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Implementing Trauma-informed Approaches to Improve Outcomes for Students in High-poverty Schools

Kimberly N Davis
Bethel University

IMPLEMENTING TRAUMA-INFORMED APPROACHES TO IMPROVE OUTCOMES FOR STUDENTS IN HIGH-POVERTY SCHOOLS

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KIMBERLY N. DAVIS

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Thesis Advisor: Amy Fox, M.A.

Program Director: Molly J. Wickam, MBA, Ph. D

Abstract

Adverse childhood experiences (ACEs) increase the likelihood of negative outcomes throughout life. ACEs are traumatic events that occur between ages 0-17 and can induce a toxic stress response negatively impacting brain development, body function, behavior, and academic performance. ACEs elevate the risk of decreased executive functioning, increased learning and behavioral difficulties, and lower school engagement, attendance, and academic performance. Childhood poverty increases the risk of ACE exposure and decreases resources that buffer the impact of toxic stress, increasing the likelihood of negative life outcomes. Improving academic outcomes for children in poverty requires educators to understand the impact of trauma on brain development, signs of trauma, and trauma-informed approaches to mitigate the impacts of trauma on student engagement, performance, and achievement.

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CHAPTER I: INTRODUCTION

I have been a classroom teacher for more than 13 years in public, high-poverty schools. Over the last few years I have become genuinely concerned by the high number of students who are disengaged in school overall - in academics, in extracurricular activities, and in the participation of creating a positive school climate. As the 2021-2022 school year began, so did the vocalization of the dissatisfaction and dismay of teachers and school staff in my building, those I know in other buildings, and those I am connected to on social media.

After nearly two years of social and educational disruption caused by the Covid-19 pandemic, educators were asking students to return to school and engage in the learning process with the same expectations as before the pandemic. Be on time. Be prepared. Be ready to learn. Be respectful of each other and school spaces. Instead, many students chose when they would attend class and when they would walk out of class to attend to other matters. They congregated in open spaces where they would shoot dice and gamble. Students vaped in bathrooms or, if they were bold, as they walked down the hallways. They left campus to smoke weed and returned to the building to congregate, again leaving the aroma of marijuana filling the hallways. Some students indulged in marijuana right in the school rather than leaving the building. There seemed to be a significant increase in the number and severity of fights. At times, staff were injured attempting to break up the fights. The vandalism and damage to school property was to a degree most had never seen before - soap dispensers, sinks and toilets ripped out of the walls; bathroom stall doors went completely missing; secured areas of the school were broken into and damaged; and band uniforms were destroyed with spray paint.

Staff were often asked to give students “grace and space.” Initially, grace and space seemed to be the right thing to do given the extenuating and potentially traumatic circumstances of the last two years. Staff and students alike could all benefit from a little grace and space. Covid-19 forced everyone home. Social relationships were immediately strained or severed. Society was inundated with messaging about the number of Covid-related deaths and the severity of the next strain. There was significant uncertainty as to when daily life would return to what it was pre-pandemic.

To further exacerbate the stress and fear induced by Covid-19, within months of the nationwide closing of schools in March of 2020 due to the pandemic, the world watched the murder of George Floyd. The murder took place in a neighboring city where approximately 40% of students in my school reside. The protests, riots, looting, and violence extended into the city where my school is located. In essence, 100% of the students in my school were somehow affected by the murder of George Floyd. Then, in early April 2021 shortly after students returned to hybrid learning, they experienced another round of tragedy and trauma that disrupted their lives. The murder of Daunte Wright by a Brooklyn Center police officer took place right in our community. The police station where the officer worked sits across the street from the school. It is surrounded by apartments that house our students. The protests, riots, looting, and violence once again directly impacted my students and our community. Families were displaced because the chemicals used to disperse the crowds entered their homes night after night. Public transportation halted temporarily, and local businesses were looted so badly that many families had no way to obtain necessities. Classes were canceled for a week and teachers were encouraged to check on their students and offer support.

Shortly after the beginning of the academic year, it became clear that "grace and space" would not suffice. Staff members were frustrated and angry. In staff meetings and professional development sessions there was finger pointing and blaming others for what they described as a chaotic and unsafe environment. I began to consider what could be done to change the culture among both staff and students. Through talking with others, it seemed that perhaps we were missing the greater picture. Many staff and students were simply not in a good place mentally and emotionally. Staff expected students who missed out on significant in-school time that is usually used to develop social, academic, and behavioral skills and expectations to return to school and meet expectations they were, through no fault of their own, ill-prepared to meet. Students who were freshmen with the initial pandemic-caused school disruption were now juniors and building leaders. This year's freshmen missed out on the middle school years where they should have learned how to transition between classes along with other academic and social skills with which they are expected to enter high school. The lack of grade level appropriate preparation, coupled with the myriad of traumatic experiences over the previous two years, combined to create a difficult learning environment. Rather than simply allowing grace and space, it is important to acknowledge the adverse, or traumatic, experiences that many students faced both before and during the pandemic years and incorporate trauma-informed approaches into every aspect of education.

