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THE IMPACT OF TRAUMA AND ADVERSE CHILDHOOD EXPERIENCES ON ADOLESCENT ACADEMIC ACHIEVEMENT

A MASTER'S THESIS PROJECT

SUBMITTED TO THE FACULTY

OF BETHEL UNIVERSITY

BY

TOBIAH J. ROBINSON

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF ARTS

SEPTEMBER 2020

Signature Page

BETHEL UNIVERSITY

THE IMPACT OF TRAUMA AND ADVERSE CHILDHOOD EXPERIENCES ON ADOLESCENT ACADEMIC ACHIEVEMENT

Tobiah J. Robinson

September 2020

APPROVED

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Acknowledgments

For my grandmother. Being a teacher herself, she taught me to see the value in every person, and perhaps as equally as important, she taught me to see the value in myself.

Abstract

This literature review examines the background of Adverse Childhood Experiences (ACEs), and the impact trauma has on adolescents' ability to learn. Brain development, brain function, and ACEs' impact on adolescent brains are also addressed in this review. Past research has shown that ACEs and the effect of trauma on adults are long-lasting, but more research has been conducted to understand the considerable impact trauma has on children and adolescents. Nationally, the NSCH study indicated that 45 percent of children from birth through age 17 have an ACE score of at least one as reported by a parent or guardian. The effects of trauma have been shown to contribute to significant cognitive deficiencies in adolescents and behavioral adaptations in students. Strategies and supports are considered and explained to help schools and teachers address the needs of learners who have experienced trauma.

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CHAPTER I: INTRODUCTION

"Her dad died when she was younger, and her mom is an alcoholic, so I take care of her." "I didn't know that," I responded. The comment shared by a guardian at a parent-teacher conference was done so with such ease, it almost seemed like it was a regular part of conversation. This was their reality, and they had come to accept it. I watched as the student's eyes moved from mine to the floor. Clearly, this was not her fault, but it was harming her ability to learn, feel safe in school, complete assignments, and be a normal high school student. The comment was not normal to me, and as the student and her guardian left my classroom, I was determined to develop a better understanding of how adolescent students are impacted by traumatic experiences, mainly how these experiences impact their ability to learn in my classroom.

Before the parent-teacher conference, I had limited knowledge of how detrimental trauma and Adverse Childhood Experiences were for students. After that day, I instantly had a desire to understand more. I wanted to understand what I could do as a teacher to positively impact the lives of students with ACEs. What saddens me and motivates me to learn more is that the student mentioned is just one of the hundreds of students I see daily. I now want to know how many of my students have ACEs and how I might be able to help.

I wanted to be a teacher to have a positive impact on students. Not all teachers had a positive impact on me, and I am determined in my career to do everything I can to be influential in the lives of those I teach. In order to do so, it is essential to understand my students and in more substantial ways than I have before. What stories do I not know about them that create their personality? What have they witnessed and experienced that influence each of them

differently as they walk the high school halls? These questions and experiences like those I have shared have created the foundation for my work.

Trauma and the ACEs Study

Understanding trauma and the ACEs study is paramount to creating a connection between these experiences and their impact on adolescents and one's ability to learn.

Trauma

Much of the knowledge related to trauma is centered around the understanding and study of Posttraumatic Stress Disorder (PTSD) seen in adults. With the rise in PTSD occurring in soldiers returning from war, much of what was studied in previous decades is related to adult trauma and unrelated to adolescents and children. However, one thing is sure, according to the Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children (2008), a large number of American children experience or are exposed to traumatic life events.

As defined, trauma is an exceptional experience in which powerful and dangerous events overwhelm a person's capacity to cope (Rice & Groves, 2005). Although the term can be defined in many different ways, traumatic events include physical and sexual abuse, domestic violence, community and school violence, medical trauma, motor vehicle accidents, acts of terrorism, war experiences, natural and human-made disasters, suicides, and other traumatic losses. In community samples, more than two-thirds of children report experiencing a traumatic event by age 16 (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children, 2008).

Most recently, children and trauma have been at the forefront of research conducted by therapists, educators, and other professionals. The research suggests that recovery after trauma depends on the professionals who understand children and are skilled in helping them make

sense of trauma and helping their families (Rice & Groves, 2005). Children and adolescents who have been exposed to traumatic events display behaviors and reactions that are similar or identical to behaviors that mental health professionals see daily, including; sadness, loss of interest in everyday activities, reduced concentration, a decline in schoolwork, separation anxiety (particularly in young children), sleep disturbance, nightmares, and anger. The impact of trauma also directly connects to the adolescent's ability to function in peer groups, family life, and in school (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children, 2008). The majority of individuals impacted by trauma can manifest resiliency and return to normal development and function, but many adolescents exposed to multiple traumas are more likely to show signs of PTSD.

Some children do not return to normal functioning and have the potential to develop PTSD symptoms and psychological symptoms, which can range in severity. These symptoms can often need clinical attention as they impact their daily functioning. However, most children and adolescents do not receive the help they need to manage and heal from traumatic situations (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children, 2008)

The impacts of trauma do not stop with those directly impacted, but spill over as secondary trauma as realized and experienced by caregivers, educators, and mental health specialists. Professionals need to put importance on self-care. Self-care can include being observant of signs of burnout and also communicating with peers to alleviate stress (Presidential Task Force on Posttraumatic Stress Disorder and Trauma in Children, 2008).

The ACEs Study

In the late 1990s, a study was conducted in San Diego, California, by the Centers for Disease Control to learn and explore adults' mental and physical health as related to their childhood emotional experiences. The study provided significant research on the correlations between adverse childhood experiences (ACE) and adult health (Felitti et al., 1998). An ACE describes a traumatic experience in a person's life occurring before the age of 18 that the person recalls as an adult (Minnesota Department of Health, 2013).

The initial study questioned respondents on eight ACEs, including exposure to parental separation or divorce, witnessing domestic violence, substance abuse in the home, death of a parent or another loved one, parental incarceration, mental illness in the home, the experience of physical abuse, sexual abuse, and psychological abuse or neglect- both emotional and physical, and suicidal household member. The researchers collected some 17,000 responses from adult patients insured by Kaiser Permanente, a prominent insurance agency in Southern California at the time. Each ACE was given a value of one. If a respondent had exposure to any of the ACEs listed above, their score would increase based on the number of ACEs they had experienced. Researchers found over half of the respondents experienced at least one ACE, and twenty-five percent had experienced multiple ACEs during their youth. Furthermore, 1 in 16 had an ACE score of four or above (Felitti et al., 1998).

The original study explored the relationship between an individual's ACE score and the likelihood of significant health concerns in the future. The findings indicated a direct correlation between ACE scores and mental health and physical health later in life (Felitti et al., 1998). However, the original study did not explore the connection between ACEs and their immediate effect on children and adolescents. More recent research similar to the ACEs study indicates

many children do suffer from traumatic experiences. Nearly 35 million U.S. children have experienced one type of childhood trauma, and in a study conducted by the Centers for Disease Control (CDC), it was found that suicide was the second leading cause of death among adolescents ages 15-19 (Center for Disease Control, 2018).

ACEs in Minnesota

In Minnesota, research on ACEs was conducted in 2011 using the Minnesota Behavioral Risk Factor Surveillance System. This research indicated that a majority of Minnesotans follow trends found in the original study and have at least an ACE score of one. ACEs are more common among Minnesotans who were unemployed, did not graduate from high school, were worried about buying nutritious food, rented rather than owned their own home, were unmarried, and worried about paying their mortgage or rent. Second, ACEs frequently occur together. In Minnesota, over half of Minnesotans experiencing ACEs had more than two ACEs (Minnesota Department of Health, 2013). The survey also found that the five most common ACEs reported by Minnesotans were physical abuse (16 percent), mental illness in the household (17 percent), separation or divorce of a parent (21 percent), living with a problem drinker (24 percent), emotional abuse (28 percent) (Minnesota Department of Health, 2013).

