trauma and other adversities experienced at young ages accumulate and affect adjustment and development later in life (Layne, et al., 2014).

Research on protective factors, while still growing, has shown that social support can help mitigate the effects of trauma (Banyard, et al., 2003; Gallus, et al., 2015; Glass, et al., 2007; Meyers, 2016). Glass et al. (2007) found that with enhanced social support, the risk of repeat victimization decreased. Similarly, they noted that as social support is open to change, this is also a relevant area for intervention (Glass et al., 2007). Roughly 80% of children grow up living with a sibling (Dunifon, Fomby, & Musick, 2017; U.S. Census Bureau, 2011). Yet, this area is not nearly as researched as other areas such as parental support and peer support. When sibling support has been studied, it was not studied relative to how sibling relationships could potentially mitigate the symptoms and effects of multiple developmental traumatic experiences. There are significant gaps in the research with respect to the possible mediating effect of attachment style and sibling relationship quality on mental health outcomes, when there have been multiple exposures to developmental traumatic experiences. The current study will contribute research where the current literature is limited, addressing the possible mediating role of attachment style and sibling relationship quality on mental health outcomes in participants' adult lives, after being exposed to multiple developmental traumas earlier in their lives.

Chapter III: Methods

This study examines the relationship between mental health outcomes and exposure to multiple developmental traumatic events, with sibling relationship quality and participant attachment style as possible mediators. According to Baron and Kenny (1986), a mediator variable identifies how a given effect occurs, or how the main independent variable is able to influence the dependent variable. Barron and Kenny (1986) note that mediation is most effective when there is a strong relation between the predictor variable, or independent variable, and the criterion, or dependent, variable. A mediation model attempts to explain why and how a cause-and-effect happens (Wu & Zumbo, 2008). A mediation effect is known as an indirect effect, or intervening effect (Wu & Zumbo, 2008). Unlike a mediator, a moderator identifies the circumstances under which a specific effect occurs in addition to the direction or strength of this effect (Holmbeck, 1997). However, because it is already known that exposure to multiple developmental traumatic experiences leads to poor mental health outcomes, the direction is already known. In this study, the researcher was more interested in how the predictor variables, or sibling attachment and relationship quality, were able to influence the criterion variable, or mental health outcomes. This research goal was more aligned with using a mediator model (Barron & Kenny, 1986; Holmbeck, 1997; Shadish & Sweeney, 1991; Wu & Zumbo, 2008).

In this study, the researcher aimed to examine how sibling relationships and attachments mediated exposure of multiple developmental traumatic experiences on mental health. The participants were self-selected through Amazon Mechanical Turk

(MTurk). After completing an eligibility screener, participants were routed to Qualtrics where data was collected.

Research Questions and Hypotheses

The following are the primary research questions and hypotheses for the study:

1. To what extent are mental health outcomes explained by attachment style and sibling relationship quality?

1a. Poor mental health outcomes are expected to be negatively correlated with warmth.

1b. Poor mental health outcomes are expected to be positively correlated with conflict.

1c. Poor mental health outcomes are expected to be positively correlated with rivalry (parental favoritism).

1d. Poor mental health outcomes are expected to be positively correlated with attachment avoidance.

1e. Poor mental health outcomes are expected to be positively correlated with attachment anxiety.

2. To what extent are mental health outcomes explained by exposure to multiple developmental traumatic experiences?

2. Poor mental health outcomes are expected to be positively correlated to exposure to multiple developmental traumatic experiences.

3. To what extent does attachment style and sibling relationship quality *mediate* the exposure of multiple developmental traumatic experiences on mental health?

- 3a. Warmth is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.*
- 3b. Conflict is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.*
- 3c. Rivalry (parental favoritism) is expected to be to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.*
- 3d. Attachment avoidance is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.*
- 3e. Attachment anxiety is expected to mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes.*

Participants

Population Sample

This study uses a regression design where all participants were recruited through Amazon Mechanical Turk (MTurk) and completed the Qualtrics-based survey at a single time point. The target population for this study is adults (18 years and older) who have been exposed to multiple developmental traumatic experiences. While these traumas occurred during a developmental age, childhood, the purpose of this study is to further understand long-term impacts on adult mental health. To advance this understanding, the study investigates whether sibling relationships and attachment style could have a mediating effect on mental health outcomes, after individuals were exposed to multiple developmental traumas. Study participants were thus required to have at least one living sibling.

As the Qualtrics survey was administered through MTurk, purposive sampling was used to collect participants who had experienced multiple traumas. Participants were able to choose whether they wanted to participate in the study based on a brief description of the study. In addition, participants were informed of how much time the study was expected to take, as well as the monetary compensation they would receive having completed the study. After clicking the link in MTurk, participants were routed to a brief screener to determine whether they met study eligibility.

The study had six inclusion criteria. These self-report inclusion criteria were:

1. Participants must be 18 years of age or older.
2. Participants must have at least one living sibling.
3. Participants must be able to read English.
4. Participants must have reliable Internet access.
5. Participants must have experienced at least two potentially traumatic experiences either directly or indirectly (e.g. crime-related events, general disaster/trauma, physical/sexual assault)?
6. Participants must be able to complete the survey in one sitting.

An answer of no to any of these questions directed respondents to a page that thanked them for their time but informed them that they did not meet the study eligibility requirements.

Power Analysis

The power of a statistical test is the probability that the null hypothesis will be rejected when it is false, or more specifically, the probability of obtaining a statistically significant result (Cohen, 1992). Power analysis for a multiple regression study with five

predictors was conducted in G*Power to determine a sufficient sample size using an alpha of 0.05, a power of 0.80, and a medium effect size ($f^2 = 0.15$, Statistics Solutions, 2013). According to this power analysis, a total sample size of $n = 92$ would be sufficient. The current study was able to collect completed information from 490 participants. With 490 participants as the final sample size it was concluded that power was sufficient for the analyses.

Human Participants and Ethical Concerns

This study was conducted with the approval of The George Washington University Institutional Review Board (IRB). Once participants completed the eligibility screening, they were routed to the Qualtrics survey where they first read a statement of informed consent. Clicking into the study provided evidence of consent. Because the researcher was not interacting directly with participants, the researcher obtained a waiver of documentation of consent (HRP-294).

Informed consent was presented at the beginning of the survey, though no written consent was collected as individual responses were not tied to any identifying information. No identifying information was collected or stored. This survey provides the researcher with information on the participants' attachment style, their relationship quality with their sibling, the participant's exposure to traumas and the impact of those traumas, and their current distress due to those events.

Although no major risk was anticipated, the researcher recognized that this study addressed potentially sensitive topics, and participants were informed that they could discontinue the study at any time for any reason. At the end of the survey, participants were provided with resources if necessary, in addition to being encouraged to email the

researcher with any concerns or needs. No participants emailed the researcher, but if they had, their confidentiality would have been maintained. The researcher obtained permission to use the relevant surveys from the appropriate parties.

Demographics

The collected sample consists of 490 participants. The ages of participants range from 18 to 72 years old, with a mean age of 32.59 years old and a standard deviation of 10.67. Participant's sibling ages ranged from 1 to 78 years old, with a mean age of 30.53 years old and a standard deviation of 12.52. With respect to gender, the sample was relatively equally distributed with 228 males (46.5%) and 258 females (52.7%). Sibling gender was also relatively equally distributed with 241 identifying as male (49.2%) and 244 females (49.8%). Participants were born from countries all over the world, however, the countries with the highest number of participants were the United States and India. 304 participants or 62% were born in the United States and 115 participants or 23.5% were born in India. The majority of participants identified their race/ethnicity as either "White or Caucasian," 266 participants or 54.3%, or "Asian," 159 participants or 32.4%. Sibling race/ethnicity was also identified as mostly "White or Caucasian," 55.1%, or "Asian," 31%. Of all of the participants, 368 or 75.1% were currently living in the United States. Because there was a large portion of participants who identified as "White or Caucasian" or "Asian," the researcher ran t-tests and regression analyses for race/ethnicity and gender to see if there was correlation in demographic variables. These two main demographic groups did differ in terms of age, sibling age, and participant sex. Asian participants were younger, as were their siblings, and were more likely to be male. This suggests that these two groups were not similar in terms of basic demographic

characteristics, yet when analyses were conducted controlling for these factors the results did not change. Thus, the polled sample results are presented throughout.

Regarding current marital status, the majority of participants identified as married, 39.8%, or as single, 36.5%. Their sibling's current marital status was identified as mostly single, 42.4%, or as married, 34.9%. In terms of highest level of participant's education, the majority of participants, 48.4%, reported having their bachelor's degrees. Similarly, the majority of the participant's siblings also reported their highest level of education as having their bachelor's degrees, 38.8%.

When the survey asked if participants grew up with this sibling, 468 participants or 95.5% answered yes. The mean number of years that participants lived with this sibling was 18.25 years. This statistic is interesting as it may increase the probability of the sibling having a mediating impact because they are present and share an environment. When asked about their relationship to this sibling, 368 participants or 78.8% reported that the sibling was fully biologically related. In addition, 42 participants or 8.6% reported that this sibling was a step sibling and 30 participants or 6.1% reported that the sibling was a half sibling. 23 participants or 4.7% reported that the sibling was a twin, and nine participants or 1.8% reported that the sibling was adopted.

In regard to household composition, majority of participants, 349 participants grew up in a household with two parents living together. Participants were also asked about whether their household composition growing up typically included adult extended family members (e.g. grandparents, aunts, uncles, etc.), to which 323 participants or 65.9% answered yes and 167 or 34.1% answered no.

Table 1

Demographic Variables

<u>Characteristic</u>	<u>N</u>	<u>Percentage</u>
Participant Gender		
Male	228	46.5
Female	258	52.7
Other	4	.8
Sibling Gender		
Male	241	49.2
Female	244	49.8
Other	5	1
Participant-Sibling Dyad Genders		
Male-Male	125	25.5
Male-Female	103	21
Female-Male	115	23.5
Female-Female	140	28.6
Other	7	1.4
Participant Race/Ethnicity		
White/Caucasian	226	54.3
Asian	159	32.4
Black/African American	34	6.9
Hispanic/Latino	34	6.9
American Indian/Alaska Native	26	5.3
Other	3	.6
Sibling Race/Ethnicity		
White/Caucasian	270	55.1
Asian	152	31.0
Black/African American	33	6.7
Hispanic/Latino	30	6.1
American Indian/Alaska Native	24	4.9
Other	4	.8
Participant-Sibling Relationship		
Biological sibling	386	78.8
Step sibling	42	8.6
Half sibling	30	6.1
Twin	23	4.7
Adopted sibling	9	1.8
Participant Marital Status		
Married	195	39.8
Single	179	36.5
Divorced	27	5.5
In a relationship	68	13.9
Other	21	4.3
Sibling Marital Status		
Married	171	34.9
Single	208	42.4

Divorced	19	3.9
In a relationship	66	13.5
Other	26	5.3
Participant Education		
Less than high school	2	.4
High school graduate or equivalent	38	7.8
More than high school	104	21.2
Bachelor's degrees	237	48.4
More than bachelor's degrees	105	21.4
Other	4	.8
Sibling Education		
Less than high school	31	6.3
High school graduate or equivalent	87	17.8
More than high school	101	20.6
Bachelor's degrees	190	38.8
More than bachelor's degrees	77	15.7
Other	4	.8
Household Composition		
Grew up with sibling	468	95.5
Two parents, living together	349	71.2
Two parents, separate residences	56	11.4
Single parent	73	14.9
Extended Family	323	65.9
Other	12	2.4

Missing Data

To avoid having to account for missing data, the researcher made the items within the study forced response. This means that in order to move forward in the survey, participants had to answer each question. However, if participants did not want to answer a question, or when participants discontinued, they were still paid the agreed upon amount and not penalized in any way.

Measures

This study consisted of five different survey measures. Demographic information was gathered about personal and family demographics, such as age, gender, level of education, and extensiveness of contact with one sibling. The predictor variables,

described more below, were measured through use of: the Adult Sibling Relationship Questionnaire-Short (ASRQ-S; Lanthier, et al., 2000), a short-form of the Experiences of Close Relationships (ECR-12; Lafontaine, et al., 2016), and the Trauma History Questionnaire (THQ; Hooper, et al., 2011). The criterion variable was measured with the short-form Depression Anxiety Stress Scale 21 (DASS-21; Lovibond & Lovibond, 1995).

The study also included an open-ended text box at the end of each section for participants to provide the researcher with anything they would like to share for the researcher to better understand their answers, such as their relationship with their sibling, their trauma experiences, or any other aspect of the study. The measures were presented to participants in a set order.

All measures included in this study were self-report and were administered via Qualtrics. Permission to use these measures in this research was obtained. The survey took participants 20-30 minutes to complete. The researcher recognized the length of this survey and hoped that the monetary incentive of \$0.20 would help encourage participants to complete the survey.