Need for Trauma-Informed Approaches to Education

Purpose of Education

An infographic published by the Association for Supervision and Curriculum Development (ASCD, 2012) highlighted how the purpose of education, according to various scholars, has grown and shifted throughout the last century. As cited in the infographic, Dewey

(1934) shared his belief that the purpose of education was to provide young people with the tools and knowledge needed to "develop in an orderly, sequential way into members of society" (para. 5). The purpose evolved, according to Martin Luther King Jr. in 1948, to be "the function of education is to teach one to think intensively and to think critically" (para. 4). The infographic included an ASCD quote from 1957 claiming "the main purpose of the American school is to provide for the fullest possible development of each learner for living morally, creatively, and productively in a democratic society" (para. 3). A quote from the ASCD in 1964 that the purpose of education "has changed from that of producing a literate society to that of producing a learning society" (para. 2) was the next progression. Finally, the ASCD infographic cited Foshay's 1991 conceptualization of a broader purpose of education in which the goal was "to bring people to as full a realization as possible of what it is to be a human being" (para. 1).

Foshay (as cited by the ASCD, 2012) noted that although other purposes of formal education such as addressing societal needs, preparing the workforce and growing the economy, and the promotion of social and political systems have been generally accepted, they are individually limited and fall short of his proposed broader humanistic purpose of education that encompasses *all* aspects of the human experience - including the aforementioned. Unfortunately, for a significant number of young people today their human experiences continually challenge them to process more than just academic content. Today's youth are faced with increased school and community violence, increased racial tensions, challenging family dynamics, and a global pandemic all while being expected to meet the behavioral and academic expectations of their educational institutions. In order to achieve Foshay's goal of education and bring students to as full a realization as possible of what it is to be human, or any other defined purpose of education, schools must acknowledge the complexities of students' lived experiences and work to address

barriers that may prevent them from fully engaging in the learning process.

Current State of the Nation's Youth

In 2020 37 million people, or 11.4% of the U.S. population, lived in poverty; for a family of three the poverty threshold was $20,591 and $26,496 for a family of four (U.S. Census Bureau, 2020). Of those living in poverty, approximately 16.1%, or 11.6 million were children and adolescents under age 18. According to The National Child Traumatic Stress Network (NCTSN), roughly one million children each year are exposed to the child welfare system for a variety of factors (n.d.). These children have experienced neglect, abuse, and/or violence as part of their everyday life. Additionally, the NCTSN reported that "each year more than ten million children in the United States endure the trauma of abuse, violence, natural disasters, and other adverse events" (n.d., p. 1). The Substance Abuse and Mental Health Services Administration (SAMHSA, 2018), provides data from the 2016 National Survey of Children's Health which showed that 25% of children and youth surveyed experienced the divorce of a parent or guardian, 9% lived with someone who struggled with drugs or alcohol, 8% had a parent or guardian incarcerated, 8% lived with a parent or guardian with mental illness, 6% witnessed parents or other adults slap, kick, hit or punch another person, 4% were the victim of violence or witnessed violence in their neighborhood, 4% reported they were treated unfairly because of their race or ethnic group, and 3% experienced the death of a parent or guardian.

The National Center for Mental Health Promotion and Youth Violence Prevention (2012) reported that before age four, 26% of children will have witnessed or experienced a traumatic event. Another study provided that about one in three children will have experienced trauma prior to age four (Felitti et al., 1998). The Substance Abuse and Mental Health Services Administration (SAMHSA, 2014) recognized that exposure to traumatic events during childhood

is a major public health concern in the United States with many children experiencing multiple traumas. It is critical to the overall well-being and success of children and adolescents that educators have a thorough understanding of the adversities that their students face, the impact they have on daily life, development and learning, as well as how to best support the students who have these adverse experiences.

Guiding Questions

This review of the literature seeks to answer the following questions: How can a trauma-informed approach to education impact outcomes for students in high-poverty schools? What trauma-informed professional development would improve outcomes for students in high-poverty schools? Considering the percentage of children that experience trauma at a young age, the relationship between living in poverty and higher ACE scores, and the negative effects traumatic experiences have on brain development and life-long outcomes, the aim of this literature review is to investigate best practices of a trauma-informed approach to education in high poverty schools that would positively impact academic outcomes.

Definition of Terms

To assist the reader, the following definitions have been provided to clarify terms used in this literature review.

Adverse Childhood Experiences (ACEs). Refers to the traumatic experiences that have the potential to affect the physical and mental health of individuals over time. They include: psychological abuse, sexual abuse, physical abuse, emotional neglect, physical neglect, household dysfunctions including family member mental illness, family members with substance abuse issues, exposure to violent treatment of the mother, and exposure to criminal behavior and incarceration (Felitti et al.,1998).

Trauma. Trauma "results from an event, series of events, or set of circumstances that is experienced by an individual as physically or emotionally harmful or life threatening and that has lasting adverse effects on the individuals' functioning and mental, physical, social, emotional, or spiritual well-being" (Substance Abuse and Mental Health Services Administration, 2014, p.7).

Stress. A "psychological condition in which the individual perceives or experiences challenges to physical or emotional well-being as overwhelming their ability and resources for coping" (Gunner & Quevedo, 2007, p.147).

Toxic Stress. Toxic stress is the consequence of "strong, frequent, or prolonged activation of the body's stress response systems in the absence of the buffering protection of a supportive, adult relationship" (Shonkoff & Garner, 2012, p. 236).