Suggestions for programs and possible initiatives have been made based on the ACEs data gathered in 2011. The Minnesota Department of Health suggested a continuation of ACEs education and explicitly focusing on increasing awareness of ACEs and their impact on society. Furthermore, the department also suggested an enhancement in communities capacity to prevent and respond to ACEs. Finally, Minnesota is committed to further collecting ACEs data and developing an inventory of agencies making an effort to reduce ACEs and support resilience.

Purpose of the Research and Guiding Questions

This literature review aims to understand trauma and Adverse Childhood Experiences (ACEs) and the effect they have on adolescent students' ability to learn. Furthermore, this literature review is being conducted to determine how caregivers such as teachers and parents can aid in students' abilities to manage emotions and develop resiliency as they process through and cope with traumatic situations and ACEs.

The guiding questions of the research are:

1) What is the impact of trauma associated with adverse childhood experiences on the academic achievement of adolescents?
2) How do teachers and parents mitigate the impact of trauma associated with adverse childhood experiences?

It is hopeful that the results of this literature review can help understand how trauma affects adolescent learning in the high school classroom and provide information on how parents, teachers, and schools can effectively support students impacted by trauma.

Definition of Terms

This is a list of the most common terms that will be used throughout this thesis.

Adolescence: the period following the onset of puberty during which a young person develops from a child into an adult (The Oxford Dictionary, 1992).

Resilience: our capacity to acknowledge and attend to personal difficulties while still working toward expectations (Souers & Hall, 2016).

Secondary Traumatic Stress: the emotional duress that results when an individual hears about the firsthand trauma experiences of another (Walker, 2019).

Social Competence: enquiring effective social skills to manage social relationships (Shujja, Malik, & Khan, 2015).

Trauma: an exceptional experience in which powerful and dangerous events overwhelm a person's capacity to cope (Rice & Groves, 2005).

Trauma-Informed Teaching: Teachers responding to the needs of students suffering from traumatic stress and making small changes in the classroom that foster a feeling of safety (Kataoka, Langley, Wong, Baweja, & Stein, 2012).

Chapter I Summary

Trauma and understanding its impact on adolescents are essential to educators, parents, and even young people themselves. Through the original ACEs study, one can see the impact these traumatic experiences have on an individual. Chapter II will examine research to understand the effects ACEs have on the adolescent brain, learning, and what must be done in the future to lessen the impact of ACEs and trauma. Also, the impact ACEs have and will continue to have on society will be considered.

CHAPTER II: LITERATURE REVIEW

This literature review aims to understand trauma and Adverse Childhood Experiences (ACEs) and the effect they have on adolescent students' abilities to learn. Furthermore, this literature review is being conducted to determine how caregivers such as teachers and parents can aide in students' abilities to manage emotions and develop resiliency as they process through and cope with traumatic situations and ACEs.

The guiding questions of the research are:

1) What is the impact of trauma associated with adverse childhood experiences on the academic achievement of adolescents?
2) How do teachers and parents mitigate the impact of trauma associated with adverse childhood experiences?

In order to research specific journals and articles related to this topic and question, search parameters were developed, including keywords like trauma, Adverse Childhood Experiences, adolescent learning, brain development, adolescent resiliency, trauma-informed teaching, and secondary trauma. The literature review is structured to understand the adolescent brain, the impact of ACEs and trauma on the adolescent brain, and provide an awareness of how ACEs are noticed in adolescent behavior in classrooms. The literature review concludes with research-based strategies schools, teachers, and parents can use to support and develop resiliency in students who have experienced ACEs and trauma.

The Adolescent Brain

Brain Development in Adolescents

Adolescence relates to the cognitive and behavioral changes that shape a child into an adult and describes a period during which significant changes take place. Functional and structural changes occur considerably in the teenage brain. These changes are associated with cognitive and social development (Koenis, 2017). Healthy brain development and discovering the extent to which environmental factors influence healthy brain development must be considered to further understand the adolescent brain affected by ACEs.

There is an explanation for how adolescents differ from adults. These differences show up in the way they behave, make decisions, and solve problems. Studies explain this difference by showing that the brain develops throughout childhood and matures into adolescence and early adulthood (Casey, Jones, & Hare, 2008). Several factors can explain the changes in the brain. These include nutrition, sleep, environment, heredity, and even childhood surgical needs. Furthermore, the adolescent brains maturation can be influenced by other factors, including physical, mental, economic, and psychological stress, and drug abuse (Arain et al., 2013).

Research shows that the brain of an adolescent is continuously changing. Specifically, the most significant change occurs in the brain through the processes of synaptic pruning and myelination. Synaptic pruning is how the brain makes itself more efficient (Kooreman, 2017). During this process, connections occur between brain cells that are strengthened regularly while those infrequently used disappear. Synaptic pruning is all occurring alongside the myelination process. Myelination occurs in the brain when finger-like projections that grow off neurons and allow for intercellular communication are coated in a fatty substance, or myelin. Myelin increases the speed of electrical impulses and acts as an insulator from neuron to neuron

(Blakemore & Choudhury, 2006). Myelination allows neurons to communicate at dramatically increased speeds (Arain et al., 2013). These concurrent changes allow for the brain of an adolescent to adapt to changes in surroundings and process information more quickly.

Just as crucial as synaptic pruning and myelination are the structural changes occurring in the brains prefrontal cortex and li mbic system as it develops in adolescents. Magnetic resonance imaging (MRI) scans have allowed researchers the ability to view developmental changes that occur in the adolescent brain. Included in the limbic system is the emotional center of the brain, also known as the amygdala. The amygdala is responsible for responding appropriately to different emotions and situations (Choudhury, Blakemore, & Charman, 2006). It also connects our emotions to our memories and determines how those memories are stored. It must be understood that the amygdala is hypersensitive in girls during puberty and in boys during adolescence (Widjojo, 2018).

Furthermore, MRI scans show the development and increase in function of the prefrontal cortex. The prefrontal cortex includes being able to appropriately interact in social settings and cognitive behaviors such as executive functioning behavior (Casey, Jones, & Hare, 2008). Synaptic pruning and myelination processes occur first in the limbic system and then move to the prefrontal cortex. The prefrontal cortex continues to develop even into adulthood (Casey, Jones, & Hare, 2008). Because of this slower development in the prefrontal cortex, the maturation process is reflected in the greater likelihood of adolescents taking part in risky activities, including using substances, engaging in sexual activity, and reckless driving (Kooreman, 2017). As the prefrontal cortex matures, judgments are made more quickly, allowing teenagers to reason better and control impulses. Both the prefrontal cortex and limbic system are major brain components that drastically change during the adolescent years.

The prefrontal cortex is also responsible for the brains executive functioning, or the ability to control and coordinate thoughts and behaviors. MRI studies have shown improvement in executive functioning abilities due to changes in the prefrontal cortex. Adolescents may see improvement in response skills, doing more than one task, decision making, and selective attention (Blakemore & Choudhury, 2006).

The brain's executive functions also give evidence that the prefrontal cortex is involved in several other high-level cognitive capacities, including self-awareness (Ochsner, 2004). In addition to neural development, there are significant changes in hormones during adolescence. Blakemore's (2006) study found the following:

> While it is difficult to understand all of the important influences on the social and emotional behavior of adolescents, significant neural development, and hormonal changes are likely to influence social cognition. Social cognition, then, may also be expected to change during this time period. In addition, the interaction may be two-way. During this time, what is perceived as important in the social world around us also changes and leaves its imprint on the pruning process. Accumulating new social experiences, for example, when entering a new school, may influence the development of social cognitive processes (p. 301).