Predictor Variables

Adult Sibling Relationship Questionnaire-Short (ASRQ-Short). The Adult Sibling Relationship Questionnaire-Short (ASRQ-S; Lanthier, et al., 2000) is a 47-item measure that includes both rating-scale and multiple-choice questions. The items are all rated on a five-point rating scale. A majority of these five-point rating scales, 35-items, are one (hardly at all) to five (extremely much). The remaining 12-items focus on favoritism/rivalry. These favoritism/rivalry items are rated on a scale that ranges from one (I am usually favored) to five (this sibling is usually favored). The midpoint

corresponds to equal treatment (neither of us is favored). The items on these scales are combined to form three higher-order factors: warmth, conflict, and rivalry. To score results, the researcher uses unit weighting of items, which result in factor scores that range from 1 to 5 for the scales of warmth and conflict (Lanthier, et al., 2000). However, rivalry scale is scored differently as it is scored from 0 to 2, where two indicates maximum rivalry and zero indicates an absence of rivalry (Lanthier, et al., 2000).

The original ASRQ has been found to have high levels of internal consistency for all scales (Stocker, Lanthier, & Furman, 1997). Internal consistency was tested on a sample of 383 young adult siblings using Cronbach's alpha. The three dimensions are as follows: warmth (alpha = .95), conflict (alpha = .93), and rivalry (alpha = .88). Using the same sample, convergent validity was measured by correlating participants' reports with their siblings. Correlations between the siblings were .60 for warmth, .54 for conflict, and .33 for rivalry, totaling a convergent correlation average of .49, indicating a high convergent validity score (Stocker, Lanthier, & Furman, 1997). Discriminant validity was assessed by examining cross-rater correlations of different factors which produced an average of .14, suggesting considerable discriminant validity across the factors (Stocker, Lanthier, & Furman, 1997).

For the shortened version, the ASRQ-S, psychometric properties were examined using a sample of 356 female and 189 male primarily Caucasian emerging adults (Lanthier, et al., 2000). This data shows that the warmth and conflict factors correlate highly with the original ASRQ factors. For the ASRQ-S, the three dimensions are as follows: warmth (alpha = .96), conflict (alpha = .93), and rivalry (alpha = .91) (Lanthier, et al., 2000).

Results from the ASRQ-Short provided information on sibling relationship quality by examining three subscales: warmth, conflict, and rivalry. Participants completed the ASRQ-S in reference to one of their siblings. If the participants had more than one sibling, then the participants were instructed to select the sibling closest in age to themselves. The reason participants were asked to choose the sibling closest in age was because this increased the likelihood that they grew up in the same environment, and therefore, may have shared experiences and histories.

The ASRQ-Short provided the researcher with information regarding sibling relationship quality and perceived treatment by parents as assessed on the three dimensions of warmth, conflict, and rivalry. This measure was chosen to provide the researcher with insight into the adult participant's relationship with their siblings. This information contributes knowledge towards whether sibling relationships could act as mediating factors for the exposure of trauma on mental health.

The psychometric properties of the ASRQ-S were examined for the current study's sample of 228 males and 258 females primarily Caucasian adults. Internal consistency was evaluated using Cronbach's alpha. The three dimensions are as follows: warmth ($\alpha = .97$, $M=3.2$, $SD=1.01$), conflict ($\alpha = .96$, $M=2.85$, $SD=.99$), and rivalry ($\alpha = .90$, $M=.81$, $SD=.56$).

Experiences of Close Relationships Short Form (ECR-12). The Experiences in Close Relationships-Short Form (ECR-12; Lafontaine, et al., 2016) is a short-form version of the original 36-item ECR self-report attachment measure (Brennan, Clark, & Shaver, 1998). The ECR-12 is a 12-item measure in which participants rate themselves on a five-point Likert scale, ranging from one (disagree strongly) to five (agree strongly),

to measure attachment in emotionally intimate relationships through the dimensions of anxiety and avoidance.

Lafontaine et al. (2016) developed the ECR-12 across five studies. The first study consisted of 2,066 French-Canadian college students. The second study was composed of 316 French-Canadian heterosexual couples from Quebec. The third study included 224 English-speaking Canadian heterosexual couples. The fourth sample included 107 men and 288 women involved in same-sex relationships. The fifth sample included 524 Canadian couples seeking couple therapy in a private practice in either Quebec or Ontario (Lafontaine et al., 2016). The goal of the first study was to develop a short version of the ECR. The remaining four independent studies aimed to examine whether the new short measure presented with better psychometric properties than the ECR-Short form.

Lafontaine et al. (2016) found that the psychometric properties of the ECR-12 were as good as those of the original ECR, and better than those of the existing short form ECR, the ECR-S. Regarding internal consistency of the questionnaire items, the ECR-12 had Cronbach's alphas that varied from .78 to .87 for the anxiety sub scale and from .74 to .83 for the avoidance sub scale (Lafontaine et al., 2016). The ECR-12 measures attachment in emotionally intimate relationships by examining two sub scales of anxiety and avoidance. For scoring, the items were separated into these two categories for anxiety and avoidance questions. In order to get a total score for each category, the score for each item in the category needed to be averaged, with a few of the items requiring reverse coding.

The ECR-12 was answered by participants based on their own attachment style. This measure was used to provide the researcher with information about participants'

attachment style. It also provided insight into other potential mediating factors for mental health outcomes in adults who have been exposed to multiple developmental traumatic experiences. Additionally, this measure helped provide more context surrounding the participant's attachment relationship with their sibling.

The psychometric properties of the ECR-12 were examined for the current study's sample of 228 males and 258 females primarily Caucasian adults. Internal consistency was evaluated using Cronbach's alpha. The two dimensions are as follows: avoidance ($\alpha = .77$, $M=2.52$, $SD=.72$), and anxiety ($\alpha = .89$, $M=3.3$, $SD=.95$).

Trauma History Questionnaire (THQ). The Trauma History Questionnaire (THQ; Hooper, et al., 2011) is a 24-item self-report measure. If survey participants endorse having experienced any of the 24 traumatic items, follow up questions are asked. The THQ asks participants questions about serious or traumatic life events, including how many times and the ages at which the events occurred. It addresses three unique trauma areas: crime-related events, general disaster and trauma, and unwanted physical and sexual experiences (Hooper, et al., 2011).

Researchers have found the THQ to be both a reliable and valid measure in both clinical and nonclinical samples (Hooper, et al., 2011). Researchers identified 60 existing published studies with usable information to assess the psychometric properties of the THQ. In a convenience study of college students, stability coefficients for specific events in a test-retest study ranged from .51 (a close person killed) to .90 (attacked with a weapon) and .91 (robbed). Not all items met the adequate reliability coefficient of .70 or greater. Researchers found that the THQ was reliable in general and for most items;

however, as some items did not meet adequate reliability, researchers have identified the need to revise and modify parts of the THQ.

With respect to validity, researchers assessed face validity and content validity by examining agreed-upon dimensions of traumatic events as well as agreement between trauma instrument developers (Hooper, et al., 2011). Construct validity was examined by both relationship to other measures and relationship with outcomes. Finally, cultural validity was assessed by examining studies of participants from different cultural backgrounds. Researchers found that the THQ highlights traumatic experiences that seem to be universal for the most part (Hooper, et al., 2011). For scoring, the 24-items were totaled generating a total score that represents the numbers and types of events endorsed. Additionally, sub scale scores can be calculated by summing the items associated with each type of event. The most common scoring is to count the number of events endorsed (Hooper, et al., 2011).

For the purposes of the current study, the THQ provided the researcher with information about the number of traumatic experiences that participants had been exposed to. Additionally, the THQ identified whether events occurred multiple times and the age ranges during which they occurred. When relevant, participants were asked about the frequency of the events and the relationship of the person who perpetrated the act.

This study examines the psychometric properties of the THQ. Because the researcher is interested in traumas that occurred in earlier developmental periods, the total THQ score is calculated only based on traumas that occurred during the ages of 0-20 years old. The total THQ score was calculated by adding the number of items that occurred for each participant within this 0-20-year-old age range. Internal consistency

was evaluated using Cronbach's alpha. The psychometric properties for the total THQ score focusing on developmental traumas are: $\alpha = .90$, $M = 5.49$, $SD = 5.44$.

Criterion Variable

Depression Anxiety Stress Scale 21 (DASS-21). The short-form Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) consists of 21 items and is designed to measure distress along three dimensions, depression, anxiety, and stress. The DASS was originally developed to help improve the discriminant validity and psychometric accuracy of instruments assessing depression, anxiety, and general stress (Lovibond & Lovibond, 1995). Lovibond and Lovibond later developed the shorter version of the DASS to reduce administration time (Oei, Sawang, Goh, & Mukhtar, 2013). Because the DASS-21 is not intended for use as a diagnostic instrument, it is widely used for both clinical and research purposes (Oei, et al., 2013; Osman, et al., 2012).

In a study conducted by Henry and Crawford (2005), the construct validity of the DASS-21 was tested in a non-clinical sample of 1,794 adults in the United Kingdom. The internal consistency, or reliability, of the DASS-21 were estimated using Cronbach's alpha. For the depression scale, alpha was .88 (95% CI = .87 - .89); for the anxiety scale, alpha was .82 (95% CI = .80 - .83); for the stress scale, alpha was .90 (95% CI = .89 - .91). Lastly, for the total scale, Cronbach's alpha was .93 (95% CI = .93 - .94). In another study, researchers evaluated the psychometric properties of the DASS-21 in a sample of 503 adults from the United States (Sinclair, et al., 2012). The internal consistency reliability scores were $\alpha = .91$ for depression, $\alpha = .80$ for anxiety, and $\alpha = .84$ for stress. Additionally, Sinclair and colleagues (2012) also reported the correlations

between scales. The correlation between depression and stress is reported as $r = .72$ and $.73$. For depression and anxiety, the correlation is $r = .73$. Lastly, the correlation between anxiety and stress is $r = .68$ (Sinclair, et al., 2012). These correlations indicate substantial overlap in terms of the content of the different scales. For purposes of examining convergent and divergent validity, researchers used the SF-8 Health Survey. Results indicated good convergent validity with correlations ranging from $r = -.58$ to $-.69$. For divergent validity, correlations ranged from $r = -.16$ to $-.34$ (Sinclair, et al., 2012).

The DASS-21 asks participants to read statements and answer how often they have related to these statements over the past week. Participants score the 21 items on a four-point frequency response scale. The response categories range from zero (never) to three (almost always). The three dimensions, depression, anxiety, and stress, each contain seven items or questions. These items are then summed to generate a three total scores, one for each of the dimensions. Each dimension has different cutoff scores to indicate a normal, mild, moderate, severe, or extremely severe level of depression, anxiety, or stress.

For the purposes of the current study, the DASS-21 allowed the researcher to better understand participant's mental health outcomes, specifically distress. The DASS-21 was chosen in part because unlike many other mental health outcome measures, it not only measures depression and anxiety, but also stress. Comprehending the long-term impacts of experiencing multiple traumatic experiences is critical to being able to determine if sibling relationships and attachment styles could have a mediating impact on mental health outcomes in adults.

The study examines the psychometric properties of the DASS-21. Depression, anxiety, and stress scores are calculated by taking the sum of the seven items within each of the dimensions. Internal consistency was evaluated using Cronbach's alpha. The three dimensions are as follows: depression (alpha = .94, $M=9.58$, $SD=6.21$), anxiety (alpha = .91, $M=8.98$, $SD=5.83$), and stress (alpha = .90, $M=9.97$, $SD=5.49$). A total score of the DASS-21 is calculated by adding the sums from each dimension and multiplying the total by two (Lovibond & Lovibond, 1995). This multiplication is done to allow comparison of obtained scores to norms on the original DASS. The psychometric properties for the total DASS-21 score are calculated: alpha = .97, $M= 57.01$, $SD= 33.16$.

Procedure

Data Collection Procedures

Participants were recruited via Amazon Mechanical Turk (MTurk) and completed the measures electronically via Qualtrics. To participate in this survey, individuals first had to complete a screener on MTurk to determine eligibility. The screener was uploaded to MTurk by the researcher and remained available until the researcher removed it when data collection was complete. After participants successfully met eligibility requirements, they were automatically routed to Qualtrics for completion of the survey. Upon completion of the survey in Qualtrics, the participant's MTurk account was notified and payment was processed. The researcher received the data in one wave of collection. Participants completed this survey within a single sitting and no follow up was necessary. The researcher expected to collect data within one month through use of MTurk, however the researcher was able to collect responses in 24 hours. The researcher provided a monetary incentive to enhance return rates at \$0.20.

Sampling Procedures

The sample was collected through use of Amazon Mechanical Turk (MTurk), a crowdsourcing internet marketplace. Participation was optional and participants were paid \$0.20 for their time upon completion of the survey, approximately a 30-minute commitment.

Participants recruited from MTurk are paid small amounts to perform Human Intelligence Tasks (HIT). MTurk has been used in many studies to recruit participants. In comparison to typical convenience samples, MTurk samples tend to be more representative and diverse, providing more generalizable results (Mortensen & Hughes, 2018). Another benefit is that the researcher is able to collect data in less time than with using traditional methods.

Any participant was able to view the invitation to the survey, but only those who passed the eligibility requirements were able to view the surveys. The eligibility screener included the six inclusion criteria. After successful completion of the eligibility screener, participants were able to begin the survey. Prior to participants completing the measures discussed above, they were asked a series of demographic information about their personal and family demographics. Some of these demographics included: age, gender, relationship status, growing up household composition, level of education, occupation, race or origin, country of origin, current residency, and type and extensiveness of contact with their sibling.

