Examining the impact of trauma on reading performance among elementary students

By

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Beginning prior to the foundational study conducted by Felitti et al. (1998), individuals of all ages have been exposed to a variety of traumatic events that had the capacity to alter overall functioning in a variety of ways. Children and adolescents are a vulnerable subset of individuals who are often exposed to various types of trauma which has the capacity to impact academic, behavioral, and social/emotional functioning (Cohen, Berliner, & Mannarino, 2010). The adverse effects related to trauma exposure in children and adolescents have been correlated with externalizing and internalizing disorders, and decreased academic performance (American Psychiatric Association, 2013). An individual’s proximity, or closeness, to traumatic events has also been correlated with increased negative outcomes to include meeting diagnostic criteria for Post-Traumatic Stress Disorder (PTSD). There is a gap in the literature, however, in determining the relationship between proximity to traumatic events and its impact on academic functioning in elementary students.

The present study sought to analyze the relationship between PTSD symptomology and academic achievement in elementary students while determining if
proximity was a moderating factor in the hypothesized relationship. Participants included 81 children in Grades 3 through 5 enrolled in elementary schools in a school district in the Southeastern United States. Linear regression analyses indicated the hypothesized relationship between PTSD symptomology and academic achievement was nonsignificant. However, when proximity was included as a moderator the increase in variance of explanation of the relationship was noted to be significant. Implications of these results suggest that inclusion of proximity as a pertinent contributor to adverse reactions may be imperative in engaging in prevention, intervention, and postvention strategies for elementary students exposed to trauma.
DEDICATION

This dissertation is dedicated to the numerous individuals who have provided unwavering support, constructive criticism, and a steadfast belief in my ability to accomplish my wildest dreams. The journey to this point has been nothing short of pandemonium and I am forever grateful to have a relentless support network to continuously push me forward. As an individual with significant trauma during childhood, I am indubitably grateful for my family, adopted family, friends, and educators from elementary school through graduate school who assured me my experiences did not have to dictate my outcome.

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Limitations

Internal Validity
External Validity
Measurement
Statistical Analysis
Future Research

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CHAPTER I
INTRODUCTION

According to the U.S. Department of Health and Human Services, children and adolescents experience an average 3.7 different types of adverse childhood experiences (ACEs; Child & Adolescent Health Measurement Initiative, 2013). Felitti et al. (1998) conducted a study exploring the relationship of health risk behavior and exposure to childhood trauma with 8,506 participants and an ACE was described as psychological, physical or sexual abuse and/or household dysfunction. To date, the description of ACEs has been expanded to include eight different types (Anda et al., 2006). The negative impact resulting in adverse reactions due to exposure of ACEs are pervasive across academic, behavioral, social, emotional, and physiological performance of children (Cohen, Berliner, & Mannarino, 2010) and adults (American Psychiatric Association, 2013).

In the educational setting, the adverse reactions to traumatic events are often misidentified which negatively impacts school personnel’s ability to facilitate implementation of prevention measures and mental health services (Cohen et al., 2010). This misidentification may be due to limited knowledge of adverse reactions to traumatic events (i.e., psychopathology) or limited knowledge related to effective interventions to negate the reactions. Research conducted in the educational setting has indicated dire shortages in relation to mental health services for children and adolescents as an
integrated component of the school day (Chafouleas, Johnson, Overstreet, & Santos, 2015; Phifer & Hull, 2016). Due to the significant amount of time children and adolescents spend in the educational setting, implementation of effective mental health services will enhance the likelihood of accurate identification of mental health disorders, such as Post-Traumatic Stress Disorder (PTSD), which may facilitate the reduction of adverse reactions. Chafouleas and colleagues (2015) advocated for the inclusion of trauma-informed care in the educational setting which would include expanding school personnel’s knowledge of the prevalence and negative impact of traumatic experiences on the school-aged child. This shift to trauma-informed care is likely to facilitate accurate identification and therefore intervention services for students who exhibit adverse reactions associated to their traumatic event exposure.

Cohen et al. (2010) identified common behavioral presentations of traumatic exposure including aggression, noncompliance, destructive behavior, or other disruptive behaviors that cause significant disturbance to a child’s overall performance. In the educational setting, adverse reactions to traumatic events are more often than not attributed to externalizing behaviors without consideration for the underlying antecedent of traumatic exposure. These behaviors are often coined as disruptive behaviors with minimal justification from potential antecedents, such as trauma exposure. One key risk factor for the development of adverse reactions is proximity (Galea et al., 2002; Pynoos et al., 1987).
Proximity Types

Physical Proximity

Proximity to a traumatic event has been identified as a significant predictor of adverse reactions to trauma exposure in children and adolescents (National Association of School Psychologists [NASP] School Safety and Crisis Response Committee, 2015). In a foundational article exploring the relationship between physical proximity and PTSD symptomology in children, Pynoos and colleagues (1987) reported significantly higher levels of PTSD symptomology as the degree of exposure to the traumatic event increased. These differences were measured using the scores on the Post-Traumatic Stress Disorder-Reaction Index (PTSD-RI) and self-reported location during the traumatic event. This suggests that children who have direct, physical proximity to the event are more susceptible to the development of PTSD symptomology. Hoven, Duarte, and Mandell (2003) further indicated that a child’s trauma history as well as physical and emotional proximity to a traumatic event are complex factors that contribute to the development of mental health disorders in children and adolescents.

Emotional Proximity

Galea and colleagues (2002) analyzed the impact of emotional proximity related to the development of PTSD in adults exposed to the World Trade Center attacks. Due to the restrictions on sampling, physical proximity to the event was a moderating variable as all participants lived around the site of the event. Social support (i.e., low, medium or high) was measured in three aspects – emotional, instrumental, and appraisal. Panic attacks were assessed using National Institute of Mental Health Diagnostic Interview Schedule and PTSD symptoms were assessed with Diagnostic Interview Schedule for
PTSD. Results indicated moderate prevalence of PTSD and depression in relation to perceived deficits in social support after the event. Prevalence rates of PTSD and depression noted after data analysis were double the baseline measures of PTSD and depression symptomology in the area noted within both the previous thirty days as well as the previous year. Galea and colleagues (2002) indicated that direct exposure, or physical proximity, increases an individual’s likelihood to experience psychiatric concerns when compared to indirect exposure, or emotional proximity. This assumption may be biased by the inclusion of a sample of respondents who were all both directly and indirectly exposed.

**Trauma and Academic Achievement**

Traumatic experiences may negatively affect academic performance in various ways including lower academic achievement, higher drop-out rates, and higher referrals for special education placement (NASP School Safety and Crisis Response Committee, 2015). Lower grade point averages and higher absences from school have been noted in students who have experienced trauma in the form of exposure to community violence (Hurt, Malmud, Brodsky, & Gianetta, 2001). Traumatic event exposure often predicts decreased scores on standardized tests and increased likelihood of a student needing individualized education programming (Goodman, Miller, & West-Olatunji, 2011).

Early traumatic stress negatively affects development across multiple areas which has a detrimental impact on learning and academic achievement (Porche, Fortuna, Lin, & Alegria, 2011). Goodman et al. (2011) conducted a study to analyze the relationship between traumatic stress and academic achievement with results that indicated traumatic stress negatively predicts academic achievement scores. The NASP School Safety and
Crisis Response Committee (2015) suggested that poor health, diminished quality of life, and academic failure are often culminations of the adverse reactions related to traumatic experiences in children and adolescents. A decline in school performance or difficulty concentrating may be academic manifestations of traumatic exposure (NASP School Safety and Crisis Response Committee, 2015). Scott, Lapré, Marsee, and Weems (2014) suggested that after a natural disaster, symptomology of PTSD may be more predictive of a student’s academic achievement as compared to their externalizing behaviors.

**Summary**

In summation, children and adolescents may experience an average of 3.7 of the 8 types of ACEs which often negatively impacts overall functioning including academic, behavioral, social, emotional, and physiological well-being. These negative interactions are often misidentified as impulsive, disruptive behavior in the educational setting which impedes school staff’s ability to implement appropriate prevention or intervention strategies that target the precipitating factors of trauma exposure. As the zeitgeist shifts to more trauma-informed care in the educational setting, accurate identification and response to traumatic events may minimize the adverse reactions, including psychopathology, which may result due to the exposure.

Adverse reactions exhibited in the educational setting may include aggression, noncompliance, attendance concerns, decreased academic performance, or other disruptive behaviors that negatively impact a child or adolescent’s overall school functioning. Both physical and emotional proximity have been identified as predictors of adverse reactions to trauma exposure in children and adolescents. When examining the impact of trauma on academic achievement, a review of the literature indicated lower
academic performance, higher rates of drop out, and higher rates of referral for special education services with traumatic stress negatively predicting academic achievement scores.

**Statement of Problem**

To date, minimal research has directly explored the impact of PTSD symptomology on the academic achievement of school-aged children and adolescents. Specifically, trauma exposure to include proximity type may play a significant role in determining an individual’s level of PTSD; therefore, it may hinder an individual’s overall learning capabilities after a traumatic experience. In order to bridge the gap between mental health and academic achievement, it is imperative to identify students who exhibit PTSD symptomology in efforts to decrease the detrimental impact relative to academic functioning. Furthermore, the PTSD-RI examines symptomology at a criterion level which will assist in adequate identification of the varying response patterns and therefore facilitate appropriate intervention topographies for individual students.

The deficit in distinguishing the impact of proximity types to various traumatic events on academic achievement in school aged children is also addressed using the PTSD-RI. The PTSD-RI includes a trauma history subsection that allows respondents to indicate if the event happened to them (i.e., physical proximity) or happened to someone else (i.e., emotional proximity). Literature suggests direct exposure, or physical proximity, is more predictive of adverse reactions including the development of PTSD (Bhushan & Kumar, 2009; Galea et al., 2002). Bhushan and Kumar (2009) also indicated that indirect exposure, or emotional proximity, is also predictive of trauma-related symptomology including the development of PTSD. When directly assessing response
differences in direct and indirect exposure, Bhushan and Kumar (2009) found that individuals with direct exposure had higher scores on scales measuring emotional distress as compared to the indirect group.

**Significance of Study**

This study contributes to both the psychological and educational literature regarding the relationship between PTSD symptomology and academic achievement. The study provided data to identify the impact of PTSD symptoms on a student’s ability to perform academically. Identifying the impact of PTSD symptomology on academic achievement assists in facilitation of appropriate responses to traumatic events in efforts to minimize long-term detrimental impacts. The study also added knowledge related to the impact of proximity type as a moderator on relationship of PTSD symptomology and academic performance of elementary students. Knowledge of the impact of proximity type may bolster the efficient identification of and intervention for children and adolescents exposed to traumatic events such that children or adolescents in close proximity may require more intensive intervention whereas those who were not may not require such high levels of support.

**Purpose of Study**

The purpose of the present study was to investigate the relationship between PTSD symptomology and academic achievement in elementary students while moderating the type of exposure proximity. Specifically, an analysis of the hypothesized relationship between the presence of PTSD symptoms and academic achievement will be conducted. Furthermore, inclusion of proximity as a moderator between the hypothesized
relationship between PTSD symptomology and academic achievement in elementary studies will also be explored.

**Research Questions**

1. Does the presence of PTSD symptoms (i.e., PTSD-RI) predict academic outcomes (i.e., Measures of Academic Progress reading scores) in students who have experienced traumatic events?

2. Does type of exposure (i.e., emotional, physical, or both) moderate the relationship between PTSD symptoms and academic outcomes in students?

**Glossary**

*Adverse childhood experience*: exposure to childhood abuse (i.e., emotional, physical, sexual) or household dysfunction (i.e., substance abuse, mental illness, mother treated violently, incarcerated household member, parental separation or divorce; Anda et al., 2006)

*Adverse reaction*: symptom presentation related to traumatic event exposure that manifests differently across developmental level; common responses include fears, somatic concerns, sleep difficulties, diminished school performance, internalizing behaviors (i.e., withdrawal, depression), and externalizing behaviors (i.e., aggression) (Dogan-Ates, 2010)

*Traumatic events*: experience that causes physical, emotional, or psychological distress that alters an individual’s perception of safety or stability (Brock & Jimerson, 2012).
CHAPTER II
REVIEW OF LITERATURE

An analysis of the current literature base regarding childhood trauma, adverse reactions, and educational impact due to trauma was conducted to establish the rationale for the current study. This section will describe the training and theoretical models directly related to childhood trauma and adverse reactions, an in-depth analysis of trauma including the various types as well as outcomes across the developmental timeframe in children and adolescents, and the diagnosis and assessment of PTSD in children and adolescents. Lastly, the present section will identify gaps in the current literature and how the current study contributes to the missing information.

The educational setting is an opportune environment for prevention and intervention strategies in various functioning areas for children and adolescents. As the prevalence of traumatic experiences in childhood and adolescence has increased, there has been a substantial need for accurate identification and response regarding adverse reactions that may occur as the result of exposure to a traumatic event. Adverse reactions have a negative impact across academic, behavioral, and social/emotional performance in children and adolescents (American Psychiatric Association [APA], 2013). Dyson (1990) noted negative outcomes associated with traumatic events including irregular school attendance, disruptive classroom behaviors, and deficits in acquisition and
retention of academic skills. Lynch (2003) confirmed the decline in attendance and increase in school behavior problems noted by Dyson (1990) and further reported that academic performance has also been noted to decline as a result of traumatic experiences in children and adolescents.

**Theoretical Background**

**Stress Response Theory**

Horowitz (1986) identified reactions to trauma using observations to incorporate the process of traumatic experiences and reactions into the Stress Response Theory. Horowitz indicated due to the disruptive nature of traumatic events, individuals attempt to apply information from prior knowledge to process the event. As an individual processes the event, psychological defense mechanisms, such as avoidance or emotional numbing, are often activated (Horowitz, 1986).

As a result of the cognitive nature of this theory, Brewin and Holmes (2003) indicated that individuals both suppress information related to the event or actively process the event to facilitate through the coping process. This oscillation enhances appropriate cognitive processing which minimizes the likelihood of exacerbating adverse reactions (Brewin & Holmes, 2003). Although understanding the neurological processes involved in reactions to traumatic events is imperative, the Stress Response Theory does not incorporate individual variations in response patterns nor the role of the environment in preventing or bolstering adverse reactions.