During adolescence, the dopamine system also sees increases in activity. Dopamine is a chemical messenger that regulates feelings of pleasure and aids the brain in creating associations between behaviors that lead to positive outcomes and the environments in which these behaviors occurred (Kooreman, 2017). Adolescents are more sensitive to rewards and pleasure or positive activities due to heightened dopamine levels.

Gender Differences in Brain Development

Differences between the male and female adolescent brains are first noticed structurally with MRI scans indicating different sizes of different parts of the brain. For example, in females, the brains memory center, or hippocampus, is larger than males during adolescence. The connections that females have with the brains memory center are also higher in number, thus indicating why females can sense more of what is going on around them in different situations (Jantz, 2014). Conversely, males tend to have a larger amygdala, or the brains emotional center (Lenroot & Giedd, 2009). During adolescence, the brain of both males and females grows but differ based on gender. Studies show that male brains are nine to 12 percent greater in size than females, and male and female brains reach their total size at age 11 in females and age 14 in males (Lenroot & Giedd, 2009).

The processing abilities of the adolescent brain are also noticed as a difference between males and females. Male brains utilize nearly seven times more gray matter for activity while female brains utilize nearly ten times more white matter. Gray matter areas of the brain are information and processing centers in specific areas of the brain (Choudhury, Blakemore, & Charman, 2006). This difference for males can mean focusing on one task at a time, like being deeply invested in a task or game while being unaware of their surroundings or other people's feelings and emotions (Lenroot & Giedd, 2009). White matter is the networking grid that connects the brain's gray matter and other processing centers with one another. The increase in white matter means that girls transition from one thing to another more quickly. The gray-white matter difference may explain why, in adulthood, females are great multi-taskers, while men excel in highly task-focused projects (Jantz, 2014).

There is much research that still needs to be done to understand the changes of development that occur in the adolescent brain; however, brain research, along with MRI scanning, has shown that neuroplasticity, or the brain's ability to adapt and change over time, is part of the adolescent remolding process that happens during these most formative years of a person's life.

Prevalence of ACEs and Trauma in Adolescents

As previously noted, the initial ACEs study conducted in 1998 presents links between ACEs and health issues noticed later in life. However, the original ACEs research did not include the immediate effects of traumatic situations for children (Souers & Hall, 2016). The initial study only determined the health impacts of ACEs on adult patients after hospital visits and did not include the impact ACEs could have on adolescents, specifically the impact on an adolescent's ability to learn. Since 1998 and the initial study, researchers have continued to try to develop an understanding of the negative effects of trauma on children and adolescents. Multiple studies have been conducted, including studies by the National Survey of Children's Health (NSCH) conducted in 2003, 2007, 2011, and 2016. As studies have evolved, the list of ACEs used has been expanded to include physical and emotional neglect, parental separation and divorce, exposure to violence outside of the home, living in unsafe neighborhoods, homelessness, bullying, discrimination based on race or ethnicity, and experience of income insecurity (Bethell, 2017). These continuing studies have given greater clarity to the volume of adverse childhood experiences noticeable in the United States. ACEs are still a common trend in the United States, even after resources and attention have been devoted to preventing them. In most states, half of all children have experienced at least one ACE (Sacks & Murphey, 2018).

A 2016 study conducted by the NSCH used an address-based sample retrieved by the U.S. Census Bureau. One child in each household was randomly selected to be the focus of the study. A parent or guardian knowledgeable about the child answered questions about the child and themselves. The survey was representative of children under 18 years of age, both nationwide and within each state. A total of 50,212 surveys were completed. The research team estimated the national prevalence of specific ACEs and compared these ACEs prevalence across states (Sacks & Murphey, 2018). The NSCH study followed this trend and included questions related to ACEs different from those of the initial study. The original seven ACEs were changed slightly, and in this study, the NSCH includes eight ACEs derived from the following yes or no questions asked of parents:

1. "Parent or guardian divorced or separated
2. Parent or guardian died
3. Parent or guardian served time in jail
4. Saw or heard parents or adults slap, hit, kick, punch one another in the home
5. Was a victim of violence or witnessed violence in his or her neighborhood
6. Lived with anyone who was mentally ill, suicidal, or severely depressed
7. Lived with anyone who had a problem with alcohol or drugs
8. Since this child was born, how often has it been very hard to get by on your family's income—hard to cover the basics like food or housing?" (p.16).

Nationally, the NSCH study indicated that 45 percent of children from birth through age 17 have an ACE score of at least one as reported by a parent or guardian. This percentage is similar to the rate of exposure found in the 2011 study conducted by the NSCH. In that study, the most common ACEs reported nationally were economic hardship and divorce or separation

of a parent or guardian (Sacks & Murphey, 2018). When dealing with increasing ACE scores nationally, one in ten children has experienced three or more ACEs, which places them into a category of exceptionally high risk. Furthermore, specific states, including Arizona, Arkansas, Montana, New Mexico, and Ohio, as many as one in seven children have experienced three or more ACEs (Sacks, Murphey, & Moore, 2014).

When examining ACE scores by specific age groups, it is noticed that ACE scores will increase with age because the longer a child is alive, the greater the likelihood they will experience an ACE. In children ages 12 to 17, adolescents have the highest percentages in every individual ACE category. The most noticeable and highest percentage follows the national trend of a child having lived with a parent or guardian who is separated or divorced. For the adolescent age range of 12 to 17, the percentage of children in the United States who have experienced this ACE is 28 percent (Sacks, Murphey, & Moore, 2014). In addition to living with a divorced or separated parent, 26 percent of adolescents experience economic hardship or find it challenging to get by on an income. Other noticeably high percentages for this age group include 12 percent of adolescents having lived with a mentally ill person and 14 percent being victims of or witnessing violence in a neighborhood. When compared to other age groups; zero to five years old and six to eleven years old, adolescents are only equal to the other groups in one ACE category; economic hardship or finding it difficult to get by on an income, where 26 percent of children ages six to eleven and adolescents ages 12 to 17 have experienced this ACE (Sacks, Murphey, & Moore, 2014).

From the 2016 NSCH study, it is also evident on a national scale that all races are not impacted by ACEs equally. White and Asian children are less likely to experience ACEs than their black and Hispanic peers. The studys findings revealed 61 percent of black non -Hispanic

children and 51 percent of Hispanic children had experienced at least one ACE, compared with 40 percent of white non-Hispanic children and only 23 percent of Asian non-Hispanic children. In every category, the occurrence of ACEs is lowest among Asian non-Hispanic children and, in most categories, is highest among black non-Hispanic children (Sacks & Murphey, 2018).

For all races, divorce and economic hardship were still seen as the highest percentages, but an interesting finding from the data was the nine percent of white non-Hispanic children who lived with anyone who was mentally ill, suicidal, or severely depressed compared to just six percent for both black non-Hispanic children and Hispanic children. For white children, this is the most common experience behind divorce and economic hardship, whereas parental incarceration is the next-most common ACE for black non-Hispanic children, and living with an adult with a substance use problem is the next-most common for Hispanic children (Sacks & Murphey, 2018)

ACEs in Minnesota

When examining ACEs in Minnesota, the Department of Health has spent a considerable amount of time and money on research to determine the impact these experiences have on Minnesota citizens. In 2011, Minnesota became the 18th state to add ACE questions as determined by the Center for Disease Control to the Behavioral Risk Factor Surveillance System (BRFSS), a survey used by individual states to determine the status of their residents' health based on behavioral risk factors. From this, the Minnesota Department of Health has been better able to understand ACEs and their prevalence in Minnesota. Using the BRFSS, more than half of adult respondents in Minnesota indicated having an ACE score of at least one (Minnesota Department of Health, 2019).