Estimated Cost of Survey

Participants were paid \$0.20 to complete this survey task (approximately a 30-minute commitment). The desired response rate was 92 participants, but the researcher

hoped to collect 600 participants. The total cost of this survey was \$168. There were no additional costs to post on MTurk and the researcher already had access to a Qualtrics account through her research lab.

Statistical Analysis

The research questions for this study were quantitative and aimed to predict and explain potential relationships between variables.

Preliminary Data Management

The collected data needed to be transformed from its raw form into more usable data. Edits and transformations were necessary in order for the appropriate analyses to be run. Data was imported to SPSS from Qualtrics. Value labels were given to the various measures. Some items needed to be reversed to reflect the correct values consistent with other scales being analyzed. The researcher checked the data for possible errors, both false participant entries and accidental keying errors. Data needed to be transformed so that each scale and sub-scale had aggregate scores. This was done by calculating the total score of each scale and recoding into different variables on SPSS.

600 participants clicked into the survey from Amazon Mechanical Turk. In addition to designing the survey to be forced response, the researcher also included three validity check questions (see Appendix A). These questions were designed to ensure that the participant was paying attention and reading the questions. Because of this, the researcher removed all participants who answered any of the three validity check questions incorrectly, a total of 78 participants. This left the researcher with 522 participants. Of those 522 participants, one participant said they were 16 years old so that participant was removed. Nine other participants needed to be removed because they had stated they

lived with their siblings for time periods that did not make sense, indicating they did not understand the question or were not paying attention. An example of this would be a participant saying they lived with their sibling for 32 years when the participant reported being 28 years old. Of the remaining 512 participants, 22 participants stopped answering questions and therefore dropped out of the survey. This leaves the total number of completed responses as 490 participants.

Statistical Analysis

All data was analyzed using SPSS. Descriptive statistics, internal consistency, and correlations among constructs were computed. After this was completed, assumption testing took place and statistical analysis of the study research questions and hypotheses was completed.

Assumptions

A Pearson's correlational analysis requires that three assumptions be tested and met (Caldwell, 2007). The first assumption is that there needs to be a linear relationship between the two variables. The second assumption is that there are no significant outliers. Finally, the third assumption is normality, which is that the conditional distributions of the prediction errors, or scores on Y, will be normal in shape with no significant outliers.

Multiple linear regression requires that five assumptions be tested and met (Lomax & Hahs-Vaughn, 2012). The assumptions are concerned with independence, homogeneity, normality, linearity, and noncollinearity (Lomax & Hahs-Vaughn, 2012). The first assumption, independence, is concerned with the independence of observations. The researcher will assess this by examining residual plots to see if the residuals fall into a random display of points. The second assumption, homogeneity of variance, is where the

conditional distributions have the same constant variance for all values of X , or the independent variables (Lomax & Hahs-Vaughn, 2012). The third assumption is normality, and this is that the conditional distributions of the prediction errors, or scores on Y , will be normal in shape with no significant outliers (Lomax & Hahs-Vaughn, 2012). The fourth assumption, linearity, is concerned with there being a linear relationship between the observed scores on the dependent variable, Y , and the values of the independent variables, X . The last assumption, noncollinearity, is concerned with there not being a strong linear relationship between two or more of the predictors, or independent variables (Lomax & Hahs-Vaughn, 2012).

Analyses

To address the first and second research questions, the researcher used a Pearson's correlation analysis. This helped the researcher understand two relationships: the extent to which mental health outcomes are explained by attachment style and sibling relationship quality; and the extent to which mental health outcomes are explained by exposure to multiple developmental traumatic events. To address the third and final research question, the extent to which attachment style and sibling relationship quality mediates the exposure of multiple developmental traumatic experiences on mental health, the researcher conducted a multiple mediation analysis using Hayes (2018) PROCESS macro. A mediation analysis is used when a researcher wants to better understand how an effect of X on Y operates (Hayes & Rockwood, 2017). More specifically, mediation is used when a researcher's goal is to establish how X has an effect on Y where one or more intervening variables, M , is located causally between X and Y (Hayes, 2018). In this case, X , how exposure to multiple developmental traumatic experiences (THQ) has an effect on

Y, mental health outcomes (DASS-21), with sibling relationship quality (ASRQ-S) and participant attachment style (ECR-12) as potential mediators, *M*. As the study was interested in examining the amount of variance explained by this model, effect size was measured using R-squared.

Chapter IV: Results

Descriptive Statistics for Sample

Regarding the descriptive statistics of the THQ, the mean number of exposures to developmental traumas was equal to 5.49 (SD = 5.44). A majority of this study's sample, 72.4%, endorsed six or less of the traumatic incidents as occurring. In addition, 8% of participants endorsed 15 to the entire 24 of the traumatic experiences. Having 2.6% of the sample, or 13 participants, endorse 23 and 24 of the potential 24 traumatic experiences happening to them by the age of 20 years old is a significant amount.

On the descriptive statistics of attachment styles, or the ECR-12, the mean score for attachment anxiety was 3.30 (SD = .95). For attachment avoidance, the mean score was 2.52 (SD = .72). Possible scores on the ECR-12 range from 1-5 with lower scores indicating higher attachment anxiety or attachment avoidance. The creators of the ECR-12, Lafontaine et al. (2016) did not report on means and standard deviations for the scale. In a longitudinal study, researchers examined the mediating role of romantic attachment in the relation between child maltreatment and psychological adaptation in emerging adults (Dion, Gervais, Birgras, Blackburn, & Godbout, 2019). Researchers used a French version of the ECR short form to measure romantic attachment. They found that the mean for attachment anxiety was 3.28 (SD = 1.43) and the mean for attachment avoidance was 2.21 (SD = 1.09). This ECR short form version used a seven-point scale, which suggests that the current sample is reporting substantially higher levels of attachment insecurity because a five-point scale was used and current sample means were higher.

Concerning the descriptive statistics of sibling relationships, or the ASRQ-S, the mean score for warmth was 3.2 (SD = 1.01). The mean score for conflict in sibling

relationships was 2.85 (SD = .99). Scores for warmth and conflict can range from 1-5 with higher scores indicating higher levels of the factor. The mean score for rivalry in sibling relationships was .81 (SD = .56). Scores for rivalry can range from 0-2 with higher scores indicating higher levels of the factor. In the current sample, sibling relationships have moderate warmth, conflict, and rivalry. Lanthier and Stocker (2000) found mostly similar descriptive statistics for the ASRQ-S factors. For warmth, they reported a mean score of 3.19 (SD = .93), for conflict they reported a mean score of 2.20 (SD = .77), and for rivalry they reported a mean score of .80 (SD = .59). Descriptive statistics for warmth and rivalry were similar, however, the mean and standard deviation for conflict was higher in the current study's sample.

The descriptive statistics for mental health outcomes, or the DASS-21, had a mean score of 57.01 (SD = 33.16). For depression outcomes, the mean score was 9.58 (SD = 6.21). According to Lovibond and Lovibond (1995), scores of 7-10 indicate a moderate level of depression. For anxiety outcomes the mean score was 8.89 (SD = 6.21). According to Lovibond and Lovibond (1995), scores of 8-9 indicate severe anxiety. Lastly, for stress outcomes the mean score was 9.97 (SD = 5.49). According to Lovibond and Lovibond (1995), scores of 8-9 indicate mild stress and scores from 10-12 indicate moderate stress. This means that overall, this sample has mean scores indicating moderate depression, severe anxiety, and mild/moderate stress.

<u>Subscale</u>	<u>Mean</u>	<u>SD</u>	<u>α</u>	<u>Range</u>
Warmth	3.2	1.01	0.97	1 - 5
Conflict	2.85	.99	0.96	1 - 4.76
Rivalry	.81	.56	0.90	0 - 2
Avoidance	2.51	.72	0.77	1 - 5
Anxiety	3.3	.95	0.89	1 - 5

Developmental Trauma	5.49	5.45	0.90	0 - 24
Depression	9.58	6.21	0.94	0 - 21
Anxiety	8.98	5.83	0.91	0 - 21
Stress	9.97	5.49	0.90	0 - 21
Mental Health Total	57.07	33.16	0.97	0 - 122

Assumptions Testing

For the first two research questions, correlation analyses were required.

Assumptions for linearity, outliers, and normality were examined. Skewness and kurtosis were computed and examined. Skewness and kurtosis values ranging from -2 and +2 are considered acceptable (Lomax & Hahs-Vaughn, 2012). The range of skewness values in this data was 1.70 and -.58. The range of kurtosis values in this data was 2.69 to -1.45.

The kurtosis values for the trauma history questionnaire was slightly outside of the acceptable range, however, upon examining the rest of the assumptions, no violations were found. The kurtosis values were likely elevated for trauma history as the study sample targeted individuals who have experienced multiple traumas. This elevation is likely due to multiple participants having experienced a majority of these 24 traumatic events. More details of the descriptive statistics for the sample are discussed below.

Correlations among study variables are summarized in Table 2.

For the third research question, a simple regression analysis with a mediation model was run. Assumptions for independence, homogeneity of variance, normality, and linearity were assessed. To assess linearity, a scatterplot of mental health outcomes against developmental trauma history was plotted. Visual inspection of this scatterplot indicated that a linear relationship between the variables was likely, as the scatterplot did not look like a curve. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.63. There was homoscedasticity, as assessed by a visual inspection

of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normality probability plot. In addition, no outliers were found. Ultimately, assumptions for a regression model were upheld.

Research Question #1

1. To what extent are mental health outcomes explained by attachment style and sibling relationship quality?

Overall Mental Health Outcomes

The researcher hypothesized that attachment avoidance and attachment anxiety would both be positively correlated with poor mental health outcomes. In addition, the researcher hypothesized that warmth in sibling relationships would be negatively correlated with poor mental health outcomes, and that conflict and rivalry would be positively correlated with poor mental health outcomes. All correlations are reported in Table 3.

Pearson product-moment correlations were computed to assess the relationships among mental health outcomes and attachment styles, separately examining attachment avoidance and attachment anxiety. There was no statistically significant correlation between mental health outcomes and attachment avoidance, $r(488) = .07, p = .10$, with attachment avoidance explaining 1% of the variation in mental health outcomes. There was a statistically significant, large positive correlation between mental health outcomes and attachment anxiety, $r(488) = .58, p < .0005$, with attachment anxiety explaining 34% of the variation in mental health outcomes.

Pearson product-moment correlations were also computed to assess the relationships among mental health outcomes and sibling relationship quality, separately examining warmth, rivalry, and conflict. There was a statistically significant, moderate positive correlation between mental health outcomes and warmth, $r(488) = .30, p < .0005$, with warmth explaining 9% of the variation in mental health outcomes. There was a statistically significant, small positive correlation between mental health outcomes and rivalry, $r(488) = .13, p = .003$, with rivalry explaining 2% of the variation in mental health outcomes. There was a statistically significant, large positive correlation between mental health outcomes and conflict, $r(488) = .62, p < .0005$, with conflict explaining 38% of the variation in mental health outcomes.

In addition, the researcher was interested in examining relationships between each of the dimensions of mental health outcomes and attachment style and sibling relationship quality. Each of the three dimensions of the mental health outcomes assessment, depression, anxiety, and stress, were examined separately.

Depression

In addition to overall mental health outcomes, the researcher was interested in looking at the three specific mental health dimensions of the DASS-21, depression, anxiety, and stress. Regarding depression, the researcher hypothesized that attachment avoidance and attachment anxiety would both be positively correlated with depression. In addition, the researcher hypothesized that warmth in sibling relationships would be negatively correlated with depression, and that conflict and rivalry would be positively correlated with depression.

Pearson product-moment correlations were computed to assess the relationship between depression and attachment style, separately examining attachment avoidance and attachment anxiety. There was a statistically significant, small positive correlation between depression and attachment avoidance, $r(488) = .14, p = .002$, with attachment avoidance explaining 2% of the variation in depression. There was a statistically significant, large positive correlation between depression and attachment anxiety, $r(488) = .56, p < .0005$, with attachment anxiety explaining 31% of the variation in depression.

Pearson product-moment correlations were also computed to assess the relationship between depression and sibling relationship quality, separately examining warmth, rivalry, and conflict. There was a statistically significant, small positive correlation between depression and warmth, $r(488) = .25, p < .0005$, with warmth explaining 6% of the variation in depression. There was a statistically significant, small positive correlation between depression and rivalry, $r(488) = .12, p = .010$, with rivalry explaining 1% of the variation in depression. There was a statistically significant, large positive correlation between depression and conflict, $r(488) = .57, p < .0005$, with conflict explaining 33% of the variation in depression.

Anxiety

The researcher hypothesized that attachment avoidance and attachment anxiety would both be positively correlated with anxiety. In addition, the researcher hypothesized that warmth in sibling relationships would be negatively correlated with anxiety, and that conflict and rivalry would be positively correlated with anxiety.