Trauma-Informed. A "program, organization, or system that is trauma-informed realizes the widespread impact of trauma and understands potential paths for recovery; recognizes the signs and symptoms of trauma in clients, families, staff, and others involved with the system; and responds by fully integrating knowledge about trauma into policies, procedures, and practices, and seeks to actively resist re-traumatization" (Substance Abuse and Mental Health Services Administration, 2014, p. 9).

CHAPTER II: LITERATURE REVIEW

Literature Search Procedures

Searches of the following databases were conducted to find the literature for this thesis: LibSearch, Academic Search Premier, The Center on the Developing Child at Harvard University, Research Gate, Google Scholar, and Education Resources Information Center (ERIC) from 1998, beginning with the original ACE study, through 2023. The keywords used in the search were "adverse childhood experiences," "complex trauma," "biology of stress," "toxic stress," "stress and child development," "poverty and ACEs," "trauma-informed teaching," "trauma-informed schools," " "trauma and school performance," "social and emotional learning," "high-poverty schools," and "student achievement in high poverty schools." Additionally, literature cited in works found through the search of the aforementioned databases were utilized. This chapter reviews the literature on adverse childhood experiences, trauma and toxic stress, trauma-informed approaches in schools, and how to improve outcomes for students in high-poverty schools.

The Biology of Stress

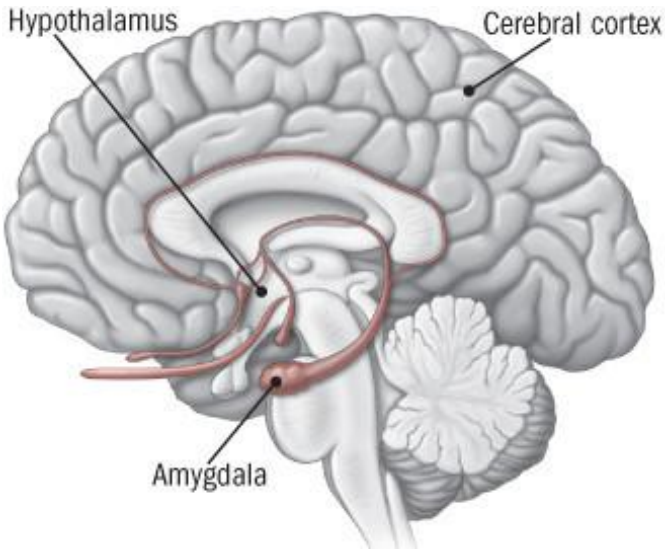
Normal Stress Response

The biology of stress involves complex interactions between the brain, the endocrine system, and a variety of physiological processes in the body. When an individual experiences stress, whether a result of physical or psychological factors, a series of responses are triggered that are designed to aid the body in coping with the perceived threat or challenge (Chu et al., 2017; Yaribeygi et al., 2017). The stress response system involves several key stages: threat perception, stress response activation, release of stress hormones, the physiological response, activation of the sympathetic nervous system, and recovery (Chu et al., 2022; Gunner &

Quevedo, 2007; Harvard Health Publishing, 2020; & Shonkoff & Garner, 2012). Under normal stress-inducing circumstances, the stress response is short-term; once the perceived threat or stressor has resolved, the body returns to its normal state.

Figure 1

Representation of the brain's command center.



Note. The amygdala interprets sounds and images. When a threat is perceived, it sends a signal to the hypothalamus. The hypothalamus communicates with the rest of the body through the autonomic nervous system providing the energy for fight or flight. From "Understanding the Stress Response" by Harvard Health Publishing, 2020, (https://www.health.harvard.edu/staying-healthy/understanding-the-stress-response). Copyright 2023 by The President and Fellows of Harvard College.

Chronic Stress

Brief increases in the stress hormones have a protective role and are essential to survive

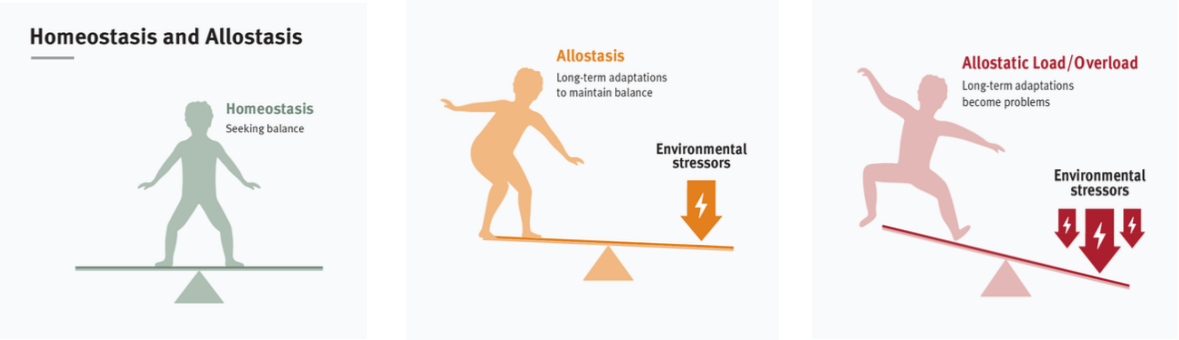
threatening situations (such as a predator, attacker, an accident, or natural disasters), whereas an inadequate or excessive adrenocortical and autonomic function is potentially dangerous to our health and survival (McEwen, 2007; Shonkoff & Garner, 2012). Chronic stress is the recurring or long-term experience of stress which can derive from a variety of sources such as work demands, financial challenges, relationship difficulties, or caregiving responsibilities. In general, chronic stress arises from the responsibilities and pressures of daily life that are present over long periods of time. While potentially challenging and disruptive, chronic stress is considered a normal response to prolonged stressors and, in moderate amounts, is not necessarily harmful. On the contrary, when chronic stress is excessive or ill-managed, various physical and mental health issues can arise, including cardiovascular problems, a compromised immune system, anxiety, depression, and fatigue.