When using the 2016 NSCH study and the Minnesota Student Survey (MSS), a census survey of sixth, ninth, and twelfth-grade students, the prevalence of ACEs in Minnesota children and adolescents is more easily understood. The NSCH study indicated Minnesota had the highest percentage of children from birth through age 17 with ACE scores of zero. Only 37 percent of Minnesota parents or guardians indicated their child had an ACE score of one or more. This number is currently similar to only two other states; Maryland and Maine, each with 38 and 39 percent indicating ACE scores of one or more (Sacks & Murphey, 2018). Specifically, Minnesota is well below the national average in two ACE categories. Only 21 percent of respondents indicated economic hardship, and 20 percent indicated having a divorced or separated parent, compared to the national average of 25 percent for both categories. Minnesota children are equal to the national average of nine percent in only one ACE category, having lived with anyone who has a problem with alcohol or drugs (Sacks & Murphey, 2018).

Since the 1990s, the Minnesota Student Survey has asked Minnesota youth about ACEs using questions covering five categories. These categories include physical abuse, sexual abuse, witnessing household violence, alcohol use by a family member that has repeatedly caused problems, and drug use by a family member that has repeatedly caused problems. The answers provided allow the MSS to give an ACE-like score to each student on a scale of one to five (Minnesota Department of Health, 2013).

The 2013 survey data indicated that almost 65 percent of Minnesota students had an ACE score of zero (Minnesota Department of Health, 2013). This percentage is comparable to the data found by the NSCH study in 2016. However, even with ACE scores that are consistently lower than the national average among students, Minnesota adolescents are still impacted by the harmful effects of ACEs. The MSS also asked students about individual alcohol use in the

previous 30 days before taking the survey. As noticed in the initial study, ACEs impact the health and well-being of those affected, and the same is true for high school students. The percentage of students indicating alcohol use in the previous 30 days before the survey was taken doubled to 20 percent of students with an ACE score increase of one, and more than doubled again to 47 percent when ACE scores were four or higher (Minnesota Department of Health, 2013). The trend of increased ACE scores impacting students is noticed with similar percentage increases for categories including binge drinking, cigarette smoking, attempted suicide, and overall mental health. As ACE scores increase, the likelihood of students being involved in or dealing with one or many of these issues also increases.

The MSS results show that the differences in ACE scores among racial groups have been consistent over the last 15 years. In each year the survey has been administered since 1995, Black, American Indian, and Hispanic ninth-graders have been at least twice as likely as white students to report three or more kinds of adverse experiences. Furthermore, each year Asian students have been slightly more likely than white students to report three or more adverse experiences (Minnesota Department of Health, 2013).

Relationship Between ACEs and Brain Development

Impact of ACEs on Adolescents' Learning

As ACEs continue to be researched and understood, it is clear there is an impact on one's ability to continue normal brain function after being affected by a traumatic situation. Many studies have been conducted to further understand how experiences shape the developing brain and associated cognitive functions. Cognitive development was once thought to be primarily the product of genetics and heredity, but it is now clear that social context and experience play a significant role in shaping cognitive outcomes (Nisbett, Aronson, Blair, et al., 2012).

Cognitive Functioning

General cognitive ability (often referred to as intellectual capacity or IQ) refers to general reasoning and thinking ability and is associated with one's ability to plan and solve problems (Nisbett, Aronson, Blair, et al., 2012). Cognitive ability and functioning dramatically decrease in students who have experienced trauma and are even more noticed in students who have experienced repeated trauma and multiple ACEs. Trauma experiences such as neglect result in lower academic achievement, lower IQ, and the potential for a greater number of PTSD symptoms (De Bellis, Hooper, Spratt, & Woolley, 2009). Furthermore, children who have experienced childhood trauma have shown a greater need for interventions academically due to performance and intellectual ability (Pechtel & Pizzagalli, 2010).

Stress responses from ACEs also impact the affected person's brain and the ability to remember and process as quickly as those not impacted by ACEs. Trauma not only changes the makeup of a child's brain during development, but it also changes the physiology of the developing child. These changes negatively impact the thinking, memory, and organization of a child (Wilson, Hansen, & Li, 2011). Overall, stress reactions due to ACEs impact the executive functioning abilities of those affected. Executive functioning allows students to perform better academically, enhance social interactions, and typical daily activities. Because of a child's response to toxic stress, lower academic achievement is noticed as well as decreased IQ and ability to maintain attention (Wilson, Hansen, & Li, 2011).

Academic Achievement

A correlation should be drawn between those affected by ACEs' cognitive and executive functioning abilities and academic achievement. Because of students' inability to process memory, deal with stress, and understand learning processes, those impacted by ACEs also see a

decrease in academic achievement. In a study conducted by the Center for Disease Control (CDC), it was found that students with ACE scores of three or more are two and a half times more likely to fail a grade (Anda, 2019). Moreover, students impacted by ACEs are unlikely to perform at grade level and more likely to be expelled, suspended, or labeled as special education (Balfanz, Byrnes, & Fox, 2014). Further research was completed in 2014 in a review of ACEs and their impact on educational outcomes. The researchers' review indicated that children with ACE scores were shown to have poor academic performance compared to students with no ACE scores. Indicators like lower grades, higher school absences, and a higher need for special education interventions were also found in the research as correlations between ACE scores and academic achievement (Romano et al., 2015).

Specifically, in Minnesota schools, a decrease in academic achievement is also noticeable in students with ACEs. Using the Minnesota Student Survey (MSS), students listed the grades they earned during the previous school year. The Department of Education connected student responses to the ACE score that each student was given based on their responses to the ACE statements on the MSS. The survey found that students with an ACE score of at least three had the lowest number of A grades and the highest number of D and F grades for the school year (Minnesota Department of Health, 2013). Moreover, the survey revealed that as ACE scores increased from zero to four or more, the percentage of students with grades of C or worst also increased. Finally, the survey indicated that students with higher ACE scores (four or more) had the highest percentage of incomplete grades in the corresponding school year (Minnesota Department of Health, 2013).

Classroom Behavior

Adolescent students with ACEs typically develop more behavioral and emotional challenges than those of their peers. These challenges are generally seen in an inability to self-regulate and pay attention (Bethell, 2017). Furthermore, neurobiology changes have been known to cause students difficulty in regulating emotions. This difficulty impairs their ability to work with others, follow directions, and pay attention (National Scientific Council on the Developing Child, 2011).

The changes in the brain and the chemical responses caused by ACEs and childhood and adolescent trauma can have particular effects on children's behavior and social functioning in a classroom environment. Chronic stress, stress resulting from ACEs and trauma, can cause a persistent fear response where the child feels he or she is in danger even when in a safe environment (National Scientific Council on the Developing Child, 2010). One example may be when a child associates fear with a specific dangerous place or harmful person with other places or people that pose no threat. This fear could cause possible issues in the classroom or with students who may interact with those impacted by chronic stress. Another response noticed in classroom behavior because of ACEs is hyperarousal. Hyperarousal occurs when students are highly aware of nonverbal cues, like eye contact or the touch of another person, and cannot interpret them appropriately. When a student tries to understand nonverbal cues, they are less likely to respond verbally even in a non-threatening environment, for example, a classroom (Child Welfare Information Gateway, 2015). The third impact of chronic stress is the inability of students to respond appropriately to different social interactions. Children or adolescents suffering from stress caused by ACEs or other traumatic situations struggle to adapt to changing social interactions and context (Hanson et al., 2010). Although students may be in a safe

environment, they may automatically perceive threats more frequently and react accordingly. This behavior may make it more difficult for these children to interact with others (National Scientific Council on the Developing Child, 2010). For example, students with a higher ACE score may become overly aggressive because of the inability to interpret peers' facial expressions.

Student engagement was also included in the State of Minnesota's study of ACEs (Minnesota Department of Health, 2016) and their impact on students. Although not directly related to classroom behavior, as discussed above, student engagement can impact students' behavior in the classroom and school environment. The MSS asked students to respond to three specific statements in the survey:

1. "If something interests me I try to learn more about it.
2. I think things I learn in school are useful.
3. Being a student is one of the most important parts of who I am" (p.4).