Pearson product-moment correlations were computed to assess the relationship between anxiety and attachment style, separately examining attachment avoidance and

attachment anxiety. There was no statistically significant correlation between anxiety and attachment avoidance, $r(488) = .04, p = .388$, with attachment avoidance explaining 0.2% of the variation in anxiety. There was a statistically significant, large positive correlation between anxiety and attachment anxiety, $r(488) = .52, p < .0005$, with attachment anxiety explaining 27% of the variation in anxiety.

Pearson product-moment correlations were also computed to assess the relationship between anxiety and sibling relationship quality, separately examining warmth, rivalry, and conflict. There was a statistically significant, moderate positive correlation between anxiety and warmth, $r(488) = .36, p < .0005$, with warmth explaining 13% of the variation in anxiety. There was a statistically significant, small positive correlation between anxiety and rivalry, $r(488) = .12, p = .011$, with rivalry explaining 1% of the variation in anxiety. There was a statistically significant, large positive correlation between anxiety and conflict, $r(488) = .62, p < .0005$, with conflict explaining 38% of the variation in anxiety.

Stress

The researcher hypothesized that attachment avoidance and attachment anxiety would both be positively correlated with stress. In addition, the researcher hypothesized that warmth in sibling relationships would be negatively correlated with stress, and that conflict and rivalry would be positively correlated with stress.

Pearson product-moment correlations were computed to assess the relationship between stress and attachment style, separately examining attachment avoidance and attachment anxiety. There was no statistically significant correlation between stress and attachment avoidance, $r(488) = .026, p = .57$, with attachment avoidance explaining

0.07% of the variation in stress. There was a statistically significant, large positive correlation between stress and attachment anxiety, $r(488) = .56, p < .0005$, with attachment anxiety explaining 28% of the variation in stress.

Pearson product-moment correlations were also computed to assess the relationship between stress and sibling relationship quality, separately examining warmth, rivalry, and conflict. There was a statistically significant, small positive correlation between stress and warmth, $r(488) = .26, p < .0005$, with warmth explaining 7% of the variation in stress. There was a statistically significant, small positive correlation between stress and rivalry, $r(488) = .15, p = .001$, with rivalry explaining 2% of the variation in stress. There was a statistically significant, large positive correlation between stress and conflict, $r(488) = .56, p < .0005$, with conflict explaining 31% of the variation in stress.

Summary

To address the first research question, to what extent are mental health outcomes explained by attachment style and sibling relationship quality, the researcher hypothesized that attachment avoidance and attachment anxiety would both be positively correlated with poor mental health outcomes. This hypothesis was partially supported, as attachment anxiety was consistently found to be positively correlated with poor mental health outcomes, regardless of the scale used. In addition, the researcher hypothesized that warmth in sibling relationships would be negatively correlated with poor mental health outcomes, and that conflict and rivalry would be positively correlated with poor mental health outcomes. Unlike the hypothesis, warmth was found to have a moderate positive correlation with poor mental health outcomes. Conflict and rivalry were both found to have positive correlations with poor mental health outcomes, supporting the

researcher's hypothesis. These findings hold true for each of the other mental health outcome scales: depression, anxiety, and stress. The one exception was that regarding depression outcomes, the researcher also found that attachment avoidance was positively correlated with depression.

Table 3
Correlation Matrix Among Key Study Variables

<u>Scale</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
1 Developmental Trauma	1.00	-	-	-	-	-	-	-	-	-
2 Mental Health Outcomes	.32**	1.00	-	-	-	-	-	-	-	-
3 Attachment Avoidance	-.06	.07	1.00	-	-	-	-	-	-	-
4 Attachment Anxiety	.22**	.58**	-.02	1.00	-	-	-	-	-	-
5 Depression	.28**	.95**	.14**	.56**	1.00	-	-	-	-	-
6 Anxiety	.32**	.95**	.04	.52**	.84**	1.00	-	-	-	-
7 Stress	.30**	.94**	.03	.56**	.84**	.84**	1.00	-	-	-
8 Warmth	.17**	.30**	-.23**	.18**	.25**	.36**	.26**	1.00	-	-
9 Rivalry	.07	.13**	.00	.19**	.12**	.12**	.15**	-.19**	1.00	-
10 Conflict	.29**	.62**	-.03	.44**	.57**	.62**	.56**	.39**	.21**	1.00

Note. Correlation for all variables assessed ($N = 490$).

** $p < .01$

* $p < .05$

Research Question #2

2. To what extent are mental health outcomes explained by exposure to multiple developmental traumatic experiences?

For the second research question, the researcher hypothesized that poor mental health outcomes would be positively correlated to exposure to multiple developmental traumas. This hypothesis was supported.

Pearson product-moment correlations were computed to assess the relationship between mental health outcomes and exposure to multiple developmental traumatic experiences. There was a statistically significant, moderate positive correlation between mental health outcomes and exposure to multiple developmental traumatic experiences, $r(488) = .32, p < .0005$, with exposure to multiple developmental traumatic experiences explaining 10% of the variation in mental health outcomes.

In addition, the researcher examined the possible relationships between multiple developmental traumatic experiences with each of the three dimensions of mental health outcomes, depression, anxiety, and stress. There was a statistically significant, small positive correlation between depression and exposure to multiple developmental traumatic experiences, $r(488) = .28, p < .0005$, with exposure to multiple developmental traumatic experiences explaining 8% of the variation in depression. There was a statistically significant, moderate positive correlation between anxiety and exposure to multiple developmental traumatic experiences, $r(488) = .32, p < .0005$, with exposure to multiple developmental traumatic experiences explaining 10% of the variation in anxiety. There was a statistically significant, moderate positive correlation between stress and exposure to multiple developmental traumatic experiences, $r(488) = .30, p < .0005$, with

exposure to multiple developmental traumatic experiences explaining 9% of the variation in stress.

Research Question #3

3. To what extent does attachment style and sibling relationship quality mediate the exposure of multiple developmental traumatic experiences on mental health?

To investigate whether attachment style and sibling relationship quality mediated the mental health outcomes of multiple developmental traumatic experiences, including depression, anxiety, and stress outcomes, the researcher used a multiple mediation analysis. This multiple mediation analysis was performed using Hayes (2018) PROCESS macro. Hayes (2018) PROCESS macro allows researchers to select from various different models depending on the researcher's goals. For the purposes of this study, the researcher selected Model 4, which describes a simple mediation model. A simple mediation model is used to explore how a variable's effect on an outcome can be separated into direct and indirect effects that can be quantified using ordinary least squares regression (Hayes, 2018). Bootstrapping is used to create an empirically derived representation of the sampling distribution of the indirect effect. This empirical representation is used to create confidence intervals. Bootstrap confidence intervals better respect the irregularity of sampling distributions and are therefore more likely to be accurate (Hayes, 2018). By default, PROCESS produces bootstrap confidence intervals for indirect effects using 5,000 bootstrap samples (Hayes, 2018). A *p* value of .05 was set as the critical level for statistical significance for all analyses. All regression results are reported in Tables 4 and 5.

Overall Mental Health

Attachment style. To investigate whether attachment style mediated the mental health outcomes of multiple developmental traumatic experiences, a multiple mediation analysis was performed. The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate poor mental health outcomes. Evidence to support partial mediation was found.

The outcome variable for analysis was mental health outcomes. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The results from this regression model were found to be statistically significant. The simple regression model indicated that developmental trauma accounted for 5% of the variance in attachment anxiety ($F(1,488) = 25.59, p < .0005, R^2 = .05; B = .04, SE = .01, \beta = .22, 95\% CI [.02, .05]$). The other simple regression model indicated that developmental trauma did not statistically significantly account for variance in attachment avoidance. Barron and Kenny (1986) would argue that without developmental trauma and attachment avoidance being significantly related, there is no way to have a mediation effect. However, Hayes (2009) argues that it is not necessary for the predictor variable and mediator variable to be significantly related and that it is still possible to have a significant mediation model.

Results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, attachment anxiety, and attachment avoidance accounted for 38% of the variance in mental health outcomes ($F(3, 486) = 98.75$). Developmental trauma predicted mental health outcomes [$t(488) = 5.57, p <$

.0005, $B = 1.25$, $SE = .22$, $\beta = .20$]. Attachment anxiety predicted mental health outcomes [$t(488) = 14.51$, $p < .0005$, $B = 18.63$, $SE = 1.28$, $\beta = .53$]. Lastly, attachment avoidance predicted mental health outcomes [$t(488) = 2.71$, $p = .01$, $B = 4.45$, $SE = 1.64$, $\beta = .10$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of attachment avoidance and anxiety) on mental health outcomes was statistically significant, [$t(488) = 7.41$, $p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on mental health outcomes [$t(488) = 5.57$, $p < .0005$]. This significant direct effect indicates that developmental trauma and mental health outcomes are related independent of the mechanism of the mediators, attachment anxiety and attachment avoidance. Attachment avoidance and anxiety partially mediated the effect of developmental trauma on mental health outcomes, reducing the effect of developmental trauma on mental health outcomes by 36%. Attachment anxiety was the only statistically significant mediator.

Sibling relationship quality. To investigate whether sibling relationship quality mediated the mental health outcomes of multiple developmental traumatic experiences, a multiple mediation analysis was performed. The researcher hypothesized that warmth, lack of conflict, and lack of rivalry would mediate poor mental health outcomes. Evidence to support partial mediation was found.

The outcome variable for analysis was mental health outcomes. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The first simple regression model was found to be statistically significant. It indicated that developmental

trauma accounted for 3% of the variance in warmth ($F(1,488) = 14.74, p = .0001, R^2 = .03; B = .03, SE = .01, \beta = .17, 95\% CI [.02, .05]$). The second simple regression model was also found to be statistically significant. It indicated that developmental trauma accounted for 8% of the variance in conflict ($F(1,488) = 43.73, p < .0005, R^2 = .08; B = .05, SE = .01, \beta = .29, 95\% CI [.04, .07]$). The final simple regression model indicated that developmental trauma did not statistically significantly account for the variance in rivalry.

The results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, warmth, conflict, and rivalry accounted for 41% of the variance in mental health outcomes ($F(4, 485) = 82.70$). Developmental trauma predicted mental health outcomes [$t(488) = 4.06, p < .0005, B = .91, SE = .22, \beta = .15$]. Warmth did not predict mental health outcomes [$t(488) = 1.81, p = .07, B = 2.39, SE = 1.32, \beta = .07$]. Conflict predicted mental health outcomes [$t(488) = 13.17, p < .0005, B = 18.15, SE = 1.38, \beta = .54$]. Lastly, rivalry did not predict mental health outcomes [$t(488) = .56, p = .57, B = 1.25, SE = 2.21, \beta = .02$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of warmth, conflict, and rivalry) on mental health outcomes was statistically significant [$t(488) = 7.41, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on mental health outcomes [$t(488) = 4.06, p = .0001$]. This significant direct effect indicates that developmental trauma and mental health outcomes are related independent of the mechanism of the mediators, warmth, conflict, and rivalry. Warmth, conflict, and rivalry partially mediated the effect of developmental trauma on

mental health outcomes, reducing the effect of developmental trauma on mental health outcomes by 53%. Conflict was the only statistically significant mediator.

Depression

Attachment style. To investigate whether attachment style mediated the depression outcomes of multiple developmental traumatic experiences, a multiple mediation analysis was performed. The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the exposure of multiple developmental traumatic experiences on depression. Evidence to support a partial mediation was found.

The outcome variable for analysis was depression. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The results from the simple regression model were found to be statistically significant. The simple regression model indicated that developmental trauma accounted for 5% of the variance in attachment anxiety ($F(1,488) = 25.59, p < .0005, R^2 = .05; B = .04, SE = .01, \beta = .22, 95\% CI [.02, .05]$). The other simple regression model indicated that developmental trauma did not statistically significantly account for variance in attachment avoidance.

Results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, attachment anxiety, and attachment avoidance accounted for 36% of the variance in depression ($F(3, 486) = 91.01$). Developmental trauma predicted depression [$t(488) = 4.68, p < .0005, B = .20, SE = .04, \beta = .17$]. Attachment anxiety predicted depression [$t(488) = 13.97, p < .0005, B = 3.41, SE = .24, \beta = .52$]. Lastly, attachment avoidance predicted depression [$t(488) = 4.36, p < .0005, B = 1.36, SE = .31, \beta = .16$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of attachment avoidance and anxiety) on depression was statistically significant [$t(488) = 6.48, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on depression [$t(488) = 4.68, p < .0005$]. This significant direct effect indicates that developmental trauma and depression are related independent of the mechanism of the mediators, attachment anxiety and attachment avoidance. Attachment avoidance and anxiety partially mediated the effect of developmental trauma on depression, reducing the effect of developmental trauma on depression by 38%. Attachment anxiety was the only statistically significant mediator.

Sibling relationship quality. To investigate whether sibling relationship quality mediated depression outcomes, a multiple mediation analysis was performed. The researcher hypothesized that warmth, lack of conflict, and lack of rivalry would mediate exposure to multiple developmental traumatic experiences on depression. Evidence to support a partial mediation was found.