As an example, students who have experienced a natural disaster, such as a tornado, may exhibited the defense mechanisms mentioned in order to begin processing the event. In the school setting, the combination of the psychological defense
mechanisms and oscillation between avoidance and active processing may present
differently for each child. The child’s daily functioning may fluctuate such that one day
the child does not engage in discussion regarding the event and the next day the child
may become emotional and wish to debrief with a trusted staff member. Children who
are processing traumatic events using the processes identified in the Stress Response
Theory (Horowitz, 1986) are using predominantly cognitive-based strategies with
minimal emphasis on solution focused strategies, environmental contributors, or the
typical responses to trauma.

Crisis Theory

Crisis Theory, originally developed by Slaikeu (1990) and further described by
Parikh and Wachter Morris (2011), is grounded upon the assumptions of a precipitating
crisis event, disequilibrium in the normalcy or routine, a breakdown in effective response
strategies such as coping mechanisms, and a period of time for appropriate crisis
response. Aside from the assumptions, crisis theory encompasses each of the states
within an individual that are often affected by a crisis event including but not limited to
emotional, behavioral, and cognitive (Slaikeu, 1990).

When applying this theory to the occurrence of a traumatic event, the assumptions
related to Crisis Theory provide the foundation for areas to target in effective response as
well as identification of the areas of functioning that are often impacted. Furthermore,
the assumptions of Crisis Theory parallel the occurrences such as a debilitating event and
difficulties in appropriate response noted in Horowitz’s (1986) Stress Response Theory.
The limitations of Crisis Theory include the lack of identification of the psychosomatic
functioning often affected by traumatic events and the protective factors that may minimize the adverse reactions.

Under the Crisis Theory (Slaikeu, 1990), children who have experienced a tornado experience the disequilibrium of their daily routine, may exhibit difficulty identifying and applying the appropriate coping mechanisms, and require an appropriate time period to effectively cope with and respond to the trauma of experiencing the tornado. This theory encompasses the emotional, behavioral, and cognitive difficulties that may be present as a result of trauma. For example, children who have experienced a tornado may express marked fear of another storm, exhibit aggressive behavior towards others, or struggle to understand why the tornado hit while oscillating through appropriate coping strategies. Slaikeu’s (1990) Crisis Theory built upon the information obtained within Horowitz’s (1986) Stress Response Theory such that emotional and behavioral functioning were included.

**Trauma Theory**

Bloom’s (1999) Trauma Theory examined the biological response noted after an individual experiences a traumatic event. Specific to the traumatic event, Bloom indicated common components of Trauma Theory as dissociation, flashbacks, and the need to establish a new sense of safety while processing the traumatic event. The fight-or-flight response is often initiated in response to a debilitating event such as a traumatic experience and is further compounded by the individual variations in one’s reactions to the event. Bloom suggested that repeated exposure to traumatic events often maintains the activation of the fight-or-flight response which may result in hypersensitivity to more common, minor obstacles or challenging events that individuals may face.
Physical, emotional, and cognitive reactions are all often impaired as a result of the constant activation of the fight-or-flight response and this persistent activation may negatively affect development in children or adolescents (Bloom, 1999). Common adverse reactions to traumatic events noted in Bloom’s Trauma Theory include learned helplessness, perceptions of loss of control of one’s own behavior or overall self, and cognitive functioning deficits such as impulsivity. The major factor noted in Bloom’s Trauma Theory that was omitted from both Horowitz’s (1986) Stress Response Theory and Slaikeu’s (1990) Crisis Theory is the interaction between the physiological response mechanisms and their negative impact on other areas of functioning. Individually, each of the three theories noted explore necessary components of the identification of how individuals process traumatic events in order to facilitate appropriate preventative or intervention strategies. The impact of environmental factors, such as exposure to the event, were missing from each of these theories.

When considering children who have experienced a tornado, Bloom’s (1999) Trauma Theory suggests the dissociation from the event coupled with flashbacks continuously elevates the child’s fight-or-flight response. As a result of this hypersensitivity, the child may overreact to typical difficulties such as a schedule change or mistake on an assignment. Furthermore, the child may react impulsively to peers or adult staff in a manner that is atypical from the child’s normal functioning. When questioned regarding the negative behavior, the child may report a lack of control of the behavior. It is imperative to consider the sustained arousal of the fight-or-flight system in regard to trauma and the adverse effects related to exposure.
Interpersonal Problem Solving Model

D’Zurilla and Goldfried (1971) developed a behavioral focused model by using problem-solving steps to overcome crisis situations. The cognitive-behavioral Interpersonal Problem-Solving (IPS) Model was designed to facilitate the development of appropriate coping strategies in response to various crises. In the original article discussing the IPS Model, D’Zurilla and Goldfried indicated the five primary steps involved in overall problem-solving as it applies to a crisis event which include: (a) general orientation, (b) problem definition and formulation, (c) generation of alternatives, (d) decision making, and (e) verification.

General orientation entails accepting the problem as it occurs with the mindset of the relative normalcy associated with challenges, identifying the occurrence as a problem or challenge, and minimizing the urge to respond impulsively (D’Zurilla & Goldfried, 1971). Upon acceptance of the problem as well as resisting the desire to react impulsively, the next step, problem definition and formulation, involves operationally defining the problem which includes identification of relevant aspects as well as potential obstacles to overcoming the problem. This allows the individual to identify goals to overcome the situation as well as exclude irrelevant information from the problem-solving process. Generation of alternatives begins once the individual has appropriately classified the problem and involves creating strategies to overcome the problem appropriately (D’Zurilla & Goldfried, 1971). This stage is centered upon brainstorming concrete strategies that directly apply to the problem at hand.

Literature suggests that interpersonal problem solving is a skill that may decrease the aversive reactions to crisis situations (D’Zurilla & Goldfried, 1971). Relative to the
overall IPS model, D’Zurilla and Goldfried (1971) included emotionality, or motivational aspects, and skills, or problem-solving aspects, as strategies to respond to crisis situations (D’Zurilla & Goldfried, 1971). Relative to problem solving, eight steps have been identified from application of the original IPS Model. The steps are as follows: identify and accept a crisis as it occurs, define the crisis in your own words, attempt to understand the crisis, set reasonable goals (behavioral or emotional), generate alternative behavior or emotional coping strategies, evaluate and choose the best alternative, implement the alternative, and evaluate the overall process while making changes as necessary. The steps identified in the IPS Model allow for flexibility dependent upon the unique needs of the individuals experiencing crisis. The IPS model can be applied across varying developmental levels, crises types, and various populations.

Overall, D’Zurilla and Goldfried (1971) explored the strategy of applying problem solving steps to overcome crisis situations using the IPS model. The cognitive-behavioral foundation of IPS was designed to assist individuals with developing appropriate strategies to cope with various crisis situations. The IPS Model includes strategies to improve motivation, or feelings related to the event, and skills, or problem-solving strategies to overcome the adverse reactions related to a traumatic experience. The core contributions of problem-solving to identify an appropriate solution are altered by the presence of adverse reactions. An individual’s difficulty appropriately navigating through the problem-solving process in relation to traumatic events may enhance the likelihood of maintaining adverse reactions.

When using strategies from the IPS Model after a tornado, a child would begin to orient to the tornado and the steps to achieve normalcy thereafter such as food, shelter,
and safety. As children identify obstacles to returning to normalcy, the IPS model (D’Zurilla & Goldfried, 1991) encourage the use of active problem solving to identify appropriate responses to solve the problem. Components of appropriate responses include trial and error of various possibilities in order to determine which would be most effective. The inherent focus on feelings and skills within the model encourage appropriate coping mechanisms to overcome the adverse effects of trauma exposure.

The previously discussed models provided the foundation for more comprehensive crisis response frameworks, such as the National Organization for Victim Assistance (NOVA) Crisis Response Team Training (Young, 1998) and Prevent, Reaffirm, Evaluate, Provide, and Respond, Examine (PREPaRE) School Crisis Prevention and Intervention Training Curriculum (Brock & Jimerson, 2012) models, to be designed. These models incorporate various components entailed in the aforementioned theories in order to focus on functioning as a whole while accounting for physiological, emotional, behavioral, and overall well-being. The models also incorporated appropriate response time frames as well as effective strategies to implement at various stages of crisis response.

**Crisis Training Models**

The development of both the NOVA Crisis Response Team Training (Young, 1998) and PREPaRE (Brock & Jimerson, 2012) School Crisis Prevention and Intervention Training Curriculum encompassed the imperative aspects noted in each of the previously mentioned theories as well as inclusion of environmental factors and individual differences in processing. Each of the models also includes predetermined strategies to enhance children’s knowledge and understanding related to common
reactions as well as techniques to dissuade the dissemination of false information related to the event. The NOVA training model (Young, 1998) is inherently reactive in nature while the PREPaRE (Brock & Jimerson, 2012) training curriculum includes prevention, intervention, and postvention strategies and also accounts for the developmental level of children and adolescents and is easily conducted in the educational setting.

NOVA Training Model

Young’s (1998) NOVA training model is a reactive model that includes six major components: safety and security, ventilation and validation, and prediction and preparation. Safety and security are the first stages when implementing the NOVA training model and provides details on establishing a safe environment for individuals who have experienced a crisis. During this stage, it is imperative to determine if the basic needs of those affected are met as well as providing a confidential, appropriate setting for connection to others for support (Young, 1998).

After a sense of security is provided, ventilation and validation allows those who have experienced crises to discuss their experiences and the adverse reactions associated with experiencing a crisis are explained and confirmed as typical occurrences (Young, 1998). The final stages of the NOVA training model (Young, 1998) include assisting those affected to predict obstacles that may arise as a result of the event along with methods to overcome them as well as available resources for those affected. Limitations associated with the NOVA training model include the predominant focus on group sessions with minimal focus on the individual needs or reactions of those involved. Brock and Jimerson’s (2012) PREPaRE model includes many facets from the NOVA training model but includes a hierarchical approach such that individuals who are
negatively affected more so than others are identified and provided individualized, intensive intervention based upon their unique needs.

In the school setting, the NOVA training model is an effective reactive strategy to assist with adequate triage of affected students by means of providing a safe environment to discuss the facts of the event as well as predict difficulties that may arise as a result of the trauma. The NOVA training model allows children to contribute as much or as little as they are comfortable with regarding their experiences during the traumatic event. Children participate in group sessions that allow a cohesive bond between those affected such that they are able to visualize and identify that others are experiencing similar reactions to the event.

**PREPaRE Training Curriculum**

PREPaRE was designed for implementation in the educational setting as an evidence-based method of prevention, intervention, and postvention strategies in response to crises. The PREPaRE training curriculum (Brock & Jimerson, 2012) is designed to meet the unique needs of both students and school staff by providing a safe location, discussing pertinent details of the event, identifying individuals who may need mental health services, identifying and dispersing information on available resources, and facilitating the process of long-term recovery after a crisis event (Brock, Nickerson, Reeves, Jimerson, Lieberman, & Feinberg, 2009). The PREPaRE training curriculum was designed as a hierarchical set of activities that include prevent and prepare for psychological trauma, reaffirm physical health and perceptions of security and safety, evaluate psychological trauma risk, provide intervention, and respond to psychological needs and examine effectiveness of crisis prevention and intervention.
When compared to the NOVA training model, the PREPRe training curriculum includes strategies for both short term and long-term identification and recovery as well as strategies to address individuals who are experiencing more significant adverse reactions related to the event. As noted previously, the steps in both models include perceptions of safety and security and crisis intervention strategies. The PREPRe training curriculum (Brock & Jimerson, 2012) further expands on the NOVA training model by means of including preventative strategies, evaluation of the level of risk, and examination of the effectiveness of crisis intervention in both the short and long-term capacities. When considering the detrimental impact of pervasive traumatic events, comprehensive strategies such as the PREPRe training curriculum are invaluable in appropriate identification and response to the unique needs of each student.

The PREPRe training curriculum (Brock & Jimerson, 2012) uses a hierarchical process to assist in prevention, intervention, and postvention for both groups and individual children who have experienced trauma. Children who reside in areas where tornados may be likely may participate in prevention activities that identify likelihood and obstacles that may arise as a result of a tornado. During the intervention phase, environmental factors including proximity to the event or trauma history contribute to the level of intervention provided. Children with a significant trauma history or who were in close proximity to the event may require individualized intervention whereas others with minimal history or proximity may require psychoeducational group sessions to address their unique needs. PREPRe (Brock & Jimerson, 2012) also includes postvention strategies that allow for the continued use of intervention as needed as well as follow up
to identify functioning after appropriate timeframes such that adverse reactions would be expected to have diminished.

**Summary**

In summary, a variety of theoretical models have created a foundation for the development of effective strategies to identify and address adverse posttraumatic reactions in children and adolescents. The pervasive impact of adverse reactions was explored across all three theories in order to identify strategies to decrease posttraumatic reactions which may lead the development of psychopathology, such as PTSD. An overview of both the NOVA and PREPaRE crisis response training models indicated similarities in effective response patterns as well as the inclusion of variables such as environment and individual differences in reference to response to traumatic events. The comprehensive nature of the PREPaRE training curriculum facilitates efficient identification of psychopathology, including PTSD, in order to rapidly provide appropriate mental health services to dissuade further negative adverse reactions.

**Posttraumatic Stress Disorder**

PTSD occurs as a manifestation of the following specific criteria as indicated by the *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* (DSM-5; APA, 2013). For children ages six through adulthood, criteria include exposure to actual or threatened death, serious injury, or sexual violence that can be observed in a variety of ways, excluding media versions, must be accompanied with intrusion symptoms, persistence avoidance of stimuli associated with the event, and negative alterations in cognitions and mood, alterations in arousal and reactivity. The duration of the
disturbances identified with those criteria must be present for longer than one month. Furthermore, the disturbance must cause significant impairment in social, occupational, or other important areas of functioning and cannot be attributed to the physiological effects of substance use or medical conditions (APA, 2013).