Researchers took the responses of students who indicated they strongly agreed or agreed with these statements and correlated them to the ACE scores of those same students. Students with an ACE score of zero or one had the highest percentages of agreeing or strongly agreeing with all three statements. When students responded to the statement of what they learn in school being useful to them, almost 85 percent of students with an ACE score of zero indicated they strongly agreed or agreed. Conversely, this number dropped to only 64 percent of students with an ACE score of four or more. Finally, when responding to the statement regarding being a student being one of the most important parts of who they are, 74 percent of students with an ACE score of zero indicated they agreed or strongly agreed. This number continued to decrease with each

increase in the ACE scores of the students surveyed to where only 47 percent of students with an ACE score of four or more agreed with the statement (Minnesota Department of Health, 2013).

Outside Influences

Many different people are essential to the academic success of adolescents. Those people, specific teaching supports, and alternative teaching strategies aid in the achievement of adolescents impacted by ACEs and trauma.

Teachers

Teachers, school administrators, parents, and other caregivers are aware of the need to create healthy learning environments for students impacted by trauma and ACEs. A solid foundation, as well as regulating emotions and appropriate attachments to adults allow children to adapt well to school (Cicchetti, 1989). Teachers spend significant amounts of time cultivating and growing relationships with students daily and must be informed and knowledgeable about what practices and teaching strategies are best for them. Furthermore, teachers must understand that working with students with traumatic backgrounds can impact their own emotional and physical well-being due to the effects of secondary trauma, or the emotional impact providing care to victims of trauma has on the caregiver.

Trauma Informed Teaching

Many schools across the country have started to tactically approach student trauma and ACEs by creating trauma-informed schools to develop environments that help students and adults effectively handle the stress that comes from these situations. Trauma-informed schools are schools that not only recognize students impacted by trauma but also support students and staff through social-emotional learning and a holistic health approach. Trauma-informed schools provide a caring culture, staff development, and support for students suffering from trauma

(Lander, 2018). School communities that incorporate trauma-informed approaches are critical to effectively meet students who face increased adversity throughout their childhood and adolescence (Copeland, Keeler, Angold, & Costello, 2007).

The National Child Traumatic Stress Network (NCTSN) (2017) has developed a framework that identifies and describes the essential elements of a trauma-informed school. The framework lists ten core elements necessary for schools to implement a trauma-informed environment successfully. The core elements are:

- "Identification and Assessment of Traumatic Stress
- Prevention and Intervention Related to Traumatic Stress
- Trauma Education and Awareness
- Partnerships with Students and Families
- Creation of a Trauma-Informed Learning Environment
- Cultural Responsiveness
- Emergency Management/Crisis Response
- Staff Self-Care and Secondary Traumatic Stress
- School Discipline Policies and Practices
- Cross-System Collaboration and Community Partnerships" (p. 2).

These elements are essential to support the overall culture, practice, and structures for a trauma-informed school (National Child Traumatic Stress Network, 2017).

Although trauma-informed teaching practices and schools are in their infancy, school-based programs and approaches are commonly addressing trauma-rooted behavioral problems and emotional problems by fostering resilience (National Association of School Psychologists, 2016). Trauma-sensitive schools have the potential to increase positive outcomes among all

students as they support students academic competence, provide tools to support students and staff in managing emotional and behavioral challenges, and support teachers and other staff in negotiating difficult situations. This support is vital, given that not all students who experience adverse childhood experiences will go on to suffer symptoms of trauma (Blaustein & Kinniburgh, 2010).

Flexible Framework

The Massachusetts Advocates for Children created another approach to teaching students impacted by trauma. In 2005, as part of the state's Trauma and Learning Policy Initiative, Harvard Law School and The Massachusetts Advocates for Children developed what is known as the Flexible Framework. The Flexible Framework focuses on a school's needs as a whole and works to create trauma-sensitive learning environments (Massachusetts Advocates for Children & Harvard Law School, 2005).

In the report written in 2005, the Massachusetts Advocates state the framework has six critical elements, each of which is to be evaluated from a trauma-sensitive perspective:

- "Schoolwide Infrastructure and Culture
- Staff Training
- Linking with Mental Health Professionals
- Academic Instruction for Traumatized Children
- Nonacademic Strategies
- School Policies, Procedures, and Protocols" (p.18).

The report states explicitly that staff training is an essential part of developing and incorporating the Flexible Framework into a school environment. Each teacher and support staff have differing levels of expertise when engaging with students impacted by trauma, and because

of this, each school needs targeted training based on the existing school culture and structure (Massachusetts Advocates for Children & Harvard Law School, 2005).

Teacher Supports

Along with necessary training and education regarding the impact of trauma on the students with which they interact, teachers also need to be supported with the necessary tools and professional learning to manage the secondary trauma they may incur. Educators may develop symptoms of trauma even if they have not been impacted by trauma personally. These symptoms are similar to those of their students and could include anxiety, depression, fatigue, and withdrawal (Walker, 2019). Secondary traumatic stress (STS) is defined by the National Child Trauma Stress Network (NCTSN) as "the emotional duress that results when an individual hears about the firsthand trauma experiences of another" (Walker, 2019). What was once thought of as teachers having a "bad day" now has different names like STS, vicarious trauma, or compassion fatigue. In an article written for the Harvard Graduate School of education, author Jessica Lander explains that STS symptoms are similar to PTSD. Educators are no longer just responsible for students' academic growth, but also take on the role of an emotional supporter like counselors. This work has led to educators experiencing unhealthy symptoms of STS like the inability to sleep, poor eating habits, isolation, and consistent worry about students (Lander, 2018).

In a 2012 study conducted by the University of Montana, researchers were aware that no studies had examined STSs effect on public school workers. Thus, researchers conducted a study on six schools and included 229 school staff members in determining the impact of STS. The research methodology included the Public School Demographics Workplace Questionnaire, Professional Quality of Life Survey, and a Peer Support Questionnaire, and data was collected

using an empirical study, interviews, qualitative, and quantitative studies. The results indicated that school personnel experienced high levels of STS. Educators still indicated high levels of job satisfaction similar to that of national averages. However, even with high levels of STS and teacher burnout, no treatment opportunities for traumatic stress have been provided for educators and other school personnel (Borntrager et al., 2012).

Specific supports for educators experiencing STS have been slowly developing as awareness of the ever-growing issue increases. In early 2019, The National Education Association (NEA) partnered with the National Council of State Education Associations (NCSEA) to understand missing supports for educators. The National Education Association affiliates met with 39 separate affiliates to discuss trauma-informed schools. A subsequent report was published in July of 2019, where the NCSEA outlined steps schools can take ensuring trauma-impacted students are successful and supported. Furthermore, teachers were also provided with steps and recommendations to support these students. The supports for teachers addressed in the report included: educator professional learning, safe working and learning environments, educator self-care, educator safety, optimal class size, and post-trauma supports for students and educators (National Council of State Education Associations, 2019).

Furthermore, the study found an essential support for teachers would be to include training on trauma in teacher preparation programs. Respondents indicated this could decrease the high burnout rate of new educators who are likely to teach at schools with the highest needs. Participants also indicated a need for the school administration to be aware of trauma and commit to addressing behavior, trauma, and STS (National Council of State Education Associations, 2019). For teachers to be the best they can be for their students, these supports

need to be addressed by school districts and administration. If not addressed or taken seriously, teacher burnout and high turnover are likely.