The body strives for homeostasis - the state of healthy physiological balance in all living things needed for proper functioning and survival. The purpose of homeostasis is to prevent the body's established internal environment from being overcome by external stimuli that may disrupt the balance (Libretti & Puckett, 2022). To return to homeostasis after a stress-induced disruption, the body must go through the process of allostasis. Allostasis is an adaptive, regulatory process designed to achieve stability through change. Through allostasis the body activates the autonomic nervous system, the HPA axis and SAM, as well as the cardiovascular, metabolic, and immune systems in an effort to protect the body by responding to internal and external stressors (Beckie, 2012; McEwen, 1998, 2006). Inadequate or excessive and prolonged activation of the stress response system and exposure to stress hormones create a "wear and tear" effect on the brain and body. This wear and tear that occurs through the process of coping with stress and returning to homeostatic balance is referred to as allostatic load. Over time and with

prolonged or excessive exposure to stress, allostatic load accumulates. Allostatic load is the cumulative burden of chronic stress - the dysregulation of the multiple physiological systems resulting from activation and deactivation of allostasis repeatedly throughout the life span in response to stressful life events (Beckie, 2012; Guidi, Lucente, Sonino, & Fava, 2021; McEwen & Gianaros, 2011; National Scientific Council on the Developing Child, 2020). This overexposure can have maladaptive and detrimental effects on various body organs and systems, ultimately leading to physical illness and psychological disorders such as anxiety, depression, and cognitive impairment (Chu et al., 2022; McEwen, 2006).

Figure 2

Illustration of homeostasis, allostasis, and development of allostatic load.



Note. Representation of the stress response and development of allostatic load. Reprinted from "Connecting the Brain to the Rest of the Body: Early Childhood Development and Lifelong Health Are Deeply Intertwined," by the National Scientific Council on the Developing Child at Harvard University, 2020, Working Paper No. 15 (https://harvardcenter.wpenginepowered.com/wp-content/uploads/2020/06/wp15_health_FINALv2.pdf). Copyright 2020 by the National Scientific Council on the Developing Child, Center on the Developing Child at Harvard University.

Toxic Stress

Toxic stress, in contrast to chronic stress, is a more severe and potentially harmful type of stress that occurs in response to exposure to adverse or traumatic events over an extended period, particularly during childhood. Toxic stress is frequently related to adverse experiences such as abuse, neglect, violence, or chronic instability in the environment, such as living in neighborhoods plagued by violence and high-crime or exposure to severe poverty. Unlike chronic stress that is generally associated with daily stressors such as relationship, work, or financial challenges, toxic stress is typically caused by significant life disruptions or traumatic events. Toxic stress can have profound and long-lasting effects on physical, cognitive, and emotional development, especially in children. It can impair brain development, weaken the immune system, increase the risk of mental health disorders, and contribute to a range of chronic health conditions later in life.

The key distinction between chronic stress and toxic stress lies in the nature of the stressors and their impact on an individual. Chronic stress stems from ongoing life pressures and can occur at any stage of life, whereas toxic stress is a response to severe, adverse, and traumatic experiences, particularly during critical periods of development. Both chronic and toxic stress can have negative consequences, but toxic stress is typically thought to be more damaging due to its potential long-term effects, especially when one experiences this stress during childhood. Toxic stress is often a result of having adverse experiences that are chronic, out of one's control, and/or are experienced in absence of supportive adult relationships or protective factors that can aid in mitigating the effects of stress.

When an individual is overwhelmed by a threat or stressor, their limbic system keeps the stress response activated at a high level, interfering with the frontal lobes' ability to operate

which initiates a mental state that is in constant survival mode (Pickens & Tschopp, 2017). Toxic stress can impact the architecture of the developing brain (Shonkoff, Boyce & McEwen, 2009; Teicher et al., 2002), as well as interrupt organ and metabolic systems (Flaherty et al., 2013; Shonkoff & Garner, 2012). These disruptions may produce anatomical changes and physiologic dysregulations that are potential precursors for learning and behavior difficulties. As well, they can be associated with being possible roots of physical and mental illness (Bethell, Newacheck, Hawes, & Halfon, 2014; Shonkoff & Garner, 2012). According to Shonkoff et al., risk factors for experiencing toxic stress during childhood include neglect, abuse, severe poverty, family violence, substance abuse, and parental mental health issues (Shonkoff, Boyce & McEwen, 2009). Felitti et al. (1998) included many of the aforementioned stressors as risk factors in the original ACE study that are likely to induce a toxic stress response, linking toxic stress and adverse childhood experiences (ACEs).