For children ages six and younger, clinically diagnosable PTSD must entail exposure to actual or threatened death, serious injury, or sexual violence by means of direct experience, witnessing the event in person, excluding events witnessed in media, or learning that the traumatic event happened to a parent or guardian (APA, 2013). Intrusion symptoms, avoidance of stimuli, and cognitive, mood, and arousal or reactivity alterations must also be present. The duration of the distress must have been present for at least one month and cause impairment in relationships with parents, siblings, peers, or other caregivers or overall behavior in the educational setting. Similar to the criteria for PTSD in older children, adolescents, and adults, the disturbance cannot be attributed to the physiological effects of a substance or medical condition. Individual characteristics, including protective factors and risk factors, play a substantial role in moderating the development of psychopathology such as PTSD (APA, 2013).

**Protective Factors**

The ecological model regarding psychological trauma (Harvey, 1996) suggests that high levels of resilience and community support often combat negative reactions to traumatic events. Harvey (1996) furthermore explored the impact that community personnel or caregivers modeling hope and tenacity may have on a child or adolescent’s recovery process after experiencing psychological trauma. Social support prior to exposure to a traumatic event and immediately after the event has been identified by the
APA (2013) as well as in Harvey’s (1996) ecological model as a protective factor. McFarlane (1998) identified the applicability of appropriate emotional response, behaviors exhibited during a traumatic event, and state of mind during the experience as protective strategies that may decrease the likelihood of PTSD development.

Pat-Horenczyk, Kenan, Achituv, and Bachar (2014) explored a protective factors-based model for posttraumatic reactions in adolescents. Perceived self-efficacy, cognitive-emotional regulation, and flexibility were included as protective factors based on results of previous research. Pat-Horenczyk and colleagues (2014) indicated flexibility entails cognitive adjustments such as alternating between trauma focus and future focus coping modalities. Adaptive strategies including restructuring the event to identify positive aspects have also been identified as protective factors (Pat-Horenczyk et al., 2014).

When analyzing the correlation between the identified protective factors and PTSD symptomology, Pat-Horenczyk and colleagues (2014) found that the strongest relationship was between the negative strategies and overall distress. This suggests that it is imperative to identify an individual’s negative coping strategies early and implement prevention or intervention programs to decrease the likelihood of negative reactions and increase the presence of positive coping strategies to address adverse reactions related to trauma exposure. Furthermore, as noted by Pat-Horenczyk et al. (2014), the most applicable models of predicting PTSD reactions include both protective and risk factors to account for individual differences. Implications of this finding bolster developmental (Shaw, 2000) and ecological (Harvey, 1996) models as well as Crisis Theory (Slaikeu,
in the inclusion of both risk factors and protective factors to facilitate positive outcomes.

Environmental factors, as evidenced by Harvey’s (1996) ecological model, play a considerable role as a protective factor against adverse reactions to psychological trauma. Protectively, educational settings have the capacity to foster a supportive, positive environment to assist children and adolescents who have experienced psychological trauma in developing appropriate coping strategies and positive response mechanisms (Phifer & Hull, 2016). The protective, social nature of the educational setting implies a protective factor for children and adolescents who may be recurrently exposed to traumatic experiences.

Brock et al. (2009) examined protective factors at the individual, peer or family, and community level with significant overlap with factors discussed previously. Active coping and problem-solving skills, as noted before and indicated as a primary component of the IPS model (D’Zurilla & Goldfried, 1971), along with support, resiliency, and cultural or religious beliefs were identified as individual protective factors (Brock et al., 2009). At the community level, access to health care, connectedness to the school, and social support were also indicated as protective factors for those who have experienced traumatic events (Brock et al., 2009).

In summary, protective factors that assist in minimizing adverse reactions to trauma exposure have been identified as social support, flexible adaptive strategies, environmental factors (e.g., school, household), appropriate coping strategies, and access to community resources. Children who have access to trusted adults (e.g., parents, caregivers, teachers, church members) and exhibit flexible yet appropriate adaptive or
coping strategies are less likely to exhibit negative trauma reactions. The educational setting is an opportune environment to foster perception of a safe place, positive connections, and appropriate coping mechanism for all children.

**Risk Factors**

Shaw (2000) identified various risk factors such as a history of separation anxiety, neuroticism, and preexisting symptoms of depression and anxiety. Dissociation or panic may also increase the likelihood of developing PTSD symptomology (McFarlane, 1998). Cohen, Berliner, and Mannarino (2010) indicated that children and adolescents who present with adverse presentations due to psychological traumatic experiences are often continuously exposed to the source of the traumatic event. Harvey (1996) indicated that variables such as age, developmental stage, intelligence, personality, coping strategies, trauma history, and various other demographic characteristics affect an individual’s response to psychological trauma. Brock and colleagues (2009) indicated young age, history of loss, failure, or mental illness, and isolation or social withdrawal are also risk factors for the development of psychopathology as a result of a traumatic event. Aside from these risk factors, proximity to a traumatic event has been repeatedly identified as a significant risk factor for the development of psychopathology, including PTSD (May & Wisco, 2015; Price, 2013).

In summary, risk factors that enhance the likelihood of adverse reactions to trauma have been identified as a previous trauma history, presence of internalizing or externalizing disorders, continued exposure to some sort of trauma, and social withdrawal. Children may have several of the aforementioned risk factors that may significantly increase the likelihood of adverse reactions. Furthermore, proximity to a
traumatic event has been identified as a significant predictor of PTSD symptomology. Children who have close proximity, either physical or emotional, to a traumatic event may be more likely to experience adverse reactions.

**Proximity**

A review of the literature has indicated two primary types of proximity to an event which include physical and emotional. The literature base on crisis response and traumatic experiences also include proximity as direct or indirect exposure to the event. As previous literature has identified proximity as a significant risk factor, it is imperative to understand the difference between the two.

**Physical proximity**

Physical proximity to a traumatic event has been repetitively identified as a significant predictor of PTSD symptomology. This suggests children who are directly involved in the trauma by means were directly exposed (e.g., happened to them) are more likely to develop adverse reactions. Prior to Pynoos and colleagues’ (1987) foundational study assessing physical proximity, it was not considered to be a significant contributor to the development of PTSD symptomology. Since the original study in which physical proximity to an event was directly analyzed, other research has explored the relationship between physical proximity and adverse outcomes.

Pynoos and colleagues (1987) conducted a study to experimentally explore a child’s response to a traumatic event by analyzing symptomology of PTSD following a sniper-attack on the playground of an elementary school. Five to eight students were randomly selected from 33 classrooms in order to randomize the various levels of
exposure in the participant group. Prior to random selection, students were engaged in a drawing and story-telling activity. Once randomly selected, the students responded to structured interviews using the PTSD-RI. Random selection resulted in 159 children who completed the PTSD-RI. After the index was completed, students were asked about concern for the safety of a sibling, occurrence of any disturbing life events in the last year, and their whereabouts during the shooting. Each child also rated on a 3-point scale degree of acquaintance with the deceased girl. Exposure levels were also verified from parents.

Measures included the PTSD-RI and the Coddington Life Events Scale which was completed by parents. An analysis of variance (ANOVA) with Bonferroni post-hoc analysis was conducted to analyze the data collected. The participating sample was 50 percent male, mean age of 9.2 years old and even ethnic distribution (i.e., 50% African American; 50% Hispanic). Exposure to the event was identified in a self-report manner with children endorsing one of seven categories ranging from out of vicinity to on playground. Results indicated that the number of post-traumatic stress symptoms increased as degree of exposure increased. Significant differences were found between exposure level and PTSD-RI scores. No significant differences in reaction scores for age, sex, or ethnicity or the interaction of the three variables with exposure level was noted.

The four most common symptoms reported include identification of the event as extreme stressor, getting upset when thinking about event, fear of recurrence, and afraid when thinking of event. Results suggest individual vulnerabilities influence symptoms in less extreme exposure while leading to initial symptoms in individuals exposed. Pynoos and colleagues (1987) identified the impact that proximity to a traumatic event has on the
development of adverse reactions in school-aged children. This foundational study laid
the groundwork for further research to explore the correlation between physical
proximity and development of adverse reactions.

Dekovic, Koning, Stams, and Buist (2008) explored the relationship between
proximity to a traumatic event and vulnerability to adverse reactions in adolescents and
found minimal variance in levels of adverse reactions two years post-event when
comparing physical and emotional proximity. Physical proximity included the physical
distance from the event while emotional proximity included emotional involvement in the
event. Dekovic and colleagues (2008) indicated that as proximity increases as does the
likelihood of negative consequences related to the event. Dekovic and colleagues (2008)
conducted a longitudinal study of 45 participants who were involved in a fire in the
community. The level of proximity varied between the participants. Standardized
instruments to assess trauma symptomology, behavior, personality, coping styles,
proximity, and social support were distributed to all participants.

Results indicated 70% of respondents reporting clinical levels of PTSD symptoms
two years after the incident and 37% indicated clinical levels of internalizing behaviors.
Female participants were more likely to report increased traumatic symptoms and
internalizing behaviors than their male counterparts. Neuroticism, which was assessed as
a personality trait, was correlated with more negative trauma symptoms. Although
minimal variance was noted, the sample included were predominantly exposed to a
singular type of event (i.e., fire) and the trauma history of the individuals was not
assessed. Regarding the impact of traumatic events on a child’s academic performance,
the current study addresses the impact of traumatic experiences as precursors for
impaired mental health on a student’s academic achievement. This study also addresses the deficit of identifying proximity type related to the traumatic experience.

Similar to the coping styles discussed in Harvey’s (1996) ecological model regarding trauma, avoidant coping strategies were more likely to predict negative response patterns as noted by Dekovic and colleagues (2008). Minimal differences were noted regarding proximity to the event. The findings of this study expand the importance of identifying individual characteristics in efforts to provide effective intervention strategies after a traumatic event. The importance of identifying a social support network as well as implementing appropriate coping strategies are validated with the results of the Dekovic and colleagues (2008) study. Hoven et al. (2003) further indicated that a child’s trauma history as well as physical and emotional proximity to the traumatic event are complex factors that contribute to the development of mental health disorders in children and adolescents.

In summary, the research on physical proximity to date has indicated that as proximity to an event increases, as does the likelihood of adverse reactions to the event. In the foundational study on physical proximity, Pynoos and colleagues (1987) indicated that as level of exposure to a traumatic event increases, scores on the PTSD-R1 also increased. Dekovic and colleagues (2008) found clinical levels of PTSD in adolescent individuals involved in a fire two years after the event with minimal difference noted between proximity type. As the literature base has suggested, physical proximity to a traumatic event considerably impacts the development of psychopathological reactions. Aside from physical proximity to an event, children can also experience emotional proximity to a traumatic event that may also enhance the likelihood of adverse reactions.
**Emotional proximity**

As the zeitgeist shifted towards the inclusion of physical proximity as a significant predictor for adverse reactions, further essential research was conducted to analyze the impact of emotional proximity to an event relative to the progression of adverse reactions. Children with high emotional proximity to an event may have an immediate family member who was directly affected or may have had a close relationship with an individual who was directly affected. Galea and colleagues’ (2002) study was one of the first to directly assess emotional proximity to a traumatic event in adults exposed to the terrorist attacks on September 11, 2001. Price, Higa-McMillan, Kim, and Frueh (2013) further analyzed the implications of emotional proximity using a longitudinal study with school-aged children as participants.

Galea and colleagues (2002) conducted a study to explore the psychological factors associated with exposure to a traumatic event, specifically the terrorist attacks on September 11, 2001, with specific interest in PTSD and depression. Data were collected through telephone interviews with individuals who were residents of Manhattan during the time of the attack. The sample was restricted to demographically homogenous individuals and those who lived closest to the physical location of the incident. Participants responded to a structured questionnaire including demographics, living arrangement prior to the attack, and location during the attack. Social support (low, medium or high) was measured in three aspects – emotional, instrumental, and appraisal.

Data were also collected on stressful events in the previous year. Questions include directly witnessed, feared death, lost friends/relatives, been displaced, involved in rescues, or lost job/possessions in relation to exposure to the incident. Panic attacks were
assessed using National Institute of Mental Health Diagnostic Interview Schedule and PTSD was assessed with Diagnostic Interview Schedule for PTSD. Two-tailed chi square tests were used to analyze association between covariate variables and PTSD or depression. Multiple logistic regression was used to examine predictors for PTSD and depression separately. The sample included 988 respondents (e.g., 52% women, 42 years of age, 71.6% Caucasian).

Results indicated PTSD prevalence rate of 7.5 and a 9.7 prevalence rate of depression. Significant predictors for PTSD and depression included Hispanic ethnicity, two or more stressors in last year, and history of panic attacks. Low social support and death of a friend were also implied for individuals with depression. Prevalence rates in the study were double the baseline measures of the area within the last year/30 days. Galea and colleagues (2002) indicated that direct exposure increases an individual’s likelihood to experience psychiatric concerns more than indirect exposure.

Bivariate associations were found for female participants and presence of depression/PTSD. Low levels of social support were implicated for both PTSD and depression (Galea, 2002). Internal threats noted in the study include the sample which was restricted to those with an overlap of both physical, or direct, and emotional, or indirect, exposure to the incident. The demographics of included participants were not representative of the U.S. Census and, therefore, may not be generalizable to the population. Overall, results of Galea’s (2002) foundational study on emotional proximity identified the need to include an individual’s emotional proximity to an event when assessing for PTSD symptomology and its impact on various areas of functioning.
To explore outcomes of trauma (i.e., type and interpersonal proximity to the event) across domains of various psychiatric symptomology while controlling for factors such as age and ethnicity, Price et al. (2013) analyzed the previously mentioned variables in a large sample of school-aged children. Data were analyzed using a previously obtained data set from the Project on Human Development in Chicago Neighborhoods study. Original data were collected longitudinally every two and a half years for eight years. Only the cohorts who completed the Child Behavior Checklist (CBCL) were included in the present study.

The final sample included 1,676 children and adolescents from 4 to 18. Assessment measures included were the CBCL, My Exposure to Violence (My ETV) structured interview regarding trauma history, and the Emotionality, Activity, Sociability, and Impulsivity (EASI) scale to assess temperament based on parent report. Data analysis included multi-level modeling to assist in identification of patterns of behaviors. Independent variables included types of trauma (i.e., known, witnessed, or direct) and degree of interpersonal proximity (i.e., relationship with the victim of the trauma). Emotionality, race, sex, age, and SES were included as covariates. Outcome variables included psychiatric symptomology.