The outcome variable for analysis was depression. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The first simple regression model was found to be statistically significant. It indicated that developmental trauma accounted for 3% of the variance in warmth ($F(1,488) = 14.74, p = .0001, R^2 = .03; B = .03, SE = .01, \beta = .17, 95\% CI [.02, .05]$). The second simple regression model was also found to be statistically significant. It indicated that developmental trauma accounted for 8% of the variance in conflict ($F(1,488) = 43.73, p < .0005, R^2 = .08; B = .05, SE = .01, \beta = .29,$

95% CI [.04, .07]). The final simple regression model indicated that developmental trauma did not statistically significantly account for the variance in rivalry.

The results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, warmth, conflict, and rivalry accounted for 34% of the variance in depression ($F(4, 485) = 61.61$). Developmental trauma predicted depression [$t(488) = 3.31, p < .0005, B = .15, SE = .26, \beta = .13$]. Warmth did not predict depression [$t(488) = .48, p = .63, B = .13, SE = .26, \beta = .02$]. Conflict predicted depression [$t(488) = 12.03, p < .0005, B = 3.28, SE = .27, \beta = .52$]. Lastly, rivalry did not predict depression [$t(488) = .01, p = .99, B = .00, SE = .44, \beta = .00$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of warmth, conflict, and rivalry) on depression was statistically significant [$t(488) = 6.48, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on depression [$t(488) = 3.31, p = .0010$]. This significant direct effect indicates that developmental trauma and depression are related independent of the mechanism of the mediators, warmth, conflict, and rivalry. Warmth, conflict, and rivalry partially mediated the effect of developmental trauma on depression, reducing the effect of developmental trauma on depression by 56%. Conflict was the only statistically significant mediator.

Anxiety

Attachment style. To investigate whether attachment style mediated anxiety outcomes, a multiple mediation analysis was performed. The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the exposure to

multiple developmental traumatic experiences on anxiety. Evidence to support a partial mediation was found.

The outcome variable for analysis was anxiety. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The results from the simple regression model were found to be statistically significant. The simple regression model indicated that developmental trauma accounted for 5% of the variance in attachment anxiety ($F(1,488) = 25.59, p < .0005, R^2 = .05; B = .04, SE = .01, \beta = .22, 95\% CI [.02, .05]$). The other simple regression model indicated that developmental trauma did not statistically significantly account for variance in attachment avoidance.

Results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, attachment anxiety, and attachment avoidance accounted for 32% of the variance in anxiety ($F(3, 486) = 75.83$). Developmental trauma predicted anxiety [$t(488) = 5.63, p < .0005, B = .23, SE = .04, \beta = .22$]. Attachment anxiety predicted anxiety [$t(488) = 12.35, p < .0005, B = 2.92, SE = .24, \beta = .47$]. Lastly, attachment avoidance did not predict anxiety [$t(488) = 1.65, p = .10, B = .50, SE = .30, \beta = .06$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of attachment avoidance and anxiety) on anxiety was statistically significant [$t(488) = 7.44, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on anxiety [$t(488) = 5.63, p < .0005$]. This significant direct effect indicates that developmental trauma and anxiety are related independent of the

mechanism of the mediators, attachment anxiety and attachment avoidance. Attachment avoidance and anxiety partially mediated the effect of developmental trauma on anxiety, reducing the effect of developmental trauma on anxiety by 32%. Attachment anxiety was the only statistically significant mediator.

Sibling relationship quality. To investigate whether sibling relationship quality mediated anxiety outcomes, a multiple mediation analysis was performed. The researcher hypothesized that warmth, lack of conflict, and lack of rivalry would mediate the exposure to multiple developmental traumatic experiences on anxiety. Evidence to support partial mediation was found.

The outcome variable for analysis was anxiety. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The first simple regression model was found to be statistically significant. It indicated that developmental trauma accounted for 3% of the variance in warmth ($F(1,488) = 14.74, p = .0001, R^2 = .03; B = .03, SE = .01, \beta = .17, 95\% CI [.02, .05]$). The second simple regression model was also found to be statistically significant. It indicated that developmental trauma accounted for 8% of the variance in conflict ($F(1,488) = 43.73, p < .0005, R^2 = .08; B = .05, SE = .01, \beta = .29, 95\% CI [.04, .07]$). The final simple regression model indicated that developmental trauma did not statistically significantly account for the variance in rivalry.

The results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, warmth, conflict, and rivalry accounted for 42% of the variance in anxiety ($F(4, 485) = 87.88$). Developmental trauma predicted anxiety [$t(488) = 4.00, p < .0005, B = .16, SE = .04, \beta = .14$]. Warmth predicted anxiety

[$t(488) = 3.56, p < .0005, B = .81, SE = .23, \beta = .14$]. Conflict predicted anxiety [$t(488) = 12.77, p < .0005, B = 3.06, SE = .24, \beta = .52$]. Lastly, rivalry did not predict anxiety [$t(488) = .57, p = .57, B = .22, SE = .38, \beta = .02$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of warmth, conflict, and rivalry) on anxiety was statistically significant [$t(488) = 7.44, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on anxiety [$t(488) = 4.00, p = .0001$]. This significant direct effect indicates that developmental trauma and anxiety are related independent of the mechanism of the mediators, warmth, conflict, and rivalry. Warmth, conflict, and rivalry partially mediated the effect of developmental trauma on anxiety, reducing the effect of developmental trauma on anxiety by 56%. Warmth and conflict were the only statistically significant mediators.

Stress

Attachment style. To investigate whether attachment style mediated the exposure of stress outcomes, a multiple mediation analysis was performed. The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the exposure to multiple developmental traumatic experiences on stress. Evidence to support a partial mediation was found.

The outcome variable for analysis was stress. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The results from the simple regression model were found to be statistically significant. The simple regression model indicated

that developmental trauma accounted for 5% of the variance in attachment anxiety ($F(1,488) = 25.59, p < .0005, R^2 = .05; B = .04, SE = .01, \beta = .22, 95\% CI [.02, .05]$).

The other simple regression model indicated that developmental trauma did not statistically significantly account for variance in attachment avoidance.

Results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, attachment anxiety, and attachment avoidance accounted for 35% of the variance in stress ($F(3, 486) = 85.60$).

Developmental trauma predicted stress [$t(488) = 5.06, p < .0005, B = .19, SE = .04, \beta = .19$]. Attachment anxiety predicted stress [$t(488) = 13.68, p < .0005, B = 2.98, SE = .22, \beta = .52$]. Lastly, attachment avoidance did not predict stress [$t(488) = 1.30, p = .19, B = .36, SE = .28, \beta = .05$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of attachment avoidance and anxiety) on stress was statistically significant [$t(488) = 7.02, p < .0005$]. Partitioning the total effects model resulted in a direct effect of developmental trauma on stress [$t(488) = 5.06, p < .0005$]. This significant direct effect indicates that developmental trauma and stress are related independent of the mechanism of the mediators, attachment anxiety and attachment avoidance. Attachment avoidance and anxiety partially mediated the effect of developmental trauma on stress, reducing the effect of developmental trauma on stress by 35%. Attachment anxiety was the only statistically significant mediator.

Sibling relationship quality. To investigate whether sibling relationship quality mediated stress outcomes, a multiple mediation analysis was performed. The researcher

hypothesized that warmth, lack of conflict, and lack of rivalry would mediate the exposure to multiple developmental traumatic experiences on stress. Evidence to support a partial mediation was found.

The outcome variable for analysis was stress. The predictor variable for analysis was exposure to developmental traumatic experiences. First the mediators were set as outcome variables to test for potential causality. The first simple regression model was found to be statistically significant. It indicated that developmental trauma accounted for 3% of the variance in warmth ($F(1,488) = 14.74, p = .0001, R^2 = .03; B = .03, SE = .01, \beta = .17, 95\% CI [.02, .05]$). The second simple regression model was also found to be statistically significant. It indicated that developmental trauma accounted for 8% of the variance in conflict ($F(1,488) = 43.73, p < .0005, R^2 = .08; B = .05, SE = .01, \beta = .29, 95\% CI [.04, .07]$). The final simple regression model indicated that developmental trauma did not statistically significantly account for the variance in rivalry.

The results from the full multiple regression model were statistically significant. The results indicated that developmental trauma, warmth, conflict, and rivalry accounted for 34% of the variance in stress ($F(4, 485) = 62.63$). Developmental trauma predicted stress [$t(488) = 3.91, p < .0005, B = .15, SE = .04, \beta = .15$]. Warmth did not predict stress [$t(488) = 1.11, p = .27, B = .25, SE = .23, \beta = .05$]. Conflict predicted stress [$t(488) = 11.38, p < .0005, B = 2.73, SE = .24, \beta = .49$]. Lastly, rivalry did not predict stress [$t(488) = 1.04, p = .30, B = .40, SE = .39, \beta = .04$].

The multiple mediation model was found to be statistically significant. The total effect of developmental trauma (direct effect for developmental trauma + indirect effects of warmth, conflict, and rivalry) on stress was statistically significant [$t(488) = 7.02, p <$

.0005]. Partitioning the total effects model resulted in a direct effect of developmental trauma on stress [$t(488) = 3.91, p = .0001$]. This significant direct effect indicates that developmental trauma and stress are related independent of the mechanism of the mediators, warmth, conflict, and rivalry. Warmth, conflict, and rivalry partially mediated the effect of developmental trauma on anxiety, reducing the effect of developmental trauma on anxiety by 48%. Conflict was the only statistically significant mediator.

Summary

The third and final research question examined the extent to which attachment style and sibling relationship quality mediate the mental health outcomes of multiple developmental traumatic experiences. The researcher hypothesized that attachment style and sibling relationship quality would mediate poor mental health. The researcher found that attachment anxiety and attachment avoidance partially mediated the effect of developmental trauma on mental health outcomes by 36%, although attachment anxiety was the only statistically significant mediator. In addition, the researcher found that warmth, conflict, and rivalry partially mediated the effect of developmental traumatic experiences on mental health outcomes by 53%, although conflict was the only statistically significant mediator. These findings hold true for each of the other mental health outcome scales: depression, anxiety, and stress. The one exception was anxiety outcomes: the researcher found that warmth as well as conflict was a statistically significant mediator.

Table 4

Results of Multiple Hierarchical Regression Analyses using THQ and Attachment Style to Predict Mental Health Outcomes

<u>Criterion Variables</u>	<u>THQ</u>				<u>ECR-Anxiety</u>				<u>ECR-Avoidance</u>			
	<u>B</u>	<u>SE B</u>	<u>β</u>	<u><i>t</i></u>	<u>B</u>	<u>SE B</u>	<u>β</u>	<u><i>t</i></u>	<u>B</u>	<u>SE B</u>	<u>β</u>	<u><i>t</i></u>
DASS-21 - Overall	.20	.22	1.25	5.57**	.53	1.28	18.63	14.51**	.10	1.64	4.45	2.71**
DASS-21- Depression	.17	.04	.20	4.68**	.52	.24	3.41	13.97**	.16	.31	1.36	4.36**
DASS-21- Anxiety	.22	.04	.23	5.63**	.47	.24	2.92	12.35**	.06	.30	.50	1.65
DASS-21 - Stress	.19	.04	.19	5.06**	.52	.22	2.98	13.68**	.05	.28	.36	1.30

Note. ** $p < .01$

Table 5

Results of Multiple Hierarchical Regression Analyses using THQ and Sibling Relationship Quality to Predict Mental Health Outcomes

<u>Criterion Variables</u>	<u>THQ</u>				<u>ASRQ-Warmth</u>				<u>ASRQ-Conflict</u>				<u>ASRQ-Rivalry</u>			
	<u>B</u>	<u>SE</u> <u>B</u>	<u>β</u>	<u>t</u>	<u>B</u>	<u>SE</u> <u>B</u>	<u>β</u>	<u>t</u>	<u>B</u>	<u>SE</u> <u>B</u>	<u>β</u>	<u>t</u>	<u>B</u>	<u>SE</u> <u>B</u>	<u>β</u>	<u>t</u>
DASS-21 - Overall	.15	.22	.91	4.06*	.07	1.32	2.39	1.81	.54	1.38	18.15	13.17**	.02	2.21	1.25	.56
DASS-21- Depression	.13	.04	.15	3.31*	.02	.26	.13	.48	.52	.27	3.28	12.03**	.00	.44	.00	.01
DASS-21 - Anxiety	.14	.04	.16	4.00*	.14	.23	.81	3.56*	.52	.24	3.06	12.77**	.02	.38	.22	.57
DASS-21 - Stress	.15	.04	.15	3.91*	.05	.23	.25	1.11	.49	.24	2.73	11.38**	.04	.39	.40	1.04

Note. ** $p < .01$

Supplemental Analyses

Additional supplemental analyses of the data were conducted to better understand the sample as well as to preliminarily examine areas for future research. To start, the researcher wanted to compare mean scores on the DASS-21 between the two largest reported ethnic groups in this sample, white/Caucasian and Asian participants. There were 226 or 54.3% of participants who identified as white/Caucasian and 159 or 32.4% of participants who identified as Asian. The mean score on the DASS-21 for the white/Caucasian participants was 49.36 (SD = 32.11) and the mean score on the DASS-21 for Asian participants was 71.39 (SD = 29.53). As discussed earlier, the mean score reported for the entire sample was 57.01 (SD = 33.16) and the highest possible score on the DASS-21 is 126. This shows the higher mental health outcomes in the Asian sample ($p < .01$), which supports the notion of future research further exploring possible cultural and ethnic differences in processing of trauma and mental health outcomes.