Behavioral Interventions

As the awareness of childhood trauma and its effect on adolescents changes in the minds and practices of those involved in education, so must the policies and structures set up to treat behaviors exhibited by those who have experienced or been exposed to traumatic situations. Traditional discipline policies are still found in many schools and use consequences to address behavior issues. These policies can increase the behavior issues of those students impacted by trauma (National Council of State Education Associations, 2019). This one-size-fits-all model of discipline in schools does not coordinate well with the changes in students who have experienced trauma-related situations. Traditional disciplinary measures do not consider those involved in a situation and thus do not limit the behavior from happening again in the future (NEA Policy Statements, 2018). Schools must instead teach students about the importance of managing behaviors and modifying reactions to negative situations when possible. As previously stated, traumatized children have difficulty processing information due to high levels of fear and arousal. Triggers occur when a child is reminded of trauma and can lead to inappropriate classroom behavior. Teachers and staff can assist in these situations as training allows staff to recognize children experiencing these different emotions. As school staff become more aware through training, they can help students by discussing appropriate responses and supporting the student effectively (Massachusetts Advocates for Children & Harvard Law School, 2005). Furthermore, having classroom accommodations like safe corners or “peaceful places”, making students aware of potential loud noises, and providing students with tasks and allowing movement can help students regulate emotions appropriately (Cermak & Larkin, 2002).

Still, traumatized children must be held accountable for their behavior. All students need to learn that following rules is important to making a positive difference in their lives. For all schools to emphasize positive behavior, there must be a coordinated behavior-management system in place (Massachusetts Advocates for Children & Harvard Law School, 2005). An example of this positive type of support for traumatized children could include breaking tasks down into small parts and providing encouragement along the way. The teacher making this change allows the child to feel safe and more comfortable in the classroom. Moreover, traumatized children may learn from peers in groups that teach ways to meet others, display socially acceptable behaviors, and provide opportunities to trust adults. These programs allow students to feel connected to more than one program or teacher and feel safe in school (Massachusetts Advocates for Children & Harvard Law School, 2013).

Role of Parenting

Although educators and school staff are necessary to an adolescent's development, so too are the parents and family structures that students return to after being in the classroom. Parents play an integral role in an adolescent's ability to cope and heal from trauma. Recently, the American Academy of Child and Adolescent Psychiatry recommended that parents be included in the practices of treating childhood trauma (Cohen, Berliner, & Mannarino, 2000). Furthermore, a 2009 study concluded that parents' interventions were seen as effective in helping children and adolescents with conduct problems improve behavior (Dretzke et al., 2009).

A recent study conducted a meta-analysis of parenting interventions and the ability to improve child psychosocial outcomes by changing parenting practices (Johnson et al., 2018). The researchers wanted to better understand how trauma-informed parenting interventions impacted child outcomes as much of the best practices of supportive parenting are not widely

applied to parents who have children who have experienced trauma. The research design included a meta-analysis of current literature and studies related to positive parenting interventions. The initial search generated 1392 relevant studies. After a first review, 195 studies met some selection criteria. These were then reviewed, read, and critiqued based on all selection criteria, shrinking the number to 17.

The study examined six intervention strategies: parenting stress, children's internalizing problems, positive parenting practices, negative parenting practices, children's externalizing problems, and trauma symptoms. In order to understand what parents can do to impact adolescents who have experienced trauma, the focus will be put on parenting stress and positive and negative parenting practices.

The study found that positive reinforcement and parental support for child behavior have been linked to fewer problems and increased self-regulation by children (Johnson et al., 2018). Another similar study of 95 physically abused children found that the negative effects of trauma decreased through positive parenting practices (Kim-Spoon, Haskett, Longo, & Nice, 2012). That study also suggested that higher-risk children benefited most from positive parenting.

Negative parenting practices were also found to have an impact on children. Negative parenting, including harshness and inconsistency, can predict externalizing problems and more significant depressive symptoms (Johnson et al., 2018). Thus, it is crucial for parents of children who have been exposed to trauma and are already at high risk for depression to decrease these negative parenting practices.

Finally, the role of parental stress is critical to consider in response to and parenting children and adolescents involved in trauma. Parents of children impacted by trauma may also have gone through a traumatic situation, which can impact the parent's ability to manage and

control stress related to their child. However, managing this stress well is an essential positive parenting behavior that can help a child adjust after trauma exposure (Johnson et al., 2018). Overall, a parenting approach that addresses these three behaviors is key to parenting children exposed to trauma.

Researchers found that these studies limitations exist when looking at parenting interventions mainly because of the short-term effects noticed by parents who practiced those interventions. More research and work needs to be done in order to understand parenting interventions and if they are useful for adolescents impacted by trauma (Johnson et al., 2018).

Trauma Invested Practices

Many schools around the country have created and further developed practices beneficial for adolescent learners impacted by trauma. One of those practices is the development of resilience in adolescent learners.

Resilience

Even with support from teachers and parents, students themselves can develop skills and traits to adapt to the effects of trauma-related issues. One of those traits is resilience. According to the American Psychological Association, students can display resilience by adapting well to the situations when faced with adversity and other significant stress. This skill allows students to live with the ability to overcome different adversities throughout their lives. With an understanding that resiliency is a learned trait and not genetic, teachers and staff can work together to develop it in their students.

Resiliency Framework

In the book, *Teaching the Whole Teen* (Benson & Poliner, 2017), practices are explained that teachers can use in their classrooms to foster the development of resiliency in all students,

especially those who have experienced trauma. The authors provide the Resiliency Framework as an effort to allow teachers to positively develop adolescents' resilience. The Resiliency Framework is made up of four skills teachers can work to enhance in the students they serve, including social competence, problem-solving, autonomy, and a sense of purpose and future in the context of school and community.

Social Competence. Social competence has long been defined in terms of acquiring practical social skills to manage social relationships (Shujja, Malik, & Khan, 2015). It has been known to increase in adolescents as social interactions grow between peers, teachers, and family members, and also is a necessary skill for students to develop to increase their resiliency. If a student has the skills to develop relationships and can connect to others, they form long-lasting relationships and bonds between people. This ability provides them with a web of relationships that represent a sense of stability and provide a guide to navigating the ups and downs of life (Benson & Poliner, 2017). Educators have a unique opportunity to include the development of interpersonal and intrapersonal skills throughout the school day.

Social Competence was further addressed in a study conducted in 2011, which examined what factors psychosocially affect adolescents as stress. Students in grades 10 to 12 were asked open-ended questions about stress and how it impacted them. Researchers used thematic content analysis to indicate that adolescents experience family relations and friendships as their most compelling stressors. Negative daily social interactions are important to adolescent stress levels. Students indicated experiences of poor self-perception and self-worth (George, 2011). Teachers and adults must recognize that emotional and social skills should be developed to have students work and live with a positive outlook in different environments.

Problem-Solving. As prior research shows, adult brains make decisions and problem solve differently than that of an adolescents brain (American Academy of Child & Adolescent Psychiatry, 2016). Parents and teachers must help students learn how to solve problems through a logical process. Students develop resiliency through problem-solving as they learn how to organize, plan, assess, and adjust based on results (Benson & Poliner, 2017).

The importance of problem-solving for students is also addressed in the research of John Hattie. In his book *Visible Learning for Teachers* (Hattie, 2017), he explains the importance of problem-solving for learners. He indicates, "Learning is primarily a social activity; new knowledge is constructed on the basis of what is already understood and believed; and learning develops by employing effective and flexible strategies that help us to understand, reason, memorize, and problem-solve" (Hattie, 2017, p.98).

Autonomy. Autonomy refers to an individuals ability to feel, decide, and act as their own person. During the adolescent years, autonomy takes on a significant meaning, allowing the adolescent to feel capable of becoming an independent person, relying less on other adults (Ghasemian & Kumar, 2017). The ability to think and act on their own is imperative to the development of resiliency in students. Educators and adults have long struggled with the idea of autonomy due to seeing the risks of students moving into making their own decisions rather than the benefits, but if educators want to increase resilience, they must be willing to let some of the decision-making fall to students (Benson & Poliner, 2017).