Results indicated 93% of the sample reported experiencing at least one traumatic event. Variability was noted in both baseline and longitudinal symptom presentations. Emotionality scores positively predicted all outcome variables and SES was not a significant factor among any outcome variables. Females were noted to exhibit higher somatic complaints while males, based on parent report, exhibited higher Attention-Deficit/Hyperactivity Disorder and Conduct Disorder symptomology. Across time,
change in direct trauma experiences was noted to be positively associated with change in psychiatric symptomology. Reported number of witnessed traumas were positively associated with Conduct Disorder symptomology. High interpersonal trauma was positively related to Oppositional Defiant Disorder and Conduct Disorder while medium and low interpersonal trauma were not significantly related to any psychiatric symptomology (May, 2013).

The literature base on emotional proximity has indicated linkages between emotional proximity, or indirect exposure, and the development of psychopathology. When conducting survey interviews on individuals who lived in Manhattan during the time of the September 11, 2001 terrorist attacks, Galea and colleagues (2002) noted that direct exposure, or physical proximity, as compared to indirect, was more likely to predict psychiatric concerns. Emotional proximity also predicted psychiatric concerns to a lesser degree. Emotional proximity has also been noted to increase the likelihood of externalizing behaviors such as Conduct Disorder or Oppositional Defiant Disorder as well as internalizing difficulties such as anxiety or depression.

Summary

The development of PTSD often negatively hinders appropriate functioning across all areas for children and adolescents to include academic, behavioral, social, and emotional. To receive a diagnosis of PTSD, one must have been exposed to actual or threatened death, injury, or violence, exhibit intrusion symptoms and avoidance of information related to the event, and also negative changes in mood and reactivity (APA, 2013). When analyzing the topography of the development of PTSD, protective and risk factors often mediate the level of psychopathological concern.
Protective factors identified in the literature base include a support system, high levels of resilience, cognitive and emotional regulation, and evidence of appropriate coping strategies (Harvey, 1996; Pat-Horenczyk et al., 2014). A history of trauma, familial history of psychopathology, negative coping strategies, and lack of social support have been identified as risk factors that enhance the likelihood of developing PTSD (McFarlane, 1998; Shaw, 2000). Proximity, or level of exposure to the event, is among risk factors that enhance the likelihood of developing psychopathological reactions with physical proximity being more likely to predict adverse reactions as compared to emotional proximity.

**Types of Trauma**

Considering the significant role of proximity to the event in relation to the development of PTSD, it is imperative to understand the various types of trauma that children and adolescents may experience. Hodges, Godbout, Briere, Lanktree, Gilbert, and Kletzka (2013) indicated that children and adolescents often experience multiple types of trauma which further increases the risk of negative adverse reactions. The predominant literature base examining childhood traumatic experience and PTSD have focused on single types of trauma as noted by Luthra et al. (2008).

Crises can be split into two categories as either human-caused or natural and man-made disasters. Human-caused traumatic events include household dysfunction, such as abuse, neglect, violence, or other negative, intentional acts caused by another individual (Brock & Jimerson, 2012). Natural or man-made disasters include occurrences such as hurricanes, tornadoes, fire, economic crises, health crises, or industrial disasters (Brock & Jimerson, 2012).
**Human-caused traumatic events**

Human-caused traumatic events include but are not limited to terrorism, domestic violence, car accidents, burglary, or fights (Brock et al., 2009). As discussed previously, children are often continuously exposed to trauma and may therefore remain hypersensitive to both trauma and typical occurrences.

Luthra and colleagues (2008) conducted a study of the association of multiple types of trauma (i.e., being involved in a car accident, fire, witnessing or being a victim of a violent crime, or experiencing abuse) and PTSD while controlling for factors such as age, gender, and ethnicity. Participants included 157 families with children between the ages of 8 and 17 from three large mental health clinics. The mean age of the participants was 12.2 years with the majority of the sample being male, Hispanic, and attending the mental health clinic due to traumatic event exposure based on self-report.

To assess reactions to trauma as well as types of trauma experienced, the Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS; Kaufman et al., 1997) was administered to all participants. From the K-SADS, only the child was used as the primary informant and the PTSD module was the only subcomponent administered. Types of trauma available for endorsement on the K-SADS include car accident, other accident, fire, witnessing a disaster, witnessing a violent crime, being victim of a violent crime, receiving traumatic news, witnessing domestic violence, and experiencing physical or sexual abuse. Based upon the previously discussed definitions of emotional and physical proximity, this study included trauma types representative of both. All respondents were asked to report which events they had experienced as well as which had
been the most distressing in order to respond to the PTSD symptoms related to that event (Luthra et al., 2008).

Results indicated 88 percent of respondents as experiencing at least one type of traumatic event included on the K-SADS. Type of exposure was significantly related to the number of PTSD symptoms endorsed which physical proximity precipitating more significant trauma symptoms (Luthra et al., 2008). Of the included sample, thirty children met the criteria for PTSD based upon results of the K-SADS. Experiencing physical abuse, hearing traumatic news, witnessing domestic violence, and experiencing sexual abuse were all significantly associated with a diagnosis of PTSD based upon the results of Luthra and colleagues’ (2008) study.

Overall results indicated exposure to interpersonal events were more likely to precede psychopathological response when compared to non-interpersonal events. Results of Luthra and colleague’s (2008) study did not indicate diagnoses of PTSD as associated with non-interpersonal traumatic experiences such as car accidents, fires, or natural disasters.

**Natural disasters**

Unlike human-caused trauma, natural disasters are often a result of typically occurring instances. This may include but is not limited to tornados, hurricanes, or flooding. Natural disasters can, at times, be unpredicted and therefore minimal preparation for the trauma is possible.

Bhushan and Kumar (2009) conducted a study to explore the presentation of PTSD and emotional distress in children and adolescents directly or indirectly exposed to a tsunami. 231 participants, 130 directly exposed and 101 indirectly exposed, between the
ages of 10 and 17 were included in the study. Group classification was based upon self-report of exposure to the tsunami. Measures included the Impact of Event Scale and the Pediatric Emotional Distress Scale. Data from the direct exposure group were collected one-year post-catastrophe with the indirectly exposed data collection occurring two months after the one-year follow up.

Results indicated those in the directly exposed group scored higher on the PEDS subscales than those in the indirectly exposed group. Sex differences noted in the directly exposed group resulted in significant differences across most subscales on both measures with males having higher mean scores. Sex differences were noted in the indirectly exposed group measure scores with males scoring higher on intrusion subscales and females scoring higher on withdrawal subscales (Bhushan & Kumar, 2009).

To analyze the relationship between exposure to a natural disaster and posttraumatic stress in children, Evans and Oehler-Stinnett (2006) conducted a study exploring the symptomology presentation of PTSD of 152 children using a self-report scale developed by the primary investigators. Prior to the study, the participating children had been exposed to a deadly tornado and the assessment of symptomology was conducted one-year post-disaster. The demographics of children involved indicated 51 percent female, 98 percent Caucasian, mean age of 9.36 years, and mean grade of 3.5. Of children included as participants, 68 reported the disaster as their first tornado. Regarding proximity to the event, no participating children directly experienced injury or witnessed injury or death. Regarding damage to property, 32% reported damage to their own home, 37% reported damage to an immediate family members’ home, 39% reported damage to an extended family member’s home, and 71% reported damage to a friend’s home.
To assess each child’s symptomology, Evans and Oehler-Stinnett (2006) created a self-report questionnaire based upon the DSM-IV-TR criteria for PTSD involving re-experiencing, avoidance, and arousal. Modification included reframing to discuss tornados and assess the criteria selected from the DSM-IV-TR. In total, 33 Likert scale format questions were included on the self-report questionnaire. Participants also completed a demographic questionnaire to identify age, gender, ethnicity, grade, and level of exposure to the tornado. Results indicated that 40% of participants did not exhibit PTSD symptomology and 25% met the criteria for PTSD based upon the DSM-IV-TR.

Vernberg, Silverman, La Greca, and Prinstein (1996) sought to examine the development of PTSD symptomology in school-age children exposed to a hurricane. Participants included 568 third, fourth, and fifth grade students from elementary schools significantly impacted by Hurricane Andrew. Assessment measures were administered approximately three months after the hurricane. The PTSD-RI was used to assess PTSD symptomology for each participant. Participants also completed the Hurricane Related Traumatic Experiences questionnaire which was developed for the purposes of the study. To assess social support and coping mechanisms, the Social Support Scale for Children and Adolescents and the Kidscope were also administered.

Results indicated 14% of respondents with few or no symptoms of PTSD whereas the majority of the participants reported mild to moderate PTSD symptomology. Approximately 56% of respondents indicated experiencing one to two life threatening events during the hurricane. Results indicated approximately 62% of the variance in PTSD symptomology was explained by the model.
In summation, the two main types of trauma include human-caused and natural disasters. The literature on trauma has indicated individuals often experience multiple types of trauma which in turn increases the likelihood of adverse reactions (Child and Adolescent Health Measurement Initiative, 2013). To date, minimal research has included an analysis of the type of trauma exposure as related to the child’s overall functioning to include the frequency and severity of exposure. Luthra and colleagues’ (2009) study explored the various types of trauma and type of exposure with children and adolescents who attended a mental health clinic for concerns related to the traumatic event. The current study further enhances the work by Luthra and colleagues (2009) by examining various types of trauma and the impact on academic performance in the educational setting. An extensive literature base has explored the frequency of traumatic event exposure in children and adolescents in order to identify types of trauma most common in children and adolescents.

**Educational Impact**

Adverse reactions associated with psychological trauma often permeate various aspects of an individual’s life. Cognitively, individuals often experience traumatic event recall, or flashbacks, of the experience which occur involuntarily and may be triggered by stimuli related to the event (Brewin & Holmes, 2003; Pynoos et al., 2009; Slaikeu, 1990). Negative beliefs about the traumatic event and oneself are also common reactions to a traumatic event which may negatively interfere with social relationships (Brewin & Holmes, 2003).

Somatic complaints such as headaches, stomachaches, difficulty sleeping, or muscle tension are frequently noted after traumatic experiences and may interfere with a
child’s overall academic and social functioning (Kugler, Bloom, Kaercher, Truax, & Storch, 2012). In regard to educational performance, exposure to traumatic events has been correlated with poor academic achievement, lower overall grade point average (GPA), increased rate of truancy or drop out, and behavioral concerns such as hyperactivity, aggression, or withdrawal (Cohen, Berliner, & Mannarino, 2010; Goodman, Miller, & West-Olatunji, 2011).

Smithgall, Cusick, and Griffin (2013) indicated exposure to trauma negatively impacts cognitive ability and skill acquisition which interferes with academic performance. Cognitive deficits noted as a result of trauma exposure include difficulty with sustained attention to task demands, short and long-term memory deficits, impaired executive functioning and problem solving, and difficulty with comprehension of information. These difficulties may therefore lead to academic disengagement which negatively impacts overall academic performance. The creation of trauma-informed systems has been identified as evidence-based methods to identify and appropriately respond to children who are experiencing adverse reactions to trauma in order to minimize disruptive behavior and support academic progress. Similar to the design of the PREParetRE model, Smithgall et al. (2013) indicated a tiered approach to trauma response is vital in identification and response to trauma experiences in children and adolescence which may involve universal, small group, or individualized intensive intervention.

Hurt, Malmud, Brodsky, and Gianetta (2001) indicated exposure to violence has become increasingly common throughout early development with increased risk for those living in inner city settings. To assess the impact of exposure to violence on academic performance, Hurt and colleagues (2001) conducted a study with 119 seven-year-old
children that were predominantly female and African American. High exposure to violence was associated with lower grade point average and higher absences from school (Hurt et al., 2001). Discussion of this study indicated that the deficits in academic performance noted in the participants were among the first to be observed in children at this young age (Hurt et al., 2001).

In a more recent analysis of the impact of trauma on academic performance in elementary-school aged children, Blodgett and Lanigan (2018) analyzed the relationship between ACE exposure and academic status (i.e., attendance, academic achievement, and behavioral difficulties). Participants included 2,101 children in grades kindergarten through sixth grade from ten elementary schools across four school districts that were selected from de-identified classroom rosters. Of the ten schools, five were Title I (i.e., high poverty) and five were not identified as Title I. The selected participants’ teachers completed a questionnaire adapted from the original study (Felitti et al., 1998) to identify each student’s trauma history. Academic success was measured by having student’s teachers rate items as true (i.e., concern) or false (i.e., not a concern) across attendance, behavior, and academic achievement.

Results of binary logistic regression, ANOVA, and generalized estimating equations analyses indicated increased ACE exposure was associated with increased risk of academic failure, attendance concerns, and behavioral difficulties. Demographic data indicated approximately 56 percent of participants reporting no ACE exposure whereas 13 percent of the remaining 44 percent of participants endorsed three or more ACEs. Demographically, Title I schools were more likely to have ACE exposure than non-Title I school students. Overall results of the study by Blodgett and Lanigan (2018) further
confirmed the relationship between ACE exposure and academic success in elementary-
school aged children.

Although there is an extensive literature base on the various types of traumatic
events that children and adolescents face, minimal research has examined the relationship
between exposure to trauma and academic performance. The literature to date has noted
deficits in reading comprehension, problem solving, lower standardized test scores, and
decreased grade point average. Reading ability in primary school has been positively
correlated with future overall success in all other areas of academic achievement (Lee &
Jonson-Reid, 2016). Furthermore, it is imperative to include community resources and
families in the response in order to bolster the social support identified by theoretical
models and extensive literature as a protective factor against the development of PTSD or
other psychopathology.