The researcher was also interested to see if there were any differences between the different types of trauma experienced by participants—experiences such as crime, general disaster, physical or sexual. The researcher believed that the traumas experienced of a physical and sexual nature would be the most highly correlated with mental health outcomes, or the DASS-21. In this sample, 53.9% of participants endorsed one or more physical or sexual trauma and 36.1% of participants endorsed two or more physical or sexual traumas. Physical and sexual experiences had a statistically significant low correlation with the DASS-21, $r = .196$. In this sample, 76.1% of participants endorsed one or more general disaster trauma experiences, and 56.5% of the sample endorsed two or more general disaster trauma experiences. General disaster trauma experiences also

had a statistically significant low correlation with the DASS-21, $r = .272$. Finally, 60.6% of participants reported experiencing one or more crime related trauma, and 37.7% of participants reported experiencing two or more crime related traumas. Crime related trauma had the highest correlation of these three, however it was still only a statistically significant moderate correlation, $r = .374$, ($p < .05$).

The researcher was also interested if there was any association between age and trauma. The researcher found a statistically significant low negative correlation between age and trauma, $r = -.211$, ($p < .05$). This means that in this sample, the older the participants the less trauma they reported. This could mean a variety of different things, such as when participants got older, they possibly normalized the trauma, perhaps they did not classify their experiences as trauma, or they potentially did not remember as much.

The researcher was also interested in examining and comparing the different age ranges in which the traumas occurred. In this dissertation, the researcher focused on traumas that occurred during early developmental periods, or zero to 20 years old. After this, the researcher split the sample up further into three different age ranges: childhood (zero-11 years old), adolescence (12-20 years old), and adulthood (21-72 years old). The researcher found that traumatic experiences reported in adulthood were not statistically significantly correlated to the DASS-21, $r = -.044$, ($p = .328$). Participants who experienced traumas in their adolescence had a statistically significant low positive correlation with the DASS-21, $r = .131$, ($p < .05$). However, participants who experienced traumatic experiences in their childhood had the highest correlation with the DASS-21, although it was still only a statistically significant moderate correlation, $r =$

.324, ($p < .05$). This provides further preliminary evidence that traumas occurring early in life have a stronger relationship to adult mental health outcomes.

The last area examined by the researcher was the differences between gender in sibling dyads. Posed as a question: was there a difference in mental health outcomes for male-male siblings versus female-male siblings versus female-female siblings? In this sample, 125 or 25.5% of participants were part of a male-male sibling dyad; 218 or 28.6% of participants were part of a mixed dyad, meaning one female and one male sibling; and 140 or 28.6% of participants were part of a female-female sibling dyad. The researcher believed that the female-female sibling dyad would report the best mental health outcomes, and for this sample this was true. The researcher examined mean scores on the DASS-21. For the male-male dyad the mean score on the DASS-21 was 63.50 (SD = 32.60). For the mixed gender dyad the mean score on the DASS-21 was 57.65 (SD = 32.78). Finally, for the female-female dyad the mean score on the DASS-21 was 50.20 (SD = 33.0). This means that in this sample, the male-male sibling dyads reported the poorest mental health outcomes and that the female-female sibling dyads reported the best mental health outcomes, ($p < .01$). Again, these findings are preliminary, but they provide further support that a difference between groups does exist and that this area requires more research.

Chapter V: Discussion

The primary goal of this study is to assess whether attachment style and sibling relationship quality can mediate the impact of developmental traumatic experiences on mental health outcomes. Few studies have examined the potential protective effects of attachment style and sibling relationships with respect to mental health, given exposures to developmental traumas. The current study is one of the first attempts to explicitly pursue this inquiry, by studying adults with exposures to developmental traumas. This section provides the researcher's interpretation of the data; discusses possible implications to practitioners and clients; identifies key limitations; and concludes with recommendations for future research.

Research Question #1

Warmth

The first research question examined the extent to which mental health outcomes were explained by attachment style and sibling relationship quality. The first hypothesis was that warmth in sibling relationships would be negatively correlated with poor mental health outcomes. However, unlike previous research, these results were not found. Instead, warmth was moderately positively correlated with mental health outcomes. This means that an increase in warmth was moderately related to an increase in poor mental health. An increase in warmth was moderately related to an increase in anxiety. There were small relations to increases in warmth, depression, and stress.

Unlike the current findings, previous research indicated that even with significant conflict, a presence of warmth was associated with fewer internalizing symptoms and less aggression (Buist & Vermande, 2014). In a study examining child siblings exposed to

trauma, researchers found that siblings receiving significant warmth and intimacy had less severe PTSD, depressive, and psychological distress symptoms (Peltonen, et al., 2010). Lanthier and Stocker (2000) discuss the descriptive statistics for the ASRQ-S factors. For warmth they reported a mean score of 3.19 (SD = .93). As stated in Chapter IV, the current study's descriptive statistics for warmth in sibling relationships was a mean score of 3.2 (SD = 1.01). The researcher expected to find large differences between the descriptive statistics of warmth relative to previous research, potentially explaining how warmth positively correlates to mental health outcomes. However, the descriptive statistics examined by Lanthier and Stocker (2000) and the current study were similar for warmth.

The researcher also wondered if there may be a connection between the amounts of warmth and conflict in sibling relationships, and how often the siblings saw each other in person. From the current sample, 42.9% of participants reported seeing their sibling in person weekly. Of the 42.9%, 15.1% of participants reported seeing their sibling daily. The researcher found a significant large positive correlation ($r = .53$) between warmth and how often siblings saw each other in person. In addition, the researcher found a significant moderate positive correlation ($r = .40$) between conflict and how often siblings saw each other in person. This means that the more siblings saw each other in person, the more warmth and conflict they reported in their sibling relationship. Although the present findings are not what was hypothesized, the researcher questions whether the impact of multiple developmental traumas on the sampled population exceeded any protective effects of warmth. In addition, understanding how much time the participant spends with their sibling may offer further insight as to the results on warmth are

different in the current study. Perhaps the sibling is a part of the trauma and spending time together brings up traumatic memories, or perhaps sibling relationships in highly traumatized individuals are more of a source of mental health problems rather than a buffer. Again, more research is needed to further understand if these findings are consistent.

Conflict

The second hypothesis was that conflict in sibling relationships would be positively correlated with poor mental health outcomes. The findings of this study support this hypothesis. An increase in conflict accounts for a large portion, 38%, of variability in poor mental health outcomes. Also, increases in conflict are related to increases in depression, anxiety, and stress. Research supports these findings that sibling conflict and hostility predict increases in internalizing symptoms (Dirks, et al., 2015). Additionally, research has found that conflict in sibling relationships is associated with increased children's anxiety, depressed mood, and delinquent behavior (Stocker, Burwell, & Briggs, 2002). In a study examining the original ASRQ, researchers found that adults with high scores on psychological functioning reported lower levels of conflict in sibling relationships than adults with worse mental health scores (Stocker, Lanthier, & Furman, 1997). Lanthier and Stocker (2000) reported the mean score for conflict in the ASRQ-S, ($M = 2.20$, $SD = .77$). The current study's mean and standard deviation for conflict were much higher, ($M = 2.85$, $SD = .99$), indicating a possible relationship between individuals who have experienced multiple traumas and higher levels of conflict in their relationship with their sibling. These findings serve as new evidence further supporting the literature,

as the sampled population is uniquely adults. They indicate that the effects of exposure to multiple developmental traumas on mental health outcomes could last beyond childhood.

Rivalry

The third hypothesis was that rivalry, or parental favoritism, would be positively correlated with poor mental health outcomes. In a previous study examining the impact of sibling relationships on children's mental health in a population exposed to trauma, researchers found that siblings who lacked rivalry in their relationships had less acute PTSD, psychological distress, and depressive symptoms (Peltonen, et al., 2010).

However, in the current research these findings were not replicated. The findings of the current research indicate that rivalry accounted for a small portion of variability in mental health outcomes. Specifically, an increase in rivalry between siblings was only slightly related to poor mental health outcomes. Similarly, there was only a small relation between an increase in rivalry in sibling relationships and an increase in depression, anxiety, and stress. Stocker, Lanthier, and Furman (1997) discussed the possibility that rivalry may be less salient in adulthood than in childhood because typically adults no longer live with each other or with their parents. The researcher compared the current study's descriptive statistics for rivalry between Lanthier and Stocker's (2000) findings. Lanthier and Stocker (2000) reported a rivalry mean score of .80 (SD = .59) and the current study reported a mean of .81 (SD = .56). As evident, the descriptive statistics between the two studies are similar. As part of the current study, the researcher conducted a correlation analysis of rivalry related to the age of participants, to potentially explain the lack of meaningful findings, but found no statistically significant correlation.

Attachment Avoidance

The fourth hypothesis was that attachment avoidance would be positively correlated with poor mental health outcomes. Previous research has illustrated the links between traumatic experiences and disruptions with secure attachment, which lead to insecure attachment styles (Kobak, Zajac, & Madsen, 2016; Stovall-McClough & Dozier, 2016). Specifically, the majority of individuals who experience chronic abuse form an insecure, disorganized, or dissociative attachment style (Anderson & Alexander, 1996; Liotti, 1999; Muller, et al., 2000). Understandably, experiencing complex traumas can lead to impaired attachment, which can manifest as trouble with boundaries, distrust and suspiciousness, interpersonal challenges, social isolation, challenges to being aware of other's emotional states, and challenges to understanding perspectives (Cook et al., 2005; Courtois & Ford, 2013; Herman, 1997). In addition, Dion, et al. (2019) found that child maltreatment was related to attachment anxiety, not attachment avoidance. These researchers hypothesized that a lack of association between attachment avoidance and psychological distress may be interpreted as a tendency to avoid or keep a safe distance from internal feelings (Dion, et al., 2019). Individuals who are high on attachment avoidance tend to be emotionally unavailable or unresponsive. As part of the current study, the researcher hypothesized that attachment avoidance would be positively correlated with poor mental health outcomes. But the findings did not support the researcher's hypothesis. The researcher found no significant relationship between attachment avoidance and mental health outcomes. In addition, there were no significant relationships between attachment avoidance and mental health outcomes of anxiety or stress. However, the researcher did find a small relationship between an increase in

attachment avoidance with an increase in depressive symptoms. The researcher wonders if there may be a relation between this attachment style and the way those participants answer on a self-report survey. Meaning, those participants who score high in attachment avoidance may not answer questions about themselves honestly and fully.

Attachment Anxiety

The fifth hypothesis for the first research question was that attachment anxiety would be positively correlated with poor mental health outcomes. The findings of the current study support the researcher's hypothesis as well as the existing literature. In this study, attachment anxiety accounted for a large portion of variability in poor mental health outcomes. Similarly, there was a large relationship between an increase in attachment anxiety and an increase in depression, anxiety, and stress. As discussed above, exposures to multiple developmental traumas can lead to compromised relationships and attachment (Cook et al., 2005; Courtois & Ford, 2013; Herman, 1997). Previous research has examined the relationship between trauma and insecure attachment styles, as well as children's abilities to manage their psychological distress and emotional dysregulation (Muller, et al., 2000; Pearlman & Courtois, 2005). An individual with attachment anxiety is an individual who was preoccupied with fear, a person needing constant reassurance, in part because of their own self-doubts. This is understandable as research shows that trauma and insecure attachment can have a serious impact on development, specifically identity formation, affective emotional and somatic competence and regulation, and the ability to relate to others (Muller, et al., 2000; Pearlman & Courtois, 2005). In addition, research shows that when attachment is severely disrupted, this can lead to long-term risk of physical disease and psychosocial dysfunction, such as stress, inability to regulate

emotions without help from others, and altered help-seeking (Courtois & Ford, 2013; Herman, 1997; Kobak, et al., 2016). Therefore, for the current study, the researcher believed that individuals with attachment anxiety would be positively correlated with poor mental health outcomes. These findings serve as new evidence further supporting the existing literature, showing that impacts to poor mental health outcomes follow participants into adulthood.

Research Question #2

The second research question examined the extent to which mental health outcomes were explained by exposure to multiple developmental traumatic experiences. The findings of the current study found a moderate relationship between an increase in exposure to multiple developmental traumas and poor mental health outcomes. There were moderate relationships between increases in exposure to multiple developmental traumas and an increase in anxiety and stress. In addition, there was a small relationship between an increase in exposure to multiple developmental traumas and an increase in depression. These findings are supported by existing research which has found that exposure to multiple traumas are often associated with depressive disorders, affect regulation, and anxiety (Briere & Scott, 2015). The existing research indicates that children with histories of complex traumas are at a greater risk for internalizing behavior problems and more mental health problems, both as children and as adults (Coley, Kull, & Carrano, 2014; Greeson et al., 2011; Taillieu & Brownridge, 2013). It also indicates that adults with repeated childhood victimizations have more severe and negative outcomes (Marx, Heidt, & Gold, 2005). Research has established relationships between exposure to violence and mental health problems such as PTSD, depression and anxiety,

and other symptoms of clinical distress (Courtois & Ford, 2013; Gregorowski & Seedat, 2013). In addition, exposure to multiple traumas are often associated with depressive disorders, personality-level disorders, impulsivity, premorbid or comorbid anxiety, dissociation, and substance use (Briere & Scott, 2015).