Toxic Stress and Brain Development

The stressors outlined in the original Adverse Childhood Experiences Study, conducted by Felitti and colleagues, and the expanded stressors outlined in follow-up studies, all have the potential to induce the over-activation of the stress response system and, as a result, induce toxic stress. Shonkoff and Garner (2012) describe the essential characteristic of toxic stress as the disruption of the brain's architecture, as well as the alteration of organ and metabolic systems, during the critical stages of early development. Experts in the field suggest that the toxic stress emanating from adverse childhood experiences is a precursor to significant developmental and life-course challenges by compromising the body's ability to respond appropriately and effectively to future physiological and psychological stressors, by limiting cognitive development, and by increasing an individual's vulnerability to stress-related physical and

mental illnesses (McEwen, 2005; McEwen & Giarnos, 2011; Shonkoff, 2010; Shonkoff & Garner, 2012).

Research is increasingly demonstrating that early trauma exposure is related to a variety of negative physical and mental health outcomes in adulthood (Anda et al., 2006; Jaffee & Christian, 2014). Toxic stress is not limited to childhood and can occur at any time in life. However, it is important to understand that the impact on children is particularly significant. Trauma in infants and toddlers has been shown to have quite deleterious effects and recent data shows that they are exposed to trauma in the form of maltreatment at alarmingly high rates (Harden et al., 2016). According to the U.S. Department of Health and Human Services (2021), the youngest children are the most vulnerable to maltreatment. In 2021, more than one-fourth, or 27.8%, of maltreatment victims were aged birth through two years old. Children younger than one year made up 15.1 percent of all victims with a victimization rate of 25.3 per 1,000 children in the population of the same age, the highest of all age groups. This rate was more than double that of maltreatment victims who were one year old and had a victimization rate of 10.7 per 1,000 children, and children two and three years old who had victimization rates of 9.8 and 9.1 respectively. Additionally, 66.2 percent of child fatalities were children younger than three years old with infants younger than one comprising nearly one-half (45.6%) of child fatalities. Another study produced similar data documenting that one-quarter of young children had experienced or witnessed a traumatic event (Briggs-Gowan, Carter, & Ford, 2012).

The National Scientific Council on the Developing Child (2014) provided a conceptual taxonomy of three distinct stress types experienced by young children - positive, tolerable, and toxic. Of these three stress classifications, toxic stress is considered the most dangerous form of stress response in terms of the potential for long-lasting physiologic disruptions (National

Scientific Council on the Developing Child, 2014; Shonkoff, 2010). When toxic stress occurs during critical periods of brain development, specifically in early childhood, it can have profound and long-lasting impacts. Birth to age five is a pivotal time in terms of both growth potential and vulnerability and is extremely important for neurodevelopment. Brain development is highly dependent on context and requires stimulation appropriate to the sensitive developmental age to ensure optimal growth, adaptation, and skill acquisition (Harden et al., 2016; National Scientific Council on the Developing Child, 2007). During this time, the brain experiences growth and refinement at a rapid rate and is highly sensitive to environmental influences, with early experiences being "mapped" onto the brain's structure and functioning (Harden et al. 2016; Jaffee & Christian 2014; Jimenez et al., 2016; Tomer, 2014). Although tremendous growth occurs during the early years, significant brain development and organization also occurs during later childhood and adolescence. The early developmental period is a time of great malleability and vulnerability, and positive, healthy experiences ensure the possibility that both the brain's complex systems develop and that major cortical restructuring takes place (Tomer, 2014; U.S. Department of Health and Human Services, 2015).

If a child experiences severe neglect and trauma during the early developmental stages, this can have a destructive effect and may inhibit the development of important later growth. Healthy development of the brain and related physical and psychological processes are either advanced or inhibited by the quality of the environment and relationships in a young child's life. Experts have found that trauma exposure at sensitive periods of brain growth and development can significantly impact the volume and functioning of the brain, in particular the developing limbic system and cortical structures (Harden, et al. 2016; Jaffee & Christian, 2014; National Scientific Council on the Developing Child, 2007; Tomer, 2014). Without positive caregiver

relationships, the toxic stress that young children may experience during the vital growth periods can affect the normal trajectory of brain development in numerous ways. The neural architecture, or formation and connectivity, of the brain's neural circuits can be disrupted by toxic stress leading to impairments in emotion regulation, ability to respond to stress, and cognitive functions. Exposure to elevated levels of stress hormones for prolonged periods of time can alter and dysregulate the balance of the brain's neurotransmitters, such as cortisol and adrenaline. High levels of stress hormones can affect the hippocampus, a region of the brain essential to learning and memory. The impaired growth and development of this region of the brain leads to attention, learning, working memory, and emotional regulation difficulties which in turn can lead to academic problems as well as increase the risk of mental health disorders throughout the lifespan.

The prefrontal cortex is also highly sensitive to exposure to toxic stress. Impaired development of this region leads to executive function deficits such as impulse control, problem-solving, and decision-making. Prolonged exposure to toxic stress may induce heightened emotional reactivity to stressors, impulsivity, and problems establishing and maintaining healthy relationships (Harden et al., 2016; Jaffee & Christian, 2014). Physical and epigenetic changes can also result from toxic stress. Epigenetic modifications are changes in how genes are expressed that do not stem from changes to the DNA sequence. These changes can influence the expression of genes related to brain development and the stress response and perpetuate the consequences of toxic stress for generations. Toxic stress has also been linked to the development of chronic diseases such as obesity, diabetes, cardiovascular diseases, autoimmune and sleep disorders, as well as gastrointestinal and reproductive problems (Chu et al., 2022; Harden et al., 2016; Jaffee & Christian, 2014).