Assessment of PTSD

A valuable informal method of assessing reactions to psychological trauma is to
identify the child or adolescent’s level of traumatic exposure as well as typographies of
response (Cohen et al., 2010). Cohen and colleagues (2010) indicated that routinely
children indicate traumatic histories more frequently when asked directly rather than
spontaneous admission. After an informal assessment of traumatic exposure using
methodologies such as interviews regarding trauma history, standardized instruments are
available to assist in identification of presentation of symptoms related to PTSD in
children and adolescents. Semi-structured standardized interviews, self-report measures
for individuals over the age of seven, and parent-report measures are frequently used to
formally assess PTSD symptomology (Cohen et al., 2010).
Interviews are an invaluable informal assessment tool that can assist mental health professionals in gaining an adequate understanding of traumatic events from the child or adolescent perspective. Shaw (2000) indicated that school-age children and adolescents are often able to informally provide a description of the traumatic events they experience. Younger children exhibit more difficulty expressively communicating accurate descriptions and may therefore require formal assessments to accurately identify levels of trauma related symptomology. A number of formal standardized assessment measures have been designed to identify the negative reactions to psychological trauma in individuals of all ages.

The *Trauma Symptom Checklist for Children (TSCC)* is a standardized assessment tool designed to measure posttraumatic stress symptomology in children and adolescents ages 8 to 16 who have recently experienced a traumatic event. The TSCC is a 54 item self-report measure that can be administered in an individual or group format. The clinical scales included on the TSCC are Anxiety, Depression, Anger, Posttraumatic Stress, Dissociation, and Sexual Concerns (Briere, 1996). Alternate forms of the TSCC include the *Trauma Symptom Checklist for Young Children* which is a parent-report measure designed for children younger than six and the *Trauma Symptom Checklist for Children-Alternate Form* which is a 44 item self-report measure that excludes sexual concerns (Briere, 1996). Internal consistency coefficients range from .77 to .89 (Briere, 1996). Convergent, discriminant, and predictive validity have been measured as adequate in both normative and clinical samples (Briere, 1996).

The PTSD-RI (Steinberg, 2004) is an assessment tool to identify PTSD in children and adolescents ages six and older based on the *Diagnostic and Statistical
Manual of Mental Disorders Fifth Edition (DSM) criteria. Comprehensive administration of the PTSD-RI entails a semi-structured interview designed to obtain the informant’s trauma and a self-report questionnaire that is beneficial identifying levels of PTSD symptomology that align with each of the criteria identified by the DSM-5. To account for variations in age and the child’s ability to self-report information, the PTSD-RI includes a parent version as well to appropriately formally assess younger children or special populations of children who may exhibit difficulty completing self-report measures independently. The PTSD-RI is also available in a variety of languages which enhances its applicability with a diverse population.

The PTSD-RI is composed of three sections: trauma screening, trauma history details, and self-report questionnaire (Steinberg, 2004). The trauma screening questions include 23 various types of traumatic experiences that an individual may have been exposed to. The trauma history section of the PTSD-RI expands on the trauma types endorsed on the history screening to identify the age at which the experience occurred, the child’s proximity to the event, and specific examples related to the broad types identified in the screening. The self-report questionnaire is composed of 23 questions with responses in a Likert scale format from 0 (none) to 4 (most days) that load onto scales related to each criterion of PTSD as based on the DSM-5. Scores on the PTSD – RI range from 0 to 80 with higher scores representing higher likelihoods of symptoms aligning with the DSM-5 criteria for PTSD (Steinberg, 2004).

Studies conducted on previous versions of the PTSD-RI have yielded high reliability scores while assessing each version of the PTSD-RI. High levels of internal consistency reliability and test-retest reliability were observed with coefficients above .80
(Elhai et al., 2013; Steinberg et al., 2013). Construct validity, convergent validity, and criterion-referenced validity have all been analyzed for the PTSD-RI. Significant correlations were noted between the PTSD-RI subscales and scale scores from the PTSD module in the K-SADS (Kaufman et al., 1997) which suggests high construct validity (Steinberg et al., 2013).

When comparing the total scale score on the PTSD-RI with the Posttraumatic Stress scale on the Trauma Symptom Checklist for Children-Alternate Form (TSCC-A), Steinberg and colleagues (2013) found high correlations which suggest strong evidence of convergent validity. Weaker correlations were noted between the other scales on the TSCC-A and the PTSD-RI, which suggests moderate discriminant validity. Steinberg and colleagues (2013) indicated criterion-referenced validity coefficients within the .90 range when comparing items on earlier versions of the PTSD-RI to the DSM-III-R as well as Clinician Administered PTSD Scale, Children and Adolescent Version (Nader et al., 2002).

Overall, the PTSD-RI is one of the most commonly used assessment measures in the literature base on trauma to identify PTSD as it relates to the DSM-5 criteria. The comprehensive nature of the PTSD-RI allows examiners to identify each individuals’ trauma history, proximity to the event, and reactions to the event each individual perceives to be impacting them the most. Results of the PTSD-RI indicate which symptom category each individual is exhibiting which allows for effective intervention strategies to minimize the negative outcomes associated with PTSD.
Overall Summary

This chapter provided a literature review on both ACES and the various areas of adverse impact often associated with the experience. In the educational setting, the impact of trauma may include inconsistent attendance, diminished academic achievement, and disruptive behavioral concerns. Three foundational theories significantly contributed to the development of the comprehensive crisis response models implemented in today’s crisis response teams.

The Stress Response Theory (Horowitz, 1986) explored the neurological impact of traumatic experiences in order to identify cognitive strategies associated with processing the event. To address the areas of adverse impact as a result of a traumatic experience such as emotional and behavioral functioning, Slaikeu (1990) developed the Crisis Response Theory in order to identify areas to target for intervention. Biologically, Trauma Theory (Bloom, 1999) suggested the physiological difficulties noted after a traumatic event such as sustained activation of the fight or flight response which impairs overall functioning. The Interpersonal Problem Solving Model (D’Zurilla & Goldfried, 1971) applied problem solving strategies to use appropriate coping strategies to respond to a crisis event. These individual theoretical models led to the development of more comprehensive crisis training models used today.

The PREPaRE and NOVA training models are implemented nationwide in response to crisis events to minimize the likelihood of adverse reactions and provide evidence-based interventions for individuals affected by the traumatic event. In the event of sustained negative reactions, individuals may develop PTSD which is characterized by exposure to a traumatic event, intrusion symptoms, avoidance of information related to
the event, and varying mood and cognitive functioning. Protective factors such as social support, appropriate coping strategies, and flexibility are examples of characteristics that have been shown to minimize the development of psychopathology such as PTSD.

Previous exposure to trauma, internalizing disorders such as depression or anxiety, and proximity to the event are factors that have been identified as predictive of negative reactions in response to trauma exposure.

Proximity to a traumatic event can be defined as two categories which include physical and emotional. Physical proximity may include personal exposure to the event whereas emotional proximity may include a previous relationship with someone injured or killed in the event with physical proximity often more predictive of adverse reactions. Human caused traumatic events include violence, war, or terrorism whereas man-made or natural traumatic events include natural disasters, fires, or hazardous chemical spills. Exposure to these types of events often negatively impact academic achievement such that GPA and attendance are typically lower, externalizing and internalizing behavioral difficulties, and deficits in skill acquisition and retention.

The current study explored the impact of traumatic experiences on academic performance. This is imperative in order to directly analyze the relationship between trauma exposure and academic achievement in efforts to identify preventative measures to minimize the likelihood of academic failure. The current study also analyzed the relationship between proximity type and academic performance in order to incorporate the differences into comprehensive crisis prevention and intervention strategies.
CHAPTER III
METHODOLOGY

The purpose of this study was to explore the relationship between exposure to traumatic events and academic performance in children and adolescents. The following sections are provided in this chapter to discuss the methods for investigating the research questions surrounding the impact of traumatic events on educational performance. These sections include the following: Participants and setting, instrumentation, procedures, research design, and data analysis.

Does the presence of PTSD symptoms (i.e., PTSD-RI) predict academic performance (i.e., Measures of Academic Progress [MAP] reading scores) in students who have experienced natural disasters?

Does type of exposure (i.e., emotional or physical) moderate/mediate the relationship between PTSD symptoms and academic outcomes in students?

Participants and Setting

Eight school districts in the southeastern region of the United States were contacted to participate in the study. The school districts were chosen based upon districts that had previously collaborated with the university for experiences such as practicum or other research studies. In order to participate, the school districts had to administer the Northwest Evaluation Association (NWEA) MAP assessment to their students. The NWEA MAP assessment was not administered in four of the eight contacted districts.
Representatives from two of the remaining four school districts did not respond to contact regarding participation in the study and one other district did not wish to participate in the study. Therefore, one school district was used to collect data for the present study.

Data were collected on an additional 25 students from one of the previously mentioned school districts. These data were not used in data analysis due to the school district not administering the version of the MAP assessment that was used in the present study. Therefore, all participants included were from one school district that administered the NWEA MAP (2013) assessment.

One school district in the southeastern region of the United States agreed to participate in the study. The school district is composed of 5,400 students. Demographic data indicate that 60% of enrolled students are Caucasian, 37% of enrolled students are African American, 2% of enrolled students are Hispanic/Latino, 0.5% of enrolled students are Asian, and 1% of enrolled students are two or more races. Regarding gender, 50% of enrolled students are male.

From this district, students enrolled in third through sixth grade were recruited to participate. Inclusion of middle school students (i.e., seventh and eighth graders) was sought, but permission was not obtained from building level principals. For the four elementary-level schools included in the present study, total enrollment per grade is as follows: 360 third graders, 436 fourth graders, 408 fifth graders, and 38 sixth graders. Third through sixth grade students were selected due to the readability of the assessment measure being administered. Individuals with reading difficulties were excluded due to the requirement of adequate reading fluency and comprehension abilities to complete the assessment measures.
Parental consent was obtained for 136 students. Four students who received special education services and four students who received reading intervention were removed prior to data collection. On the day of data collection, 12 students were absent, and three students did not wish to participate in the study. A total of 113 students participated across one district, four school buildings and four grades. The final participant group included 81 students. The remaining 32 students moved or did not have MAP assessment scores during data collection.

The mean age for participants was 9.9 years ($SD = 0.95$). Of the participants, 40 were male and 41 were female. Third grade students accounted for 2% of participants ($n = 2$), fourth grade students accounted for 43% of participants ($n = 35$), fifth grade accounted for 33% of participants ($n = 27$), and sixth grade accounted for 21% of participants ($n = 17$). The total participant group was ethnically represented as 38% Caucasian ($n = 31$), 48% African American ($n = 39$), 4% Latino/Hispanic ($n = 4$), 2% Native American ($n = 2$), and 6% Other ($n = 5$). The sample size was reflective of district level enrollment in regard to gender. Compared to district level ethnicity rates, the current sample size was not an accurate representation (e.g., district level of 59% Caucasian and 36% African American). When considering grade level distribution, third and sixth grade were under-represented in the current study. See Table 1 for a representation of demographic data.
Table 1

Demographics of Participants

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Total Sample (N = 81)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Eight</td>
<td>1 (1.23%)</td>
</tr>
<tr>
<td>Nine</td>
<td>28 (34.57%)</td>
</tr>
<tr>
<td>Ten</td>
<td>29 (35.80%)</td>
</tr>
<tr>
<td>Eleven</td>
<td>17 (20.99%)</td>
</tr>
<tr>
<td>Twelve</td>
<td>6 (7.40%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40 (49.38%)</td>
</tr>
<tr>
<td>Female</td>
<td>41 (50.62%)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>2 (2.47%)</td>
</tr>
<tr>
<td>Fourth</td>
<td>35 (43.21%)</td>
</tr>
<tr>
<td>Fifth</td>
<td>27 (33.33%)</td>
</tr>
<tr>
<td>Sixth</td>
<td>17 (20.99%)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>31 (38.27%)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>39 (48.15%)</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>4 (4.94%)</td>
</tr>
<tr>
<td>Native American</td>
<td>2 (2.47%)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (6.17%)</td>
</tr>
</tbody>
</table>

**Instrumentation**

To address the identified variables, three instruments were used. A demographic questionnaire developed by the primary researcher was used to collect general information such as age, gender, and ethnicity about the participants. The PTSD-RI was used to assess each participant’s trauma history and symptom presentation. The participant’s scores on the MAP reading assessment was used as an indicator of each student’s academic performance in reading.
Demographic Questionnaire

A demographic questionnaire was developed by the researcher to explore the characteristics of the participants (see Appendix A). The demographic questionnaire included 4 items which prompted the respondent to circle the choice that best describes them. The questionnaire distributed to participants included items related to the participant’s age, gender, ethnicity, and current grade level.

Posttraumatic Stress Disorder Reaction Index (PTSD-RI)

The PTSD-RI was used to measure each student’s proximity to traumatic events as well as their level of symptomology of PTSD. The PTSD-RI is a screening questionnaire based on the DSM-5 criteria to assess post-traumatic reactions in children and adolescents ages six and older. The PTSD-RI includes two formats – a self-report and parent report version. Administration of the PTSD-RI can be done in a semi-structured interview format to get a full description of traumatic experiences for children and adolescents. A self-report questionnaire is included to evaluate the level of PTSD symptomology according to the DSM-5. Readability levels were assessed using the Flesch-Kincaid analysis in Microsoft Word and the indicated reading level of the PTSD-RI was grade 6.1 overall and grade 3.9 on the self-report questionnaire. The PTSD-RI is available in English, Spanish, German, and Arabic.

The PTSD-RI includes three main sections: Trauma Loss/History Screening, Trauma/Loss Details, and Post-Traumatic Stress Symptoms Screening. The Trauma Loss/History Screening section includes 23 various types of traumatic experiences for respondents to indicate if they have experienced the event. To account for the reading ability of all students being recruited, the trauma history portion of the PTSD-RI was
adapted which resulted in a lower reading level of 2.4 (see Appendix B). Adaptations to the trauma history portion included removal of various experiences and examples that were not being directly assessed in the current study. Of the remaining trauma types (e.g., man-man, household dysfunction, natural disasters), grade and developmental-level appropriate examples were provided. The adaptation of the trauma history portion of the instrument may have impacted overall reliability and validity that was previously assessed using the original assessment measure. The Trauma/Loss Details section of the PTSD-RI expands on the trauma types endorsed on the history screening.