Building on the existing literature, the researcher hypothesized that poor mental health outcomes would be positively correlated to exposure to multiple developmental traumatic experiences. Findings indicated that exposure to multiple developmental traumatic experiences accounted for a moderate portion of variability in poor mental health outcomes. These findings help strengthen existing literature that discusses the long-term impacts of exposure to multiple developmental traumas on mental health outcomes in adults.

Research Question #3

The third research question examined the extent to which attachment style and sibling relationship quality mediated the exposure of multiple developmental traumatic experiences on mental health outcomes. In addition to overall mental health outcomes, the researcher was also interested in the extent to which attachment style and sibling relationship quality mediated the exposure of multiple developmental traumatic experiences on depression, anxiety, and stress separately—to see if there were unique patterns of prediction.

Overall Mental Health Outcomes

The first hypothesis was that low attachment avoidance and low attachment anxiety would mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes. Attachment anxiety and attachment avoidance partially mediated

the effect of developmental trauma on mental health outcomes. Specifically, attachment anxiety and attachment avoidance reduced the effect of developmental trauma on mental health outcomes by 36%. Similar to other findings in this study, attachment anxiety was the only statistically significant mediator. The literature has established a link between exposure to multiple traumas and insecure attachment styles (Anderson & Alexander, 1996; Briere & Scott, 2015; Stovall-McClough & Dozier, 2016). Researchers have found that exposure to multiple traumas leads to poor mental health outcomes (Coley, Jull, & Carrano, 2014; Taillieu & Brownridge, 2013). They have also found that insecure attachment styles are related to poor mental health outcomes (Courtois & Ford, 2013; Herman, 1997; Kobak, et al., 2016). Given the existing literature, the researcher hypothesized that attachment avoidance and attachment anxiety would mediate the exposure of multiple developmental traumas on poor mental health outcomes. The mediation results emphasize the significance of attachment style on mental health outcomes—particularly, the impact of attachment anxiety on adults who have had exposures to multiple developmental traumas. Similar to the current findings, Dion, et al. (2019) found that child maltreatment was related to attachment anxiety, not attachment avoidance. In addition, they found that attachment anxiety was a mediator between child maltreatment and psychological adaptation (Dion, et al., 2019).

The second hypothesis was that warmth, lack of conflict, and lack of rivalry in sibling relationships would mediate the exposure of multiple developmental traumatic experiences on poor mental health outcomes. The findings indicated that warmth, conflict, and rivalry partially mediated the effect of developmental trauma on mental health outcomes. Specifically, warmth, conflict, and rivalry reduced the effect of

developmental trauma on mental health outcomes by 53%. However, similar to the study's other findings, conflict was the only statistically significant mediator of these effects. This finding is different from previous research conducted by Peltonen, Qouta, Sarraj, and Punamaki (2010). Previous research has examined how war-related traumatic events impacted sibling relationships and how those relationships were associated with children's mental health (Peltonen, et al., 2010). Researchers found that siblings who had substantial intimacy and warmth and lacked rivalry in their relationship had less severe PTSD, depressive, and psychological distress symptoms (Peltonen, et al., 2010). In their study, rivalry was the only statistically significant mediator (2010). Because there are limited studies that examine sibling relationship quality, further research is needed to establish consistency in the findings. The findings of the current study indicate that in conditions of exposure to multiple developmental traumas where poor mental health outcomes are at risk, sibling relationship quality is extremely important. The mediation results highlight the significance of sibling relationships, particularly the importance of conflict in sibling relationships, in adults who have exposure to multiple developmental traumas. This illustrates how cherishing sibling relationships, especially when exposed to multiple developmental traumas, can be critical, and failure to do so can seriously interfere with long-term mental health outcomes. Specifically, these findings demonstrate how growing up with low conflict sibling relationships might be particularly beneficial in times of trauma and stress.

Depression Outcomes

The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the exposure of multiple developmental traumatic experiences on

depression. Attachment anxiety and attachment avoidance partially mediated the effect of developmental trauma on depression by 38%. Additionally, attachment anxiety was the only statistically significant mediator.

The researcher also hypothesized that warmth, lack of conflict, and lack of rivalry in sibling relationships would mediate the exposure of multiple developmental traumatic experiences on depression. As with the findings for overall mental health outcomes, warmth, conflict, and rivalry partially mediated the effect of developmental trauma on depression by 56%. Additionally, conflict was the only statistically significant mediator of these effects.

The current findings indicate that in conditions of exposure to multiple developmental traumas where there is a risk of depression, attachment style and sibling relationship quality are important. The mediation results emphasize the significance of attachment style and sibling relationship quality, particularly the impact of anxious attachment and conflict in sibling relationships, for adults who have exposure to multiple developmental traumas.

Anxiety Outcomes

The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the exposure of multiple developmental traumatic experiences on anxiety. As with overall mental health outcomes and depression outcomes, attachment anxiety and attachment avoidance partially mediated the effect of developmental trauma on anxiety by 32%. Similarly, attachment anxiety was the only statistically significant mediator.

In addition, the researcher hypothesized that warmth, lack of conflict, and lack of rivalry in sibling relationships would mediate the exposure of multiple developmental traumatic experiences on anxiety. These findings were similar to those of overall mental health outcomes and depression outcomes in that they indicated that warmth, conflict, and rivalry partially mediated the effect of developmental trauma on anxiety by 56%. However, unlike the rest of the mediation models, warmth and conflict were both statistically significant mediators.

These findings indicate that in conditions of exposure to multiple developmental traumas where outcomes of anxiety are likely, attachment style and sibling relationship quality are important. The mediation results emphasize the impact of anxious attachment style and sibling relationships, particularly the impact of warmth and conflict in sibling relationships, for adults who have had exposures to multiple developmental traumas.

Stress Outcomes

The researcher hypothesized that low attachment avoidance and low attachment anxiety would mediate the stress outcomes of multiple developmental traumatic experiences. As with previous findings, attachment anxiety and attachment avoidance partially mediated the effect of developmental trauma on stress by 35%. In addition, attachment anxiety was the only statistically significant mediator.

Lastly, the researcher hypothesized that warmth, lack of conflict, and lack of rivalry in sibling relationships would mediate the exposure of multiple developmental traumatic experiences on stress. The findings of the study indicated that warmth, conflict, and rivalry partially mediated the effect of developmental trauma on stress by 48%. However,

similar to other findings in this study, conflict was the only statistically significant mediator of these effects.

These findings indicate that in conditions of exposure to multiple developmental traumas where outcomes of stress are likely, attachment style and sibling relationship quality are extremely important. The mediation results highlight the significance of attachment style and sibling relationship quality, particularly the impact of anxious attachment and conflict in sibling relationships, for adults who have exposure to multiple developmental traumas.

Summary

As a whole, these findings serve as evidence that sibling relationship quality and attachment style can influence the overall mental health impacts of exposure to multiple developmental traumas—specifically, impacts to depression, anxiety, and stress. While some findings, such as the lack of evidence for warmth, rivalry, and attachment avoidance, challenge the researcher’s intuitions, other findings have potential to increase the efficacy of practitioners who support individuals with exposure to multiple developmental traumas. Attachment style and sibling relationship quality can serve as resources to mediate negative mental health outcomes. The mediation results highlight the impact of attachment style and sibling relationship quality in adults who have had exposures to multiple developmental traumatic experiences reducing the impact of trauma by 32 to 56 percent. This shows how critical it is to promote healthy attachment and focus on reducing conflict in sibling relationships when exposed to multiple developmental traumas. A failure to do so may seriously interfere with good adjustment and long-term mental health outcomes.

Limitations

Online Survey

As stated previously, this study is a self-selection study administered via the internet. Not only are self-selection studies limited in terms of the types of participants they attract, but administration online could further limit generalizability. Also, recruitment for this study was carried out using Amazon Mechanical Turk, which provides monetary incentive upon completion of studies. Again, this could limit the type of participant taking the study, but the incentive provided was very small. Another potential limitation for administering this study online was the risk of being hacked and artificial intelligence (AI) completing the study instead of real humans. To account for this, the researcher included various validity check questions in the survey. Not only did this help to make sure human participants were reading the questions and paying attention, but this type of logic would be hard for most AI to navigate. There is still the risk that a more advanced AI was able to take this survey undetected, however, because of the steps taken, the researcher believes it was not likely to have occurred.

Measures

As stated, this study is limited by its use of self-report measures exclusively. Using only self-report measures leaves the data exposed to potential interpretation errors by participants as well as participants not being accurate in self-judgments. Additionally, because these topics are sensitive, even though the study is completely anonymous, participants may not feel comfortable fully or accurately disclosing all relevant information. One way to address this limitation in future research would be to add a

social desirability measure. This would allow researchers to better understand the extent to which participants are answering in a way they believe to be favorable by others.

A further limitation of these measures, specifically the THQ, is that it is asking about traumatic events retrospectively. Not only are these measures asking about sensitive topics, but they also ask about events that may have happened long ago. Additionally, memories of traumatic events may be fragmented and incomplete, as disassociation is a common result of exposure to trauma. While retrospective data is useful, research on using retrospective data with physical, emotional, and sexual trauma has shown that there can be variability and conclusions that are not always consistent (Prino, Longobardi, & Settanni, 2018). In another study, Hardt and Rutter (2004) analyzed the validity of adult retrospective reports of adverse childhood experiences. They found that when evidence indicates that abuse or neglect is retrospectively reported, it should be taken seriously, as these positive reports are likely to be correct (Hardt & Rutter, 2004). The main concern that these researchers noted was that a third of individuals do not report the occurrence of serious abuse or neglect specifically when they are asked about it in adulthood (Hardt & Rutter, 2004).

Another potential limitation of this study is the possible cross contamination between the measurement of attachment anxiety in the ECR-12 and anxiety outcomes in the DASS-21. In the future, the researcher would recommend adding a measure of neuroticism to address this possible cross contamination. A final limitation is that the current research did not collect information about other siblings. This would be an area to include in future research to not only better understand participants and their relationships, but also more information about their family environments.

Recommendations for Future Research

This study was one of the firsts of its kind. It contributed to the literature by introducing a new perspective, the potential mediating effects of attachment style and sibling relationships on poor mental health outcomes for individuals who have been exposed to multiple developmental traumas. In addition, this study examined participants as adults, which adds evidence to the potential long-term impacts of these developmental traumas on mental health outcomes. As this is new territory, the researcher recognizes the need for others to replicate the findings associated with the study's research questions. Besides replicating the current study in its existing format, the researcher believes using other formats of distribution would be helpful in increasing the generalizability of the findings. As this study used an online, self-selection, monetary incentive recruitment strategy, the researcher believes branching out into other methods of data collection could further the understanding of these findings, as not everyone has access or the ability to navigate this type of online study. For example, surveys could be administered in person with recruitment occurring in community-based settings, such as mental health agencies, community centers, schools or colleges, and other shared areas where individuals may congregate. In addition, future research could utilize a mixed-methods approach, combining an online or in person survey with follow up interviews to further understand participants' experiences and relationships. Another potential area for exploration in future research could be attempting to get longitudinal data, which would deal with the retrospection problem for the trauma measurement. While this presents challenges, being able to track mental health outcomes over periods of time would allow for a deeper and

more confident understanding of the long-term impacts of multiple developmental traumas.

In addition, the researcher believes that future studies would benefit from collecting information on not only the participant, but their sibling as well. Not only does this increase the information and validity of the data about the sibling relationships, but it would provide researchers with a more well-rounded view of the sibling. In addition, by collecting information from the sibling, the researcher could also inquire about the sibling's experiences with trauma, specifically multiple developmental traumas.

Researchers would not only have access to data on whether the siblings were exposed to traumas, but also whether those traumas were the same between siblings. As siblings tend to share environments, and 95.5% of study participants reported growing up with this sibling, there is a potential increased likelihood of overlap in traumatic exposures. Future research could take this a step further and use this opportunity to learn more about the environment in which the participant and sibling grew up, and what their community looked like. This could help further understand other confounding variables that impact mental health outcomes specifically in relation to multiple developmental traumas. In addition, researchers could use this opportunity to examine cross-cultural differences and potential differences in long term outcomes. These cross-cultural differences could include, but are not limited to, better understanding the impact of sibling relationships in different cultures, processing of developmental traumatic experiences across different cultures, and the potential mediating impact of these sibling relationship and attachment styles across different cultures.

Another interesting area to explore in future research could be to examine the different types of developmental traumas experienced, specifically those of an interpersonal nature versus not of an interpersonal nature. This would not only add to existing research on understanding the long-term impacts of interpersonal traumas, but it would also expand the research base. Regarding interpersonal trauma, understanding who perpetrated these traumas and the differences in those potential long-term mental health outcomes could be extremely informative. In addition, by collecting responses from both the participant and their sibling, researchers could understand the potential impact of a shared environment. *Were both siblings victimized? Did the siblings find support in one another? Did either of those experiences change the long-term impacts on mental health outcomes?* These are just a few potential directions this particular research area could examine. Future research could also further examine the relationships and impacts of other variables such as race/ethnicity, culture, gender, sex, and education level, to name a few. This study had many strengths and it allowed for exploration in an area that has not been deeply researched, however this leaves many opportunities for future research to develop and expand on these areas.