Adverse Childhood Experiences

Impact of Trauma on Adult Health Outcomes

The groundbreaking study first published in 1998 and directed by Dr. Vincent Felitti and Dr. Robert Anda revolutionized our understanding of the correlation between childhood experiences and health outcomes in adulthood. This study was conducted between 1995 and 1997 in an attempt to describe the long-term relationship of childhood experiences as they relate to medical and public health issues. The Adverse Childhood Experience (ACE) study was designed to assess, retrospectively and prospectively, the long term impact of childhood abuse and dysfunction on disease risk factors and incidence, quality of life, health care utilization, and mortality in adulthood. The study included 9,508 adult patients of Kaiser Permanente's Health Appraisal Clinic in San Diego who completed a questionnaire seeking information about deleterious experiences they may have faced in childhood. Seven categories of traumatic experiences, or adverse childhood experiences, were examined. These categories included: abuse that was either psychological, physical, or sexual in nature; violence against the child's mother; living with household members who were substance abusers, living with family members who were mentally ill or suicidal, or having a parent or family member who was ever imprisoned. Together with patient medical history, the patient responses to the ACE survey were analyzed to measure health risk behavior, disease, and health status in adulthood.

The study showed an astonishing 52% of survey respondents reported exposure to one or more categories of adverse childhood experiences and 6.2% of respondents reported four or more exposures. Felitti and colleagues found an association between the number of categories of deleterious childhood exposures (the ACE score) and adult health risks behaviors and diseases. The analysis showed that individuals with an ACE score of four or more were 4 to 12 times more

likely to experience drug or alcohol abuse, depression, and suicide attempts. These individuals also demonstrated a two to four times higher risk of smoking and poor self-rated health. This same relationship was found between increased ACE scores and the presence of health problems such as ischemic heart disease, cancer, and lung and liver diseases. As the number of exposures to adverse childhood experiences increased, so did the prevalence and risk of physical inactivity, obesity, smoking, depression, and suicide attempts. Just as astounding as the number of individuals who reported an adverse childhood experience was that for those who identified any single category of exposure there was a 60-90% probability of exposure to additional ACE categories. This disconcerting correlation meant that people who are exposed to any one category of abuse or dysfunction during childhood had an elevated risk of exposure to further categories of abuse and dysfunction. The study also demonstrated that, in general, individuals with an elevated ACE score exhibited increased health risk behaviors, had a lower health status, and heightened disease presence (Felitti et al., 1998).

Impact of Trauma on Child Development

The original Adverse Childhood Experience study by Felitti et al. (1998) inspired others to explore the different impacts traumatic experiences that occurred during childhood may have on those individuals who had the adverse experience. One such study, published by Nadine Burke (2011) et al., investigated the impact of trauma on child development. The study focused on a pediatric, low-income, urban population. The researchers studied the ACE score prevalence in various categories. Additionally, they examined the relationship between both the psychological and physical outcomes of the studied population in terms of learning/behavioral issues (as identified by the primary care physician) as well as the body mass index of the subjects - whether or not they were overweight or obese - as they related to ACE score. These outcomes

were chosen specifically because they had been identified as risk factors for chronic health problems in adulthood.

Burke et al. cited data from the Northern California Council for the Community that identified violence as the leading cause of years of life lost for those who lived in the Bayview Hunters Point community. Burke et al. hypothesized that the majority of youth who resided in and around the Bayview Hunters Point community would meet one or more ACE categories and that they would find an association between an elevated ACE score (≥4) and higher odds of being diagnosed with learning or behavioral problems and/or obesity. The research was conducted by using the data from a retrospective chart review. The charts of 701 pediatric patients aged 0-20 from the Bayview Child Health Center in San Francisco, CA were reviewed.

After reviewing the charts, the researchers found that 67% of the youth had experienced at least one ACE category and 12% had experienced four or more of the nine ACE categories. They found that the study results maintained the original hypothesis - most subjects were in fact exposed to one or more ACE categories and there was a correlation between having an ACE score ≥4 and an increased risk of being diagnosed with learning/behavioral disorders and an elevated BMI. Interestingly, the prevalence of exposure to an ACE was significantly higher in this study than the original adverse childhood experience study conducted by Felitti et al. (67% and 52% respectively). In addition, the prevalence of learning and behavioral issues among children with exposure to at least four ACEs was significantly higher when compared to children without the same level of ACE exposure (51% and 3% respectively).

Burke et al. recognized that there were limitations to their review of retrospective medical charts that may have led to potential selection bias as well as a possible sampling bias due to parental reluctance to report abuse to primary care providers because they are mandated

reporters. This could have resulted in the underreporting of exposure to the various categories of adverse childhood experiences. Despite the limitations, the researchers opined that the elevated discrepancy between children with and without learning or behavioral challenges signified a critical need to both screen for ACEs in urban populations *and* target the learning and behavior concerns that are prevalent in the populations with high exposure to adverse childhood experiences (Burke et al., 2011).

Greeson et al. (2014) cited a nationally representative survey of 1,400 youth that showed the pervasive nature of childhood trauma. In said survey, more than two thirds of the surveyed youth indicated they had experienced at least one traumatic event by the time they were 16 and another one third of those surveyed reported they had experienced multiple traumas. Given the findings of the survey and the well-documented associations between childhood trauma and poor life course health outcomes, Greeson et al. conducted a study that broadened the original ACE study. The researchers found the "studies consistently demonstrate robust links between ACEs and social, emotional, and cognitive impairments….adoption of health risk behaviors….disease, disability, and social problems that manifest into adulthood, including marked reductions in life expectancy associated with traumatic childhood experiences" (p. 538). Despite the established links between ACEs and negative life outcomes, the authors found there to be several methodological limitations to previous studies on adverse childhood experiences.

The first limitation identified is that few studies focused on the prospective, or future, consequences of ACEs in childhood and adolescence, rather the focus was on adolescence and young adulthood. The second limitation was that many studies were retrospective in nature and with several decades between the traumatic exposure and reporting of the event there is a question of validity. The third constraint discussed is that the prior adverse childhood

experiences studies examined a limited number of ten or fewer adverse life events. Greeson et al. (2014) described this as:

> a methodological practice that restricts the capacity to investigate the possible effects of other potentially high-magnitude childhood events, whether they be commonplace (e.g., community violence, sexual assault, traumatic loss/separation/ bereavement, and school violence) or comparatively more rare in U.S. clinical settings (e.g., natural disaster, kidnapping, forced displacement, war/terrorism/political violence) (p. 539).

This is significant in terms of the long-term effects of a traumatic experience. Although they may be more rare, the physical, psychological, social and emotional consequences of a single occurrence event (such as those above) still have the capacity to have long lasting and enduring consequences.

Greeson et al. (2014) suggested the consequences of experiencing trauma, loss, and other extreme childhood adversities could be better understood by studies that aim to systematically examine a variety of traumatic experiences and events that occur during childhood and adolescence. The original ACE study conducted by Felliti et al. (1998) included seven ACE categories and focused on patients of one clinic in California. Greeson et al. investigated childhood exposure to an increased number of adverse experiences as well as examined data from youth who had been assessed and treated across the United States. The objectives of the study were twofold: to examine the relationship between the number of different trauma types experienced in childhood and demonstrated behavioral problems as a child/adolescent, as well as to examine whether or not the prevalence of trauma type experienced was a predictor of child/adolescent behavioral problems without regard to demographic characteristics. In an attempt to better understand the consequences of exposure to adversities of any kind during

childhood, Greeson et al. diversified the number of trauma types from the seven in the Felitti et al. framework to 20 categories of trauma, loss, and other severe adversities experienced during childhood and adolescence. These 20 categories, as described by Briggs et al. (2012b), included:

1. traumatic loss/separation/bereavement in the form of death or separation of a primary caregiver or sibling; the unexpected, premature death of a close relative or friend; separation due to parental incarceration or hospitalization, or out of home placement;

2. domestic violence directed at adult caregiver(s) in the home;

3. caregiver history of depression/mental health problems, other medical illness, or alcohol/drug abuse;

4. emotional/verbal abuse, excessive demands;

5. emotional, physical, medical, or educational neglect;

6. actual or attempted physical abuse by a caregiver;

7. actual or attempted sexual molestation, exploitation, or coercion by a caregiver;

8. community violence;

9. actual or attempted sexual molestation, exploitation, or coercion not by a caregiver and not recorded as sexual abuse;

10. school violence: school shooting, bullying, classmate suicide;

11. unintentional serious accident or injury;

12. actual or attempted physical assault not by a caregiver and recorded as physical abuse;

13. life threatening or extremely painful illness or medical procedure;

14. exposure to homicide, suicide;

15. major accident or disaster that is the result of a natural event;

16. kidnapping;

17. forced relocation due to political reasons;

18. exposure to acts of war/terrorism/political violence on U.S. soil, including individuals acting in isolation (e.g., sniper attacks, OK bombing);

19. exposure to acts of war/terrorism/political violence, including living in a region affected by bombing, shooting, or looting; accidents that are a result of terrorist activity outside the U.S.;

20. trauma not reported elsewhere.

The study utilized a core set of data from participating member sites of the National Child Traumatic Stress Network which included centers that provide trauma-informed mental health services to children across diverse settings and service systems (e.g., mental health and health services, child welfare, schools, juvenile justice). The data set included 14,088 children who had been referred for treatment, but only children and adolescents between the ages of 1½ to 18 years who experienced at least one confirmed or suspected trauma type were included in the study sample (n = 11,028). Parents or caregivers completed the Child Behavior Checklist (CBCL) to provide data on the behavioral and emotional problems of the children and adolescents included in the study. According to Greeson et al. (2014), the CBCL is one of the most predominantly-used standardized measures for evaluating behavioral and emotional concerns across various developmental stages. The CBCL has five externalizing subcategories and six internalizing subcategories. The externalizing subcategories include:

1. Aggressive Behavior
2. Emotionally Reactive Behavior
3. Rule Breaking Behavior

4. Attention Problems
5. Social Problems

The internalizing subcategories include the following:

1. Anxious/Depressed
2. Somatic Complaints
3. Sleep Problems
4. Thought Problems
5. Withdrawn/Depressed
6. Withdrawn (Greeson et al., 2014).