The Trauma/Loss Details is used to elicit information such as age of experience, the individual’s role in the event (i.e., victim, witness, or learned about), and specific examples to indicate based on the overall traumatic event endorsed. For the purposes of the present study, proximity type was identified by each child’s role in the identified events with physical proximity including victim and emotional proximity including witness or learned about. The Post-Traumatic Stress Symptoms Screening section is composed of 27 questions with responses in a Likert type format from 0 (none) to 4 (most days). Scores on the PTSD-RI range from 0 to 80 with higher scores representing higher likelihoods of symptoms aligning with the DSM-5 criteria for PTSD. When scoring, four item sets are scored by taking the highest score only of an indicated set of question items.

Regarding reliability and validity, multiple studies have analyzed previous versions of the PTSD-RI to identify reliability and validity evidence (Elhai et al., 2013; Pynoos et al., 1987; Steinberg et al., 2013). Studies conducted on previous versions of the PTSD-RI have yielded high internal consistency reliability (Elhai et al. 2013; Pynoos et al., 1987; Steinberg et al., 2013), criterion referenced validity, construct validity, and
test-retest reliability with a coefficient of .84. Steinberg and colleagues (2013) indicated internal consistency coefficients of .90.

**Measures of Academic Progress**

The MAP is a computerized assessment developed by the Northwest Evaluation Association (NWEA; 2013) to provide growth and achievement data to facilitate development of appropriate instructional strategies (NWEA, 2013). MAP measures student growth and overall achievement in Reading, Language Arts, Mathematics, and Science. The computer administered, adaptive nature of the MAP allows for immediate selection of the level of subsequent test items dependent upon the student’s performance on previous items.

MAP results are indicated in equal-interval Rasch Unit (RIT) scores which is an estimation of the student’s instructional level. Higher scores on the MAP indicate higher levels of academic performance. School districts using the MAP are able to administer the adaptive assessment up to four times a year to get an adequate representation of each student’s growth. Normative data for the MAP are currently collected across 32 states and includes 2.3 million students across 794 school districts.

**Procedures**

The following section discusses administration procedures including consent for participation, researcher training, coding of participants, administration, and scoring. This includes IRB, parental consent, child verbal assent, training of graduate researchers, data coding and collection, and scoring of the PTSD-RI.
Consent

District consent was sought from the participating district prior to submission of an approval form to the Institutional Review Board (IRB). The primary investigator engaged in face-to-face meetings with the necessary administrators of the school district to discuss the purpose of the study, foreseeable risks and benefits, and respond to any questions or concerns. An approval letter was signed by the superintendent, deputy superintendent, and building principals who agreed to participate for inclusion in the IRB submission. IRB approval was requested from Mississippi State University’s IRB board. After district approval and IRB approval (See Appendix C), consent forms were distributed to all children in the third through eighth grade. A brief description of the study was discussed with all potential student participants.

Parental consent forms were provided for each student to take home to request parent/guardian consent. A two-week window for consent return elapsed prior to data collection. A researcher visited the schools involved once a week to collect returned consent forms, respond to any questions or concerns, and distribute a second round of consent forms. In total, each participating school building was visited by a trained graduate researcher three times (i.e., first round of consent distribution, second round of consent distribution, and data collection).

Researcher Training

Researchers assisting with this study were recruited from graduate level students in school psychology. Research assistants were used to administer the PTSD-RI and demographics questionnaire to participants. To ensure valid administration of instruments, group training was conducted by the primary researcher prior to data
collection using a training protocol created by the primary investigator (See Appendix D). Group training sessions included appropriate group administration of the demographics questionnaire and the PTSD-RI. Training also included an overview of the study, presentation and description of materials to be used, scripts for administration of the instruments, and procedural steps for administration.

Each research assistant was provided a detailed script (See Appendix E) of what to say during both consent distribution and data collection as well as a procedural checklist which included the order of disbursement of information. After training, each research assistant was provided the opportunity to model administration and answer questions regarding key information discussed. Correct responses to questions were required before active participation in the study. A procedural integrity checklist (See Appendix F) was used to assess training completion and administration of assessment measures. During training, integrity was assessed until research assistants obtained 100% compliance.

**Coding of Participants**

To maintain confidentiality, each student was given a numerical identification number to correspond with information collected (i.e., demographics questionnaire, PTSD-RI, and MAP assessment results). One master file was created that contained the names of the participants. Each student received a randomized ten-digit number. The first two numbers identified the school, the following two numbers identified the classroom, the following two numbers identified the grade, the next two numbers identified the student’s age, and the final two numbers were a randomized student code.
between 00 and 99. The randomized number ensured that students from the same classroom do not have the same randomized code.

01 03 05 13 98

*Figure 1. Example of randomized student code*

A sticker with the randomized number was placed on all instruments for dispersal. A removable identifier with each child’s name written on it was placed on the top of the instrument packet to streamline the distribution process. Once each student received the packet, the removable identifier was disposed.

**Administration**

Upon return of parental consent forms, packets of assessment measures were created for students whose parents agreed to allow their child to participate. Assessment measures were distributed to students in a group setting in a large room (e.g., library) in the school building. Prior to dispersing the packet, the study was described to students again and students were asked for their assent to participate. Students completed assent forms prior to distribution of the assessment measures.

For students who chose to participate, the assessment measures were then distributed for each student to complete. The packet included the demographic questionnaire (See Appendix A), Trauma History Checklist (See Appendix B), and the screener portion of the PTSD-RI. Trauma histories were collected from each student using the checklist format provided in the group setting with a research staff member present to assist as necessary. At least two research staff members were available during all administrations to provide instructions, respond to questions, and ensure procedures
were being followed adequately. After completion of the assessment measure packet, students were provided small incentives (i.e., bracelet, candy).

Data were collected during the school day prior to lunch. Students who had parental consent were requested to report to the library at which point a brief description of the study was read aloud once more followed by assent form and assessment measure distribution. Students were informed not to write their names on any documents they were provided and were instructed to remove the sticky note with their name on the packet prior to submitting it to a researcher.

When students completed their questionnaire packet, trained graduate student researchers reviewed the questionnaire for completion as well as if the student had reported ideation or previous behavior regarding harm to self or harm to others. For students who endorsed these items, trained graduate researchers prompted students to tell more about their response. After review, a total of approximately 10 students endorsed ideation or previous behavior regarding harm to self or harm to others. Four of the 10 students indicated major occurrences of ideation of self harm and were immediately referred to the school counselor. Few students became upset during data collection due to occurrences they had experienced and debriefed with the trained graduate student researchers. All students were provided the opportunity to debrief with the graduate student researchers prior to leaving.

MAP scores were manually entered into the password encrypted database by the primary researcher. Each MAP score was aligned with individual student’s numerical identifier. All completed assessment measures were collected by a research staff member and stored in a safe, locked location. A single database was created by the primary
researcher for data input of all assessment measures. The database was password protected and only included the numerical identifiers to maintain confidentiality. A separate password encrypted document was created to match student information to numerical identifiers.

**Scoring**

PTSD-RI was scored using the computer software provided by the publisher. The student’s numerical identifier was entered as student name to maintain confidentiality. Each response was entered manually. Output data included each student’s numerical identifier as well as scores for each category of clinically diagnosable PTSD as based on the DSM-5. A total score indicating level of PTSD symptomology was included. The total score was the primary score of interest for the current study. These score reports were saved to a password protected drive.

**Procedural Integrity**

To ensure integrity of scoring, 33% of PTSD-RI were scored by a second research staff member. This research member received individual training regarding the PTSD-RI scoring system and was provided a checklist (See Appendix G) to complete the scoring. To complete this process, 27 completed packets were selected by taking every third questionnaire packet to be included in interobserver agreement (IOA) scoring. The PTSD-RI page of the completed packet was scanned into a shared folder between the primary researcher and a trained graduate student. The checklist provided (See Appendix G) was used by the trained researcher to score the scanned materials using the electronic
scoring system for the PTSD-RI. Results of inter-scorer agreement indicated 81 percent integrity.

**Research Design**

The study used a 1 (academic performance) x 1 (PTSD) x 3 (physical proximity, emotional proximity, or both) design. Linear regression was used to analyze the relationship between PTSD and academic performance. A hierarchical linear regression was used to analyze the moderation of proximity and academic performance.

**Independent Variable**

For the purposes of the present study, PTSD was used as the independent or predictor variable. PTSD was assessed using each participant’s total score on the PTSD-RI. Moderator variables including physical and emotional proximity to the traumatic event were measured using the PTSD-RI as well. Physical proximity was indicated by victim (i.e., “Happened to me”) endorsed on the PTSD-RI Trauma History and emotional proximity was indicated by witness (i.e., “Happened to someone I know) endorsed on the PTSD-RI Trauma History. For the purpose of the present study, proximity was coded as a dichotomous variable (e.g. “1” if participant endorsed happened to me and “0” if participant did not endorse happened to me). Therefore, an indicator of one for physical, emotional, or both was representative of the presence of that type of proximity.

PTSD symptomology is defined as each participant’s respective score on the PTSD-RI with higher scores indicating higher presence of PTSD symptomology. The participants’ level of PTSD symptomology was assessed using the scores on the PTSD-RI. (Steinburg, 2004). Based on previous literature, physical proximity is defined as the
physical distance from the event or witnessing injury/death (Deković, Koning, Stams, & Buist, 2008); degree or amount of exposure (Brock, Ballard, & Saad, 2013). Emotional proximity is defined as emotional involvement such as injury or death of a loved one (Deković et al., 2008); emotional connection to people who were affected by a crisis or a sentimental association to the crisis location (Huang, Starbird, Orand, Stanek, & Pederson, 2015).

**Dependent Variable**

For the purpose of this study, the dependent variable in this study is academic performance. Academic performance is defined as academic achievement specifically related to reading (Makri-Botsari, 2015) and each participant’s academic performance was measured using the reading score in RITS from NWEA MAP. Educational performance was assessed using the MAP scores for each participant with higher scores indicating higher levels of academic performance. Participants completed the NWEA MAP assessment during the Spring of the 2016-2017 school year.

**Data Analysis**

To examine the first research question, a simple linear regression analysis was used to assess the relationship between PTSD symptoms and academic outcomes. Simple linear regression is used to predict change in a dependent variable based upon the influence of one or more independent variables (Hair, Black, Babin, & Anderson, 2010). Assumptions noted in multiple linear regression include normality, homoscedasticity, linearity, and independence of correlated error. Normality includes that the data should follow the shape of a normal distribution (Hair et al., 2010). Both univariate and
multivariate normality are assessed with multiple linear regression in that univariate normality includes single variables whereas multivariate normality includes the combination of two or more variables.

Relative to the assumption of normality, Hair and colleagues (2010) indicated the importance of kurtosis and skewness in describing the shape of the distribution of the data. Kurtosis involves the peak or flat shape of the data whereas skewness looks at the balance of the data versus more so to the left or the right side. Homoscedasticity requires the dependent variables have equal levels of variance on the identified predictor variables (Hair et al., 2010). The distribution of variance across variables allows for a generalizable representation of the relationship between the included variables. Linearity involves the linear relationship between included variables which effects the correlation value between the included variables. Independence of error requires that data be collected independently to avoid biased results.

To examine the second research question, hierarchical linear regression analysis was used to explore proximity as a moderator on the relationship between PTSD and academic achievement. Hierarchical linear regression is used to predict change in a dependent variable based upon the influence of one or more independent variables similar to linear regression but includes moderator variables as a second level of analysis (Hair, Black, Babin, & Anderson, 2010). As the analysis is the same, assumptions are also parallel to those discussed as contributing to the analysis of research question one.

Power analysis for regression with four 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 ($f^2 = 0.15$; Faul et al., 2013). Based on the aforementioned conditions, the
minimum desired sample size is 77. The present study included 81 participants which, under these conditions, is estimated to have a statistical power of .82.
CHAPTER IV

RESULTS

The purpose of the present study was to analyze the hypothesized relationship between the presence of post-traumatic stress symptomology and academic achievement in children and adolescents. Furthermore, the researcher also sought to analyze the existence of a moderating relationship between proximity (i.e., Physical Proximity and Emotional Proximity) and academic achievement. To investigate these hypotheses, the following two research questions were used: (a) Does the presence of PTSD symptoms (i.e., PTSD-RI scores) predict academic outcomes (i.e., MAP reading scores) in students who have experienced traumatic events as well as a small portion \((n = 3)\) of students who reported no trauma and (b) Does type of exposure (i.e., emotional or physical) moderate the relationship between PTSD symptoms and academic outcomes in students? Multiple linear regression and hierarchical regression were used to address the research questions.

**Question 1: Does PTSD symptomology predict academic achievement?**

A simple linear regression was used to analyze the hypothesized relationship between PTSD symptomology as noted by PTSD-RI scores and academic achievement as noted by MAP scores. The independent variable used was PTSD-RI scores for each student whereas MAP scores were used as the dependent variable. Descriptive statistics indicated an average PTSD-RI score of 33.91. An analysis of the PTSD-RI scores from the participants indicated 44 percent \((n = 36)\) were observed to have scores greater than
or equal to 38 which is indicative of clinically diagnosable PTSD. The average MAP score obtained in the present sample was 436.38 (see Table 1 for further descriptive statistics). A review of the MAP scores by grade level indicated one of two third grade students was performing below grade level, the majority of fourth grade students were performing below grade level, the majority of fifth grade students were performing below grade level, and the majority of sixth grade students were performing at grade level. It is important to note the sixth grade participates were obtained from one school campus and may not be representative of the districts’ sixth grade level performance. Overall descriptive statistics noted from the participant’s scores indicated a presence of below grade level performance. Pearson correlations of the independent and dependent variables are indicated in Table 2.

When considering assumptions, the Shapiro-Wilk test of normality for the independent variable indicated univariate normality ($p > .05$). Linearity was assessed using a scatter plot of the residuals. A scatterplot of the independent and dependent variables indicated a non-linear relationship. Transformations including square root, log, and reciprocal were unsuccessful in yielding a linear relationship. The assumption of homoscedasticity was assessed by visual analysis of a scatterplot including standardized residuals and predicted values. The assumption of homoscedasticity was met such that equal distribution was noted across both the X and Y axes.