Implications for Practice

Most people will be exposed to at least one sort of trauma in their lifetime. Of those people, more than two thirds of children report experiencing at least one traumatic event by the age of 16 (SAMHSA, 2017). As the ACEs study highlights, 37.9% of individuals were exposed to two or more adverse childhood experiences (SAMHSA, 2017). Gaining a deeper understanding of the long-term consequences of these traumas is critical.

Understanding these consequences as well as potential protective and mitigating factors can make a huge difference in the lives of clients receiving counseling.

Regarding traumas that occur in childhood, there is considerable research that focuses on the immediate physical and mental health outcomes of those traumas. However, there is not as much research that focuses on the long-term consequences of these traumas and how these developmental traumatic experiences continue to influence people's lives beyond childhood and into adulthood. One of the goals of the current study was to examine these potential long-term impacts. Among counselors who work with trauma, it is understood that trauma can have deep and long-term impacts on our clients, even when the traumas happened long before our work may have started. It is not uncommon for clients to see counselors wanting to process traumas that happened in their childhood as they recognize that the impacts of these traumas are affecting their adult lives. However, this area is not something that is readily researched. Much of the existing research on childhood complex traumas and multiple developmental traumas studies the children and adolescents who are either currently or have recently experienced these traumas. There is also research studying multiple traumas in adulthood. However, far less research examines the impacts of multiple traumas that happen in earlier developmental periods on people's lives as they are adults. This study begins to provide evidence that the impacts of multiple developmental traumas on mental health outcomes lasts beyond childhood and adolescence, and that these impacts can carry into adulthood.

In counseling work, as much as practitioners may want to change the problems that they see, in this case the amount of people who are exposed to traumas, this is mostly beyond their control. Counseling work usually focuses on helping people who have

already experienced or who are currently experiencing these events. However, while it is arguably out of the practitioner's control to prevent the traumas from occurring, they can address protective mechanisms in their clients lives to help protect or potentially lessen the effects and outcomes for when these events do occur. Clinicians constantly talk about adding "tools" to client's toolboxes. The purpose of these tools is often to help these clients better protect against adverse experiences and emotions, or in some cases help them to experience these emotions in a safer and more constructive way. Regarding trauma, there is a growing body of literature that discusses risk and protective factors that increase and decrease a person's likelihood for being exposed to trauma as well as information on how that trauma may impact them. This research focuses on the populations most likely to encounter these traumas such as poor and minority children or being part of a marginalized ethnic or racial group (Cooley-Strickland et al., 2009; Kaufman, Hall & Zagura, 2012; Liberman, et al., 2011; Turner, et al., 2006). This information is important for counselors to know, because when working in these communities knowing that this is an at-risk population may influence how practitioners approach various situations.

In addition to needing to understand those who may be at risk, it is important for counselors to have an understanding of what factors may bolster resilience. Some research has indicated that children having creative outlets may provide an emotional release and a sense of purpose (Meyers, 2016). In addition, the positive effect of therapy has been examined in how that may improve resiliency and help individuals with their internalized view of self, self-efficacy, and cognitive and emotional regulation (Meyers, 2016; Pat-Horenczyk, Kenan, Achituv, & Bachar, 2013). Researchers have also

examined the protective impact of parents and peers (Gallus, Shreffler, Merten, & Cox, 2015; Meyers, 2016). However, as discussed earlier, at times these parents may be the source of the trauma or they may not be able to provide this protection. Research on protective factors is still growing, however it has shown that social support can help alleviate the effects of trauma (Banyard, et al., 2003; Gallus, et al., 2015; Glass, Perrin, Campbell, & Soeken, 2007; Meyers, 2016). While all of this research exists, there is barely any research focusing on the potential protective impact that sibling relationships can have on the exposure to multiple traumas. As discussed, roughly 80% of children grow up living with a sibling (Dunifon, Fomby, & Musick, 2017; U.S. Census Bureau, 2011). Understanding the potential impact these siblings have on one another is critical for counselors, especially if these siblings create more risk or more protection.

Summary and Conclusions

The current study suggests that attachment style and sibling relationship quality mediate the impact of multiple developmental traumatic experiences on mental health outcomes, including depression, anxiety, and stress. Although these findings are preliminary, conflict in sibling relationships and participants attachment anxiety were found to be consistent and strong mediators between exposure to developmental traumatic experiences and overall mental health outcomes, as well as with depression and stress. For anxiety outcomes, warmth, in addition to conflict and anxious attachment, was also found to be a significant mediator between exposure to developmental traumatic experiences and anxiety. The influence of attachment style and sibling relationship quality should continue to be explored in adults, particularly as potential mediating

factors for the exposure of developmental traumatic experiences on mental health outcomes.

The current study had many strengths and limitations. It made use of a large and diverse dataset and examined questions that have been rarely posed in research. However, research was limited by self-selection, self-reported data, and the study being administered online. Overall, the current study's findings suggest that there is a protective component to sibling relationships and attachment style in conjunction to exposure to developmental traumas. The researcher recommends that additional studies be conducted to replicate and validate these findings. In addition, the researcher recommends that counselors should be aware of the implications of sibling relationships and attachment styles, especially when working with children and adolescents. Being able to strengthen these sibling relationships and work towards healthier attachment styles when clients are experiencing or have recently experienced these developmental traumas may make a huge difference in their mental health outcomes, both in the present and long term. Additionally, counselors can use this information to work with clients towards decreasing conflict in their sibling relationships as a way to reduce the impacts of developmental trauma on mental health outcomes. In fact, conflict in sibling relationships may be a form of trauma that needs to be addressed in therapy. Counselors need to understand the impact of their client's attachment style, specifically those who have experienced multiple developmental traumas and who are anxiously attached. Being able to work with clients to better understand and address their attachment style may help to reduce the impacts on mental health outcomes. As a counselor, understanding these relationships allows us to better target treatment goals. While this study focused on adults, this

information is still critical for counselors who work with children, adolescents, emerging adults, and families. Being able to integrate this knowledge, especially when the traumas are currently occurring or recently occurred, may make a big difference in long-term mental health outcomes. Based on the provided recommendations, future studies may enable researchers and counselors to further understand and provide better support for clients who experience multiple developmental traumas, by building on the foundations of existing sibling relationships.

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Appendix A: Measures

ASRQ-Short Items and Dimensions

Warmth

1. How much do you talk to this sibling about things that are important to you?
2. How much does this sibling talk to you about things that are important to them?
8. How much does this sibling try to cheer you up when you are feeling down?
9. How much do you try to cheer this sibling up when they are feeling down?
14. How much does this sibling know about you?
15. How much do you know about this sibling?
16. How much do you discuss your feelings or personal issues with this sibling?
17. How much does this sibling discuss their feelings or personal issues with you?
23. How much can you count on this sibling to be supportive when you are feeling stressed?
25. How much can this sibling count on you to be supportive when they are feeling stressed?
30. How much do you know about this sibling's relationships?
31. How much does this sibling know about your relationships?
32. How much do you really understand this sibling?
33. How much does this sibling really understand you?
40. How much do you discuss important personal decisions with this sibling?
41. How much does this sibling discuss important personal decisions with you?
46. How much do you know about this sibling's ideas?
47. How much does this sibling know about your ideas?

Conflict

3. How much do you and this sibling argue with each other?
4. How much do you irritate this sibling?
5. How much does this sibling irritate you?
10. How much do you dominate this sibling?
11. How much does this sibling dominate you?
18. How often does this sibling criticize you?
19. How often do you criticize this sibling?
20. How often does this sibling do things to make you mad?
21. How often do you do things to make this sibling mad?
26. How much is this sibling bossy with you?
27. How much are you bossy with this sibling?
34. How much does this sibling disagree with you about things?
35. How much do you disagree with this sibling about things?
36. How much does this sibling put you down?
37. How much do you put this sibling down?
42. How much does this sibling act in superior ways to you?
43. How much do you act in superior ways to this sibling?

Rivalry

-
- 6. Do you think your mother favors you or this sibling more?
 - 7. Does this sibling think your mother favors him/her or you more?
 - 12. Do you think your father favors you or this sibling more?
 - 13. Does this sibling think your father favors him/her or you more?
 - 22. Does this sibling think your mother supports him/her or you more?
 - 24. Do you think your mother supports you or this sibling more?
 - 28. Does this sibling think your father supports him/her or you more?
 - 29. Do you think your father supports you or this sibling more?
 - 38. Does this sibling think your mother is closer to him/her or you?
 - 39. Do you think your mother is closer to you or this sibling?
 - 44. Does this sibling think that your father is closer to him/her or you?
 - 45. Do you think your father is closer to you or this sibling?
-

ECR-12 Item Dimensions

Anxiety

- I worry that romantic partners won't care about me as much as I care about them.
- I worry a fair amount about losing my partner.
- I worry about being abandoned.
- I worry about being alone.
- I need a lot of reassurance that I am loved by my partner.
- If I can't get my partner to show interest in me, I get upset or angry.

Avoidance

- I feel comfortable depending on romantic partners.
 - I usually discuss my problems and concerns with my partner.
 - I tell my partner just about everything.
 - I don't mind asking romantic partners for comfort, advice, or help.
 - I don't feel comfortable opening up to romantic partners.
 - I feel comfortable sharing my private thoughts and feelings with my partner.
-

*Trauma History Questionnaire – Developmental Percentages**

<u>Question</u>	<u>%</u>
1. Has anyone ever tried to take something directly from you by using force or threat of force, such as a stick-up or mugging?	42.4
2. Has anyone ever attempted to rob you or actually robbed you (i.e., stolen your personal belongings)?	39.2
3. Has anyone ever attempted to or succeeded in breaking into your home when you were <u>not</u> there?	28.6
4. Has anyone ever attempted to or succeeded in breaking into your home while you <u>were</u> there?	19.8
5. Have you ever had a serious accident at work, in a car, or somewhere else?	33.3
6. Have you ever experienced a natural disaster such as a tornado, hurricane, flood or major earthquake, etc., where you felt you or your loved ones were in danger of death or injury?	29.6

7. Have you ever experienced a “man-made” disaster such as a train crash, building collapse, bank robbery, fire, etc., where you felt you or your loved ones were in danger of death or injury?	21.4
8. Have you ever been exposed to dangerous chemicals or radioactivity that might threaten your health?	16.5
9. Have you ever been in any other situation in which you were seriously injured?	26.7
10. Have you ever been in any other situation in which you feared you <u>might</u> be killed or seriously injured?	23.1
11. Have you ever seen someone seriously injured or killed?	23.3
12. Have you ever seen dead bodies (other than at a funeral) or had to handle dead bodies for any reason?	20.2
13. Have you ever had a close friend or family member murdered, or killed by a drunk driver?	17.6
14. Have you ever had a spouse, romantic partner, or child die?	11.4
15. Have you ever had a serious or life-threatening illness?	15.5
16. Have you ever received news of a serious injury, life-threatening illness, or unexpected death of someone close to you?	31.4
17. Have you ever had to engage in combat while in military service in an official or unofficial war zone?	9.2
18. Has anyone ever made you have intercourse or oral or anal sex against your will?	21.6
19. Has anyone ever touched private parts of your body, or made you touch theirs, under force or threat?	26.9
20. Other than incidents mentioned in Questions 18 and 19, have there been any other situations in which another person tried to force you to have an unwanted sexual contact?	14.7
21. Has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon?	14.7
22. Has anyone, including family members or friends, ever attacked you <u>without</u> a weapon and seriously injured you?	18.4
23. Has anyone in your family ever beaten, spanked, or pushed you hard enough to cause injury?	24.9
24. Have you experienced any other extraordinarily stressful situation or event that is not covered above?	18.8

*Percentage of participants who endorsed the item in the 0-20 age range.

DASS-21 Item Dimensions

Depression

3. I couldn't seem to experience any positive feeling at all
5. I found it difficult to work up the initiative to do things
10. I felt that I had nothing to look forward to
13. I felt down hearted and blue
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
21. I felt that life was meaningless
-

Stress

- 1. I found it hard to wind down
- 6. I tended to over-react to situations
- 8. I felt that I was using a lot of nervous energy
- 11. I found myself getting agitated
- 12. I found it difficult to relax
- 14. I was intolerant of anything that kept me from getting on with what I was doing
- 18. I felt that I was rather touchy

Anxiety

- 2. I was aware of dryness of my mouth
 - 4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)
 - 7. I experienced trembling (e.g., in the hands)
 - 9. I was worried about situations in which I might panic and make a fool of myself
 - 15. I felt I was so close to panic
 - 19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)
 - 20. I felt scared without any good reason
-

	<i>Validity Check Items</i>				
1. If you are reading this question, click hardly ever.	Always	Sometimes	About half the time	Hardly ever	Never
2. Please answer this question with the number three if you are reading this.	One	Two	Three	Four	
3. Please answer this question by clicking most of the time, if you are reading this.	Always	Most of the time	About half the time	Sometimes	Never