Further studies indicated the importance of allowing students the ability to make decisions in regards to their learning. Self-regulated learning is viewed as a proactive process that students use to acquire academic skills (Zimmerman, 2008). As students learn how to keep track of the learning process, they are developing autonomy and increasing self-regulation

abilities (Dent & Koenka, 2016). Teachers must provide students with the ability to make learning decisions to increase autonomy as part of the development of resilience.

Sense of Purpose and Future. Research shows that to develop a school culture that is successful for a wide range of learners, the school must provide rich opportunities for students to make their own connections to the work and apply their unique ideas (Benard, 2004). This structure puts the responsibility on teachers to create learning experiences relevant to what the students are experiencing in their daily lives. Benson and Poliner (2017) explain, "Students who believe the work they do in school contributes to the person they want to become and the life they want to live, are strongly positioned to doing well in school" (p. 17). Educators must develop educational experiences that connect students to relevant learning to further develop resiliency in students. Table 1 presents activities teachers can use within the classroom setting in order to forge resiliency in students.

As teachers interact with students who have been involved with trauma and those who have not, one must remember that resilience is demonstrated differently. In *Fostering Resilient Learners*, authors Souers and Hall (2016) explain, "Access to healthy support systems and safe environments augment the development of resilience. Relationships matter. Professional educators – teachers, counselors, administrators, and others – can provide the environment, the relationship, and the support systems for our trauma-affected students and families" (p. 154).

Relationships

Without proper development of relationships between teachers and their students, developing resiliency and supporting those with trauma would be even more challenging. Relationships are a core need for all humans as they provide the body with an ability to regulate appropriately and thus feel safe. This safety, created through a positive relationship with a

teacher, is what students need to learn effectively (Souers & Hall, 2018). Furthermore, with proper relationships in place, teachers can impact student behavior in the classroom and recognize the positive benefit relationships with their students provide to their mental health. School connectedness has been researched and found to have positive benefits on students physical, mental, emotional, and academic health and thus can significantly impact students who have experienced trauma in their lives (Dods, 2013).

First, positive relationships with students form part of the foundation to foster academic success in the classroom. In an interview with teachers from multiple backgrounds, researchers found that many teachers see relationships as part of good teaching and are personally interested in students as individuals. Thus, teachers who strive to personalize their classrooms based on an awareness and understanding of their students believe that relationships enable academic success (Bernstein-Yamashiro & Noam, 2013).

Second, connecting with students personally can impact behavior inside the classroom (Craig, 2016). When teachers work to understand their students, they can notice triggers or possible negative behavior that may occur because of classroom situations. With proper training and self-awareness, teachers can respond appropriately to students' behavior and redirect them using strategies created through the supportive relationships between teacher and student (Craig, 2016).

Finally, studies of teacher morale and mental health have found that mentoring relationships with students inspire teachers' work and gives them a deep sense of purpose. Teaching has been known to be a stressful and sometimes thankless job, yet developing connections with students can provide teachers with gratification and benefits otherwise overlooked (Bernstein-Yamashiro & Noam, 2013). Overall, to provide safety and connection to

students, supportive and caring environments must be created by teachers in order for students impacted by trauma to feel empowered to learn (Souers & Hall, 2018).

CHAPTER III: DISCUSSION AND CONCLUSION

ACEs and trauma are now more often included in the educational conversation, and there are research and literature that provides awareness and understanding of this challenging societal issue. The review of the literature sought to find existing research on these guiding questions:

1) What is the impact of trauma associated with adverse childhood experiences on the academic achievement of adolescents?
2) How do teachers and parents mitigate the impact of trauma associated with adverse childhood experiences?

One must understand that adolescence is a crucial time in the brain development of a child. The adolescent brain is always adapting and changing due to the synaptic pruning process and myelination (Kooreman, 2017). During these formative years, the brain works through these processes to streamline itself and understand the environment to adapt and process information more quickly. The limbic system and prefrontal cortex experience much change during the development of a child during adolescence as well. These parts of the brain continue to develop into adulthood (Casey, Jones, & Hare, 2008).

There is a noticeable impact on normal brain function and cognitive abilities of adolescents who have been affected by ACEs and trauma. What was once thought to be based on genetics and heredity, cognitive development is now seen as a product of social context and experiences (Nisbett, Aronson, Blair, et al., 2012). Adolescents who have experienced a traumatic situation or have an ACE score are more likely to display lower academic performance, higher importance for individualized education programs, and impaired intellectual ability (Pechtel & Pizzagalli, 2010). This research was further confirmed through a study of Minnesota adolescent learners with ACEs. The study found that students with ACE scores of at

least three had the highest number of failing grades during a school year (Minnesota Department of Health, 2013).

Not only do ACEs influence the ability for students to perform well in the classroom, but they also impact behavior and choices made inside and outside of school. Students with ACE scores experience chronic stress, which correlates to the ability to feel safe in school, regulate emotions, and read social cues (National Scientific Council on the Developing Child, 2011).

Teachers, administrators, and school staff are all a necessary part of an adolescents development, whether the student has experienced trauma or not. Trauma impacts children in different ways, but adolescents who are able to attach to a caring adult are usually able to regulate their emotions and adapt well in school (Cicchetti, 1989). Many schools around the country have developed an approach to trauma by creating trauma-informed teaching practices, so students and teachers can both understand and support those impacted by trauma. This change has allowed schools to meet the complex needs of students who face many types of adversities (Copeland, Keeler, Angold, & Costello, 2007). Approaches like the Flexible Framework (Massachusetts Advocates for Children & Harvard Law School, 2005) and other teaching strategies like that of the Resiliency Framework (Benson & Poliner, 2017) have also provided teachers with different opportunities to support and nurture adolescent learners who have experienced trauma.

Parents have been and always will be necessary for developing a child after being exposed to trauma. Like schools and teachers have created, trauma-informed parenting strategies have been studied to show links between positive reinforcement from parents and a correlation to fewer problems and better self-regulation by children (Johnson et al., 2018).

Still, much of how someone processes trauma is based on a persons ability to develop resiliency. Resiliency is a learned trait and something that students can cultivate through experiences created in a school environment. This understanding is a critical component that educators and school staff must be aware of to help adolescents overcome the negative impact of trauma on their lives.

Professional Application

To benefit from this research, one must be able to apply the knowledge gained and put it into practice in a school and classroom setting. This information can be looked at from a national, state, and local perspective.

Nationwide

As the research on adverse childhood experiences grows, more are becoming aware that it is a critical public health issue. The Centers for Disease Control (CDC) has been active in determining these experiences and how to prevent them throughout the United States (Sacks & Murphey, 2018). The CDC continues to use the Behavioral Risk Factor Surveillance System (BRFSS) to determine the number of people in the United States who have experienced ACEs. The CDC has indicated that the prevention of ACEs will have a drastic effect on public health in the future, and they are working to provide resources to communities to limit this effect.

Schools across the country are also noticing the impact that trauma and ACEs have had on students, and the National Education Association is taking a strong stance on fighting trauma. Many schools and districts are working together to create safe and supportive environments for students and educators. These safe environments are “trauma-informed” or are “trauma-sensitive” environments and are developed to support students and teachers who have experienced trauma or STS (National Council of State Education Associations, 2019).

State of Minnesota

The Minnesota Student Survey (Minnesota Department of Health, 2013) is a source of data for the state to understand how adolescent students are behaving and adapting to their environment. This anonymous survey provides state administrators and districts the ability to see how students answer questions about a wide variety of youth behaviors, including risk behaviors such as alcohol, tobacco, and other drug use, violence and sexual activity, as well as positive behaviors and connection to family, school, and community (Minnesota Department of Health, 2019). There are no specific questions related to ACEs on this survey, but a suggestion is to add questions related to ACEs to the survey in the future in order to determine how many students would explain the traumatic situations they have experienced.

Although there is not a one-size-fits-all strategy for addressing trauma and ACEs in schools, a curriculum that brings awareness to the ever-growing issue may provide students with an understanding of how trauma can affect their lives. This curriculum could be financed and developed by the state based on the most noticeable ACEs in Minnesota communities. The curriculum could be tailored to socioeconomic background, race, and gender to provide a unique learning experience for adolescent students in Minnesota regarding ACEs and trauma.

Minnesota High School Classrooms

Teachers need to understand trauma and the impact ACEs have on an individual. Unless a teacher were to go to school specifically to understand the brain and how trauma changes the brain, one would know little about it. Still, teachers are the adults who are spending many hours each day around those students who have experienced trauma. Education and professional development must be considered on a district and school level to provide training for teachers to understand trauma more comprehensively. Without this awareness, educators will continue to

see some students as problems in their classroom and not work to understand the individual student based on ACEs those students may or may not have already experienced in life.

Application of the Resiliency Framework

This work has propelled my desire to understand the human brain even more and understand how the brain is changing with each new experience we face. Because of this, I believe I can do more in my classroom and be a positive force in the lives of my students to help them develop the resiliency and strategies needed to mitigate the effects of trauma in their lives. There are three ways I plan to use the Resiliency Framework to improve my teaching.

First, providing opportunities for students to manage their time effectively has been known to increase resiliency. In my classroom, I provide students with opportunities to develop projects and complete work over a specific amount of time. I plan to continue this and also enhance my projects by having students complete work throughout a two-month time period for the end of the semester project. Students will be given deadlines for each component of the project work and will have to meet those deadlines to complete the entire project to specific expectations. This amount of time and specificity in what each student needs to complete and when will allow students to develop abilities to manage time well inside and outside of school, and in turn, develop resiliency.

Next, student resiliency can be enhanced as teachers provide more control to the student over their learning. This strategy allows for more commitment and a sense of purpose to be experienced by the student. In my classroom, I plan to give students more control regarding what they create to meet learning standards. When allowing students more control in their work, I hope to see an increase in their commitment to the project and dedication to their work. Specifically, this could be in their choice of how to give a presentation. I will provide options for

students, including presenting in front of the class, creating a video, using a Google Slides presentation, or even allowing them to write a blog about their work. When students are given these options and more control, their commitment to their work will increase. Furthermore, although I teach a specific subject, students should have the option to meet learning targets using knowledge or interests from other subjects. I plan to allow for cross-disciplinary opportunities when meeting standards for my courses. Student resiliency will increase as they determine how and what they want to use to meet specific expectations of the coursework.

Finally, student resiliency increases through activities like developing personal aspirations and education goals. In my classroom, I want to incorporate this idea early in the semester by creating student "vision boards." In a vision board, students would develop personal goals and goals for their education using pictures, graphics, or words placed on a tangible board or digital board format. Students would not only develop their goals but also share them with other students in the classroom, creating a bond between students with similar goals and aspirations. Moreover, I also plan to use a Google Form that students will complete each week to list and explain their learning goals for a specific time period. With this form, I will monitor student progress throughout each week and help students who may need extra support. Finally, the celebration of achieved goals is important to consider. At the end of each week, students who have completed their learning goals will be celebrated in class. Through the use of goal development and achievement, students will increase their own ability to set goals in the future and develop resiliency.

Limitations of the Research

There is much research available explaining the prevalence of trauma in society today and the profound impact it has on adolescent lives. However, little research has been conducted

outlining how schools can understand and determine which students have been impacted by ACEs. For example, how schools pre-screen or evaluate students' personal histories would be helpful, as it is known that ACE scores have an impact on a student's ability to learn. Indeed, it takes a dedicated teacher to get to know students and their backgrounds, but knowing ACE scores in advance could help teachers. Understanding how teachers could teach students with different backgrounds would benefit both student and teacher.

Another limitation of the research is the lack of awareness around how age impacts resiliency development in adolescents. While there is some research (Souers & Hall, 2016) about age and resiliency, it is limited. Understanding if a thirteen-year-old student can develop resiliency similarly to that of an eighteen-year-old would help educators. Moreover, there are strategies that should be used by educators to develop resiliency in students of different ages or those who have experienced different types of trauma. Knowledge of these differences would allow schools and communities to develop curriculums that support students no matter the age or the type of trauma they may have experienced earlier in life.

Finally, some of the research surrounding ACES is getting outdated. For instance, the Minnesota Department of Health (2013) data could benefit from newer statistics and an updated list of questions in the survey. Society is changing rapidly, and the survey questions that indicate how students are impacted socially do not reflect those changes.

Implications for Future Research

There are several implications for future research based on the limitations of the current literature. More research needs to be conducted on different types of trauma that adolescents are now experiencing. Social media and cyberbullying are impacting the lives of young people. Research also needs to be done on how increased gun violence or police brutality has changed

young peoples perspectives in America. The public media and what adolescents see on television or read online changes their social and emotional health and needs to be researched more thoroughly. It would also be beneficial to know how adolescents who experienced the COVID-19 pandemic of 2020 may be impacted by unseen trauma separate from the types of trauma indicated in original studies. These types of research will soon need to be completed in order for educators and parents to understand how society today is impacting the lives of adolescents. With this knowledge, professionals, including educators, would better help and guide students and adolescents as they work together to understand the world.

It is clear the impact ACEs have on physical health and the brain's ability to function correctly, but more research must be done to understand what happens to adolescents' emotional and mental health because of trauma and ACEs. What is unclear is whether there will be long-term impacts for the adolescents affected by trauma and ACEs that are not seen or noticed until later in life. Similarly to that of the initial Kaiser Permanente study on physical health and the correlation to ACEs (Felitti et al., 1998), will society not see the impact on mental health and social well-being until it is too late? If research could be conducted to determine this impact and provide support for reversing the effects, not only would adolescent lives be impacted, but society at large.

Conclusion

This literature review aimed to understand trauma and ACEs and the effect they have on adolescent students' ability to learn. The literature review was also used to determine how caregivers, such as teachers and parents, can help students manage emotions and develop resiliency as they process through and cope with traumatic situations and ACEs.

The literature identifies trauma and ACEs as a growing problem in society today. Adolescent learners have experienced traumatic situations and ACEs at all ages, and it is these situations that have a dramatic impact on brain development and function as well as behavior and success in school. Research shows there is a connection between ACE scores and a student's ability in school. However, research also shows that adolescents can develop resiliency and develop tools and strategies to cope with trauma in healthy and productive ways. Much work falls to the educator and parents responsible for the upbringing and development of adolescent learners. Schools and communities across the country are working to support and create structures to help those impacted by trauma and ACEs. Through the development of relationships and trauma-informed teaching practices, educators can be instrumental change agents in the lives of adolescents who have experienced a traumatic situation.

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Table 1: Activities of the Resilience Framework (Benson & Poliner, 2017)

Resilience Framework Trait	Activities Used to Develop Traits in Students
Social Competence	● Developing long lasting friendships ● Noticing others' emotions, when they need support, and offering it ● Appreciating others' styles, interests, and perspectives ● Respecting others, acting as an ally, protecting others ● Behaving in trustworthy ways as part of building relationships and working in groups
Problem-Solving	● Planning for the short term and long term ● Organizing materials and tasks ● Managing time effectively – estimating tasks and time, scheduling themselves, meeting deadlines ● Learning to make decisions; internalizing criteria that are healthy and ethical ● Expecting to make mistakes and learn from them
Autonomy	● Making better decisions, even when experiencing peer or community pressure ● Have more sense of control, leading to more commitment and purpose ● Taking healthy risks ● Taking good care of health; using healthy coping strategies to manage stress

	● Accepting responsibility and consequences for one's actions
A sense of purpose and future in the context of school and community	● Identifying personal aspirations and educational goals ● Developing special interests and skills ● Expressing hope and optimism ● Using future goals to balance daily dramas and sustain perspective; delaying gratification for a larger, later goal ● Connecting to larger missions and traditions