As a result of data analysis, the presence of PTSD symptomology as noted by the PTSD-RI score does not, in this sample, predict academic achievement as noted by the MAP score. Results of the linear regression (see Table 3) indicated PTSD symptomology accounted for approximately 3 percent of the variance in academic achievement which
was noted to be non-significant ($p > .05$). Results indicated the linear regression model was not significant ($p > .05$) in predicting academic achievement as compared to chance occurrences.

Table 2

*Descriptive Statistics for Independent and Dependent Variable*

<table>
<thead>
<tr>
<th></th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD-RI</td>
<td>33.91</td>
<td>15.87</td>
</tr>
<tr>
<td>MAP</td>
<td>436.38</td>
<td>74.75</td>
</tr>
</tbody>
</table>

*Note:* Observed sample size was 81.

Table 3

*Pearson Correlations of Independent and Dependent Variables*

<table>
<thead>
<tr>
<th></th>
<th>PTSD-RI</th>
<th>MAP Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD-RI</td>
<td>1.00</td>
<td>0.16</td>
</tr>
<tr>
<td>MAP Score</td>
<td>0.16</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 4

*Regression Model Summary Table*

<table>
<thead>
<tr>
<th>$R$</th>
<th>$R^2$</th>
<th>Adj. $R^2$</th>
<th>Std. Error</th>
<th>$R$ Square Change</th>
<th>$F$ Change</th>
<th>$df1$</th>
<th>$df2$</th>
<th>$Sig.$</th>
</tr>
</thead>
<tbody>
<tr>
<td>.16</td>
<td>.03</td>
<td>.01</td>
<td>74.26</td>
<td>.03</td>
<td>2.07</td>
<td>1</td>
<td>79</td>
<td>.15</td>
</tr>
</tbody>
</table>

*Note:* Statistical significance was determined at $p < .05$.

**Question 2:** Does proximity to traumatic events moderate the relationship between symptomology of PTSD and academic achievement?

The second research question in the present study aimed to determine if proximity (i.e., physical or emotional) to a traumatic event moderated, or impacted the strength of, the hypothesized relationship between the presence of PTSD symptomology and academic achievement.
academic achievement. For the purposes of the present study, proximity included physical, emotional, or both which resulted in dummy coding for three categorical variables. A hierarchical regression was used to analyze the impact of proximity on both the predictor and outcome variables. Frequency statistics for the variables included in the hierarchical regression are displayed in Table 4. The Pearson correlations between the independent, dependent, and moderator variables are displayed in Table 5. Assumptions assessed prior to running the hierarchical regression analysis include normality, linearity, homoscedasticity, multicollinearity, and independence of errors. Considering the variables added to the model to determine the presence of a moderating relationship were categorical, the output for each of the assumptions remained the same as that observed in research question one.

Table 5

*Frequencies of Proximity Variable*

<table>
<thead>
<tr>
<th>Proximity Type</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>20</td>
</tr>
<tr>
<td>Emotional</td>
<td>16</td>
</tr>
<tr>
<td>Both</td>
<td>42</td>
</tr>
<tr>
<td>None</td>
<td>3</td>
</tr>
</tbody>
</table>
A three-stage hierarchical regression analysis was conducted using the MAP score as the dependent variable and the PTSD score as the independent variable for the first stage. The second stage included the MAP score as the dependent variable followed by PTSD score with hypothesized moderator variables of physical, emotional, or both proximity as the independent variables. The final stage introduced the interaction terms between the independent variable, PTSD score, and each of the moderator dummy coded variables of proximity type (e.g. Physical Proximity x PTSD, Emotional Proximity x PTSD, and Both Proximity Types x PTSD).

Results of the hierarchical regression including the moderator variable and interaction terms are presented in Table 6. Outcomes of the hierarchical regression analysis at the first stage indicated identical results to research question one such that a relatively small relationship between the MAP score and the PTSD score was observed. Stage two of the hierarchical regression, however, indicated that the addition of proximity as a moderating variable accounted for 9.3% more of the variance in the original hypothesized relationship between the MAP score and the PTSD score. Furthermore, the

<table>
<thead>
<tr>
<th></th>
<th>PTSD-RI</th>
<th>MAP</th>
<th>Physical Proximity</th>
<th>Emotional Proximity</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD-RI</td>
<td>1.00</td>
<td>0.16</td>
<td>0.06</td>
<td>-0.08</td>
<td>0.02</td>
</tr>
<tr>
<td>MAP</td>
<td>0.16</td>
<td>1.00</td>
<td>-0.18</td>
<td>-0.19</td>
<td>0.30</td>
</tr>
<tr>
<td>Physical Proximity</td>
<td>0.06</td>
<td>-0.18</td>
<td>1.00</td>
<td>-0.28</td>
<td>-0.59</td>
</tr>
<tr>
<td>Emotional Proximity</td>
<td>-0.08</td>
<td>-0.19</td>
<td>-0.28</td>
<td>1.00</td>
<td>-0.52</td>
</tr>
<tr>
<td>Both</td>
<td>0.02</td>
<td>0.30</td>
<td>-0.59</td>
<td>0.52</td>
<td>1.00</td>
</tr>
</tbody>
</table>
change in $R^2$ was noted to be significant $F (3, 76) = 2.54, p = 0.05$. The addition of the interaction terms in the third stage accounted for an additional 3% of the variance in the MAP score but the change was noted to be nonsignificant $F (3,76) = 1.82, p= 0.10$.

When reviewing the significance of the individual interaction terms, all results were noted to be nonsignificant.

Table 7

**Summary Statistics for Hierarchical Regression Analysis**

<table>
<thead>
<tr>
<th>Block</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$R^2$</th>
<th>$R^2$ Change</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td>0.03</td>
<td>0.01</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score</td>
<td>0.16</td>
<td>1.44</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 2</td>
<td>0.12</td>
<td>0.07</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score</td>
<td>0.16</td>
<td>1.43</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Proximity</td>
<td>-0.19</td>
<td>-</td>
<td>0.74</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td>Emotional Proximity</td>
<td>-0.1</td>
<td>-</td>
<td>0.79</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Both Proximity</td>
<td>0.08</td>
<td>0.27</td>
<td>0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 3</td>
<td>0.15</td>
<td>0.08</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score</td>
<td>0.43</td>
<td>0.77</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Proximity</td>
<td>0.16</td>
<td>0.28</td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Proximity</td>
<td>0.18</td>
<td>0.34</td>
<td>0.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both Proximity</td>
<td>0.15</td>
<td>0.23</td>
<td>0.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score X Physical Proximity</td>
<td>-0.45</td>
<td>-</td>
<td>0.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score X Emotional Proximity</td>
<td>-0.44</td>
<td>-</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD Score X Both Proximity</td>
<td>-0.11</td>
<td>-</td>
<td>0.88</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Statistical significance was determined at $p < .05$. 
CHAPTER V
DISCUSSION

The purpose of the present study was to analyze the hypothesized relationship between the presence of PTSD symptomology and academic achievement in children and adolescents. Furthermore, the present study sought to determine if proximity to traumatic events moderated the hypothesized relationship between PTSD symptomology and academic achievement. Previous literature has assessed the global effects of post-traumatic stress on academics with minimal literature noted that incorporates the effect of proximity to an event as a factor in academic achievement after exposure to traumatic events.

Overview of Findings

Research Question One – PTSD and Academic Achievement

The primary research question sought to determine if a relationship existed between PTSD symptomology as observed using the overall score on the PTSD-RI and academic achievement as observed by individual scores on the NWEA MAP assessment. For the purposes of the present study, only NWEA MAP reading scores were used as an indicator of academic achievement. Results of linear regression analyses indicated PTSD scores did not significantly relate to MAP scores in this sample of elementary aged children. This suggests that for the sample included in the present study, there was not a significant difference in academic performance for children as a function of their degree
of PTSD. This finding is contradictory to previous research that analyzed the relationship between PTSD and academic achievement in school aged children (Goodman, Miller, & West-Olatunji, 2012).

Previous research conducted by Goodman et al., (2012) indicated traumatic stress was a significant predictor of lower academic achievement in elementary aged students. The findings from the present study did not align with the findings from Goodman et al., (2012) such that post-traumatic stress symptomology was not predictive of lower academic achievement scores. This substantial difference could be attributed to the small, rural sample size used in the present study that may not be generalizable to the overall population. Furthermore, traumatic stress as noted in the Goodman et al., (2012) study was characterized by re-experiencing, avoidance, and arousal along with internalizing and externalizing behaviors whereas post-traumatic stress symptomology in the present study was representative of self-reports of symptomology aligning with each of the criterion for PTSD as observed in the DSM-5.

Compared to previous research, including that conducted by Goodman et al., (2012), the present study had participants self-report various trauma types they may have experienced followed by responding to items on the PTSD-RI while considering the trauma type endorsed prior to responding to the PTSD-RI items. This yielded a heterogeneous pool of trauma types that may have impacted the hypothesized relationship between academic achievement and post-traumatic stress as opposed to research that has been conducted with homogenous trauma types. Previous research of this nature indicated a negative relationship between trauma and academic achievement.
such that when trauma exposure increased, academic performance decreased (Hurt, Malmud, Brodksy, & Giannetta, 2001).

In a more recent study, Blodgett and Lanigan (2018) further validated the linear relationship between ACE exposure and academic failure such that children with higher adverse childhood experiences are more likely to exhibit academic failure. In the present study, there was minimal relationship noted between participant’s self-reported PTSD-RI scores and their NWEA MAP scores which is not commensurate with previous literature. This may be attributed to differences in sample size, inclusionary factors relative to indicators of trauma, and strategies to identify academic achievement.

Blodgett and Lanigan (2018) used teacher ratings for 2,101 kindergarten through sixth grade students that analyzed their acquisition of grade level material based upon grades on report cards. Previous literature has consistently identified a negative relationship between trauma and academic performance such that children with high trauma exposure levels are more likely to exhibit academic difficulty (Blodgett & Lanigan, 2018; Goodman et al., 2009). The discrepancy between the present study and previous literature may be attributed to the sample size or indicator of academic achievement used. In the present study, academic achievement was identified using a single representation of performance by means of a standardized assessment score.

When considering research question one, differences in results of the current study and results from previous studies were noted. The presence of protective factors, such as religious affiliation, appropriate coping strategies, and the perception of the event as non-traumatic were not included in the present study and may have impacted the lack of a relationship between PTSD symptomology and academic achievement noted in the
study. For example, students who have been provided resources such that they have learned appropriate coping strategies or have access to a support network may not exhibit adverse reactions to the level of those who have not. This may be attributed to factors such as methodology for assessing trauma or academic achievement as well as overall sample size. This will be discussed further in this chapter.

**Research Question Two – Proximity as a Moderator**

The second research question in the present study sought to analyze whether proximity to a traumatic event moderated the hypothesized relationship between academic achievement (i.e., reading) and post-traumatic stress symptomology among elementary students. It was hypothesized that the inclusion of the moderating variable, proximity, would strengthen the relationship between academic achievement and post-traumatic stress symptomology. This would be indicated by students with physical, emotional, or both types of proximity to an event having more significantly impacted academic achievement as a result of their proximity to traumatic events.

Results indicated the inclusion of proximity explained a significant additional portion of the variance noted between post-traumatic stress symptomology and academic achievement. This suggests the inclusion of proximity, with all other variables held constant, as a predictor of academic achievement after exposure to traumatic events explains a significant portion of the variance attributed to the model. When considering proximity, or closeness to a traumatic event, children who had direct (i.e., physical or happened to them) or indirect (i.e., emotional or happened to someone they know) proximity to an event were more likely to have an increase in PTSD symptomology and a decrease in reading academic achievement.
Proximity to a traumatic event has been consistently studied and identified as a risk factor to the development of PTSD in individuals of all ages (May & Wisco, 2015). Furthermore, a significant research base also exists on the impact of proximity to traumatic events on social/emotional and behavioral well-being in children and adolescents (Deihl, 2013). The inclusion of proximity with traumatic exposure as a predictor of reading academic achievement, however, is presently a gap in the literature on trauma and reading academic achievement.

The foundational study conducted by Pynoos and colleagues (1987) with 159 elementary-school aged children identified the relationship between physical proximity and increased presence of PTSD symptomology whereas the foundational study by Galea and colleagues (2002) with 1008 adults identified the relationship between emotional proximity and increased presence of PTSD symptomology. The presence study further explored the impact of proximity to a traumatic event relative to reading academic achievement and found proximity to be an important predictor of explaining the relationship between PTSD symptomology and reading academic achievement. This significant finding yields several implications for practice as well as further avenues for continued research.

**Implications**

A substantial literature base has determined that increased traumatic exposure in children and adolescents often results in decreased academic performance. The present study sought to further analyze the relationship between post-traumatic stress symptomology and academic achievement while also accounting for an individual’s proximity to the event. Results indicated proximity to the event was a significant
variable when added to the hypothesized dichotomous relationship between post-traumatic stress symptomology and academic achievement. As the zeitgeist shifts to facilitate the inclusion of more trauma-informed approaches within the educational setting, it will be important to also consider each student’s unique, individualized exposure to various traumatic events, to include their proximity to the event, in order to decrease the likelihood of the negative outcomes associated with high rates of trauma exposure.

Prevention strategies should continue to be on the forefront of school-based mental health initiatives. Results of the present study suggest that proximity to a traumatic event is a significant predictor of negatively impacted reading academic achievement. This suggests preventative strategies that include knowledge of a student’s trauma history as well as proximity to traumatic events may play an integral role in minimizing poor reading academic achievement. A multi-tiered approach, such as the PREPare model (Brock et al., 2009) is an effective model that includes both protective factors and risk factors, such as proximity, in order to engage in preventative, intervention, and postvention strategies relative to traumatic event exposure. The inclusion and application of thorough crisis plans, to include appropriate crisis response at all levels, may assist in identification of students who have been exposed to traumatic events in order to minimize the negative outcomes associated with increased exposure to trauma.