Greeson et al. found that a significant correlation could be made between the number of traumas experienced and behavior and emotional issues for all of the CBCL categories except sleep (which is only administered to 1 1⁄2 to 5 year olds). The study demonstrated that for each additional trauma type there was a significant increase in odds of scoring above the clinical threshold, providing further evidence of the correlations between adverse or traumatic childhood experiences and behavioral concerns. Greeson et al. concluded that their findings underscore the numerous manners in which traumas experienced in childhood are likely to contribute to negative life outcomes and emphasized the need for a trauma-informed social welfare and public health approach to prevention and intervention for youth who have experienced trauma.

The ACEs pyramid designed by Felitti et al. (1998), illustrates their hypothesis of the impact of adverse childhood experiences throughout the lifespan (Figure 3). Adverse childhood experiences made up the base of the pyramid; these experiences lead to social, emotional, and cognitive impairment, which leads to the adoption of health risk behaviors, in turn leading to disease, disability, and social problems, with the top of the pyramid resulting in early death.

Although gaps in the science and research of the Felitti et al. study were present, the numerous studies and research conducted after the original ACE study to deepen understanding of the impact of early life trauma on the brain continue to demonstrate the strong correlations between adverse childhood experiences and negative outcomes throughout the lifespan.

Figure 3

The original ACE Pyramid.

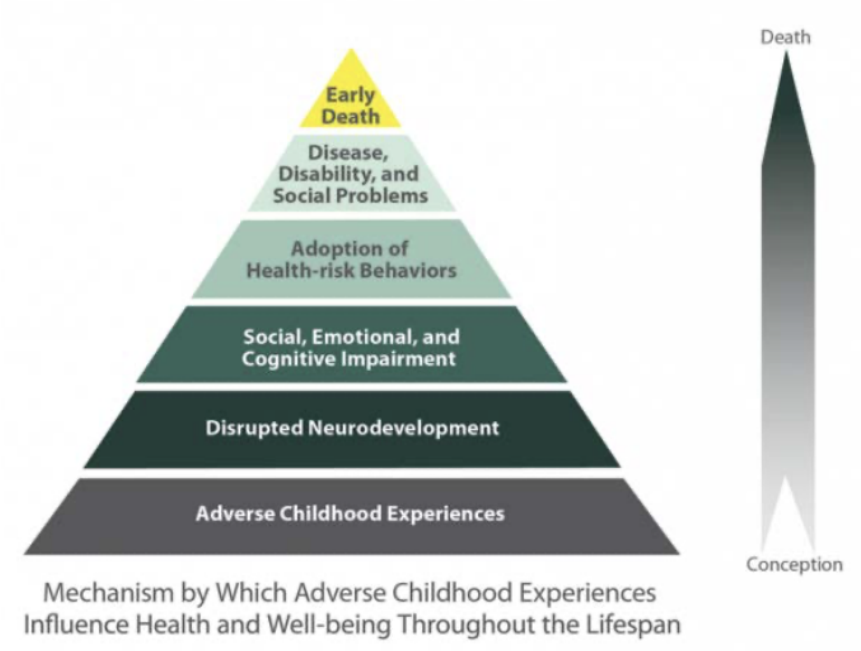
Note. The original ACE Pyramid represents the conceptual framework for the ACE study demonstrating the potential negative effects adverse childhood experiences may have from conception to death. From "Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study," by V.J. Felitti, R. F. Anda, D. Nordenberg, D. F. Wiliamson, A.M. Spitz, V. Edwards, M.P. Koss, and J.S. Marks, 1998, American Journal of Preventive Medicine, 14(4), p. 256 (https://doi.org/10.1016/S0749-3797(98)00017-8). Copyright 1998 by the American Journal of

Preventive Medicine.

The Centers for Disease Control and Prevention revised the original ACE pyramid (Figure 4) to demonstrate new understandings of the impact of early childhood trauma and resulting toxic stress on the development of the brain and body. Much research on the biology of stress has shown that extreme and/or prolonged activation of the body's stress response systems can disrupt healthy brain and body development and have long-term deleterious and damaging effects on learning, behavior, and health (Cook et al., 2005; Lombroso & Sapolsky, 1998; National Scientific Council on the Developing Child, 2005, 2014; Shonkoff & Garner, 2012)

Figure 4

Centers for Disease Control and Prevention revised ACE Pyramid.



Note. Illustration of the influence of adverse childhood experiences to the development of risk factors for disease, and well-being throughout the life course. From Centers for Disease Control and Prevention, 2021 (https://www.cdc.gov/violenceprevention/aces/about.html). In the public

domain.

Impact of Trauma on Education

Poverty: A Catalyst for Trauma

Although poverty itself is not widely considered an adverse childhood experience or traumatic event, an argument can be made that it should be one. The Center for Disease Control and Prevention (CDC, 2019) published a list of risk-factors that can potentially lead to an adverse childhood experience, or traumatic event. One risk identified by the CDC is that children from low-income families are more likely than their more affluent peers to experience a traumatic event in childhood. Studies have shown that families raising children in low-income, urban neighborhoods are exposed to multiple persistent traumas. In addition to the adverse childhood experiences, children in