Results of the present study further validate the need for teachers, counselors, psychologists, and other school staff to be knowledgeable of post-traumatic stress symptomology, while accounting for precipitating factors such as proximity, to provide
academic intervention services to address each student’s unique needs. As observed in the current study, students, at times, are experiencing several various types of trauma simultaneously which, as literature has indicated, is a negative predictor for academic, behavioral, and social/emotional functioning (Eslinger & Sprang, 2015; McLean, Rosenbach, Capaldi, & Foa, 2013). It is imperative to include curriculum or professional development sessions on ACES, trauma, and the outcomes associated with trauma in order to increase school staff’s ability to identify and provide adequate services to heterogeneous populations. The implementation of evidence-based trauma informed practices within the school at the systems level may minimize the negative effects of trauma exposure in children and increase the likelihood of positive overall functioning.

**Limitations and Future Research**

The limitations of the present study will be presented in four primary areas. These include internal validity, external validity, measurement, and statistical analysis. Future research identifies areas for further analysis based upon results of the present study as well as current literature.

**Limitations**

**Internal Validity**

For the present study, participants self-reported PTSD symptomology during data collection. Academic achievement indicators, however, were collected from the previous school year’s assessment results. The time lapse between the participants NWEA MAP assessment and data collection for the current study may have negatively impacted the hypothesized relationship between PTSD symptomology and reading academic
achievement. Participants in the study were asked to endorse frequency of specific events occurring within the previous three months as well as within the previous three to six months which suggests the traumatic experience may have happened after the NWEA MAP assessment.

**External Validity**

The present study had a sample size of 81 children which negatively impacts the generalizability of the results of the study. Furthermore, a convenience sample of 81 children is not representative of the overall population of school aged children. Although recruitment of middle school students was attempted, no students in sixth grade returned parental consent forms. The sample used in the present study is also located within a small, rural school district in the southeastern United States using convenience sampling as opposed to random sampling. This may negatively impact the generalizability of the results as well as applicability to other populations. Furthermore, participants in the present study included students who had experienced some form of a traumatic event. Therefore, a comparison group of participants who had not experienced a traumatic event was not available.

The present study also did not control for factors such as socioeconomic status, household demographics, or developmental information. Factors such as these as well as familial support or other protective factors may have further explained the variance in the relationship between PTSD symptomology and academic achievement. Although the present study sought to include children and adolescents between grades three through eight, no students above fifth grade returned parent permission forms. Therefore, only
children between third and fifth grades are represented. This resulted in a homogenous sample of students between 8 and 11 years old.

**Measurement**

Participant responses on the PTSD-RI and trauma histories were based on each participant’s unique experiences which increased the heterogeneity of the traumatic events each participant referred to when responding to questions on the PTSD-RI. In previous literature assessment of PTSD and academic performance were assessed using a homogenous traumatic experience (e.g. single, known traumatic experiences that occurs at one point in time). The identification and use of a heterogeneous grouping of traumatic events may have negatively impacted the accurate measurement of PTSD in the sample. Furthermore, the present study limited academic achievement to a single score as opposed to several scores in order to identify trends in the student’s performance. The academic score was a result of an assessment conducted prior to inquiry into each participant’s PTSD symptomology level.

Reliability and validity of the PTSD-RI as reported in the present study are representative of the previous version of the assessment measure that aligned with the DSM-IV-TR (APA, 2000). The PTSD-RI was revised to align with PTSD criteria as noted in the DSM-5. Therefore, current reliability and validity indicators were not available. On the NWEA MAP assessment, Brown and Coughlin (2007) indicated poor predictive validity and high concurrent validity. Future researchers may consider directly addressing academic achievement using indicators of success with high predictive validity such as reading fluency.
Statistical Analysis

Although a priori estimates of power and effect size indicated a suggested sample size of 77 for a medium effect size of .80 and the present study had a sample size of 81 for a medium effect size of .82, a larger sample size may be beneficial in identifying differences using a smaller effect size. Furthermore, the present study used simple linear regression to analyze the relationship between PTSD and academic achievement whereas a multiple linear regression including PTSD, academic achievement, and pertinent risk and protective factors, to include proximity, may be more beneficial in identifying contributors to the negative relationship between PTSD and academic achievement.

Future Research

The present study addressed a significant gap in the literature on trauma by means of analyzing the impact of proximity to a traumatic event on the relationship between PTSD symptomology and reading academic achievement. Although the relationship between PTSD symptomology and reading academic achievement in the present study was determined to be nonsignificant, the inclusion of proximity to traumatic events as a moderating variable yielded a significant increase in the explanation of the variance between PTSD symptomology and reading academic achievement. It is imperative to continue to research the impact of proximity on not only academic functioning but also behavioral, vocational, and social/emotional functioning in order to minimize negative outcomes and increase the likelihood of overall success.

Future research should include an analysis of the impact of trauma exposure and proximity to the event on academic achievement by incorporating direct measures of academic achievement such as grades, grade point average, or reading fluency rates.
Future research should continue to analyze the impact of proximity to traumatic events on a student’s academic achievement in order to identify and expand upon evidence-based practices for trauma-informed approaches. It may be beneficial to conduct a similar study as the present one with a larger group of both children and adolescents. It would be beneficial to assess the impact of proximity to a traumatic event across various developmental levels in order to identify response patterns across the various developmental stages. Further research may also benefit from the inclusion of multiple school districts in order to increase generalizability. Furthermore, future research should continue to explore the implications of dual proximity exposure in order to identify potential outcomes as a result of dual proximity exposure. While continuing to research the impact of proximity as a contributor to adverse reactions, it may be beneficial to include the impact of risk and protective factors as moderators between reading academic achievement and PTSD symptomology.
REFERENCES


APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE
Student Demographics Questionnaire

Please answer the following questions the best you can. Please DO NOT write your name anywhere on this sheet. These answers will help us understand information about you. Your name or any information about you will not be discussed with anyone. If you have any questions, please ask one of the adults who passed out this sheet.

1. How old are you?  8  9  10  11  12  13  14
2. Gender (Circle one):  Male    Female
3. What grade are you in?  3rd  4th  5th  6th  7th  8th
4. What is your racial identity? (Circle the best one that describes you)
   White/Caucasian
   African American
   Latino/Hispanic
   Asian/Pacific Islander
   Native American
   Other
APPENDIX B

TRAUMA HISTORY CHECKLIST
Please circle any of the following that have happened to you or someone close to you (for example, a family member or close friend).

<table>
<thead>
<tr>
<th>Type</th>
<th>Examples</th>
<th>Role</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Disasters</td>
<td>Tornado</td>
<td>Happened to me.</td>
<td>Within the last 3 months</td>
</tr>
<tr>
<td></td>
<td>Hurricane</td>
<td>Happened to someone else.</td>
<td>3 - 6 months ago</td>
</tr>
<tr>
<td></td>
<td>Flood</td>
<td></td>
<td>6 months to a year ago</td>
</tr>
<tr>
<td></td>
<td>I live with one parent.</td>
<td>Happened to me.</td>
<td>Within the last 3 months</td>
</tr>
<tr>
<td></td>
<td>I had to live with someone else because of bad things happening to me in my home.</td>
<td>Happened to someone else.</td>
<td>3 - 6 months ago</td>
</tr>
<tr>
<td></td>
<td>One of my parents is in jail.</td>
<td></td>
<td>6 months to a year ago</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Over a year ago</td>
</tr>
<tr>
<td>Household Dysfunction</td>
<td>Car accident</td>
<td>Happened to me.</td>
<td>Within the last 3 months</td>
</tr>
<tr>
<td></td>
<td>Robbery</td>
<td>Happened to someone else.</td>
<td>3 - 6 months ago</td>
</tr>
<tr>
<td></td>
<td>Fight</td>
<td></td>
<td>6 months to a year ago</td>
</tr>
<tr>
<td></td>
<td>Shooting</td>
<td></td>
<td>Over a year ago</td>
</tr>
</tbody>
</table>
APPENDIX C

IRB APPROVAL
NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE: June 22, 2017
TO: Shelby McGrew, MS, Counsel Ed Psych & Foundation
FROM: Kari Reeves, Assoc Dean/Assoc Prof, MSU Expedited

PROTOCOL TITLE: Examining the impact of trauma on reading performance in children and adolescents
PROTOCOL NUMBER: IRB-17-266
APPROVAL PERIOD: Approval Date: June 22, 2017, Expiration Date: June 15, 2018

Under an expedited review procedure, the research project identified above was approved for one year on June 22, 2017 by the Mississippi State University Institutional Review Board (MSU IRB). The application qualified for expedited review under CFR 45.110, Category 7.

This memorandum is your record of the IRB approval of this study. Please maintain it with your study records.

Please note that the MSU HRPP accreditation for our human subjects protection program requires an approval stamp for consent forms. The approval stamp will assist in ensuring the HRPP approved version of the consent form is used in the actual conduct of research. If applicable, you must use the stamped consent form for obtaining consent from participants.

The MSU IRB approval for this project will expire on June 15, 2018. If you expect your project to continue beyond this date, you must submit an application for renewal of this HRPP approval. HRPP approval must be maintained for the entire term of your project.

If, during the course of your project, you intend to make changes to this study, you must obtain approval from the HRPP prior to implementing any changes. Upon becoming aware of an unanticipated problem that suggests participants or others are at greater risk of harm than was previously known or recognized, a problem report must be submitted to the HRPP as soon as possible, but always within 10 days. Serious problems must be reported verbally within one business day, in addition to the submission of the written Problem Report.

You are required to maintain complete records pertaining to the use of humans as participants in your research. This includes all information or materials conveyed to and received from participants as well as signed consent forms, data, analyses, and results. These records must be maintained for at least three years following project completion or termination, and they are subject to inspection and review by the HRPP and other authorized agencies.

Please notify this office when your project is complete. Upon notification, we will close our files pertaining to your project. Reactivation of the HRPP approval will require a new HRPP application.

If you have any questions relating to the protection of human research participants, please contact the HRPP by phone at 325.3984 or email irb@research.msstate.edu. We wish you the very best of luck in your research and look forward to working with you again.

Kari Reeves

Approval Period: June 22, 2017 through June 15, 2018
APPENDIX D

TRAINING PROTOCOL
Training Procedures for Research Assistants Aiding in Administration

1. Part A: Introduction to the Instruments
   a. PTSD-RI
      i. Purpose of instrument
      ii. Description of instrument
      iii. Brief overview of administration
   b. Student Demographics Questionnaire
      i. Purpose of instrument
      ii. Description of instrument
      iii. Brief overview of administration

2. Part B: Administration Guidelines
   a. PTSD-RI & Student Demographics
      i. Provide pencils to students
      ii. Instruct students to not write their name on the materials.
      iii. Hand out Student Demographics and PTSD-RI
      iv. Read verbal description / purpose of the assessments
      v. Explain sticky note and numerical identifiers
      vi. Ask students to complete demographics questionnaire
      vii. Check for completion of Demographics Questionnaires
      viii. Read Instructions for PTSD-RI
      ix. Check for completion of PTSD-RI
      x. Collect PTSD-RI Protocols
      xi. Provide debriefing to students and thank for participation
xii. Place PTSD-RI into Proper Folder

3. Part C. Modeling of the Training Procedures
   
   a. Modeling of the Student Demographics and PTSD-RI Procedures
   
   b. Completion of procedural integrity checklist
   
   If score is below 100%, repeat Parts C and D
APPENDIX E

SCRIPT FOR RESEARCH ASSISTANTS
“Good morning/afternoon. Thank you for agreeing to participate in our project/study. Today, we will ask you to answer questions about yourself including your age, gender, and grade as well as questions about any trauma you may have experienced. If you have any questions as we go along, please raise your hand and one of us will help you. When you get your packet, make sure it is your name on the sticky note on the front.”

*Distribute packets*

“Please take the sticky note off of your packet and answer the five questions on the first page. Please do not write your name on any of the pages.”

*Walk around room to monitor completion and answer questions as necessary.*

“On the second page, please check any of the events that have either happened to you or you have seen happen to someone close to you. There is a column if it happened to you and a separate column if you saw it happen to someone else.”

*Walk around room to monitor completion and answer questions as necessary.*

“On the last page, please answer the questions about your own thoughts and feelings related to the information you just checked on page two.”

*Walk around room to monitor completion and answer questions as necessary.*
APPENDIX F

PROCEDURAL INTEGRITY CHECKLIST
### Procedural Integrity Checklist

#### Administration Procedures

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Provide pencil to all students</td>
<td>No</td>
</tr>
<tr>
<td>2. Instruct students not to write their name on the materials</td>
<td>No</td>
</tr>
<tr>
<td>3. Introduce the confidential identification process</td>
<td>No</td>
</tr>
<tr>
<td>4. Hand out Student Demographic Questionnaire and PTSD-RI</td>
<td>No</td>
</tr>
<tr>
<td>5. Read handout about purpose of assessment and instructions for completion</td>
<td>No</td>
</tr>
<tr>
<td>6. Ask students to complete demographics questionnaire and stop</td>
<td>No</td>
</tr>
<tr>
<td>7. Answer questions</td>
<td>No</td>
</tr>
<tr>
<td>8. Check for missing/incomplete items on the demographics questionnaire</td>
<td>No</td>
</tr>
<tr>
<td>9. Read instructions for the PTSD-RI</td>
<td>No</td>
</tr>
<tr>
<td>10. Check for completions of the PTSD-RI and answer questions</td>
<td>No</td>
</tr>
<tr>
<td>11. Collect PTSD-RI</td>
<td>No</td>
</tr>
<tr>
<td>12. Check for missing/incomplete items on the PTSD-RI</td>
<td>No</td>
</tr>
<tr>
<td>13. Provide debriefing through reading of script and thank participants</td>
<td>No</td>
</tr>
<tr>
<td>14. Place Student Demographics and PTSD-RI into proper folder</td>
<td>No</td>
</tr>
</tbody>
</table>
**Procedural Steps for Scoring Post-Traumatic Stress Symptoms Questionnaire**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Open PTSD Reaction Index Scoring Application.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>2.</td>
<td>Input child’s numerical identifier in ID box.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3.</td>
<td>Input age, sex, and grade in the appropriate box.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>4.</td>
<td>Input child’s responses for each question.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5.</td>
<td>Verify responses are input correctly by going over data a second time.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6.</td>
<td>Press “Symptom Analysis”.</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>7.</td>
<td>Save the outcome as a PDF under the child’s numerical identifier.</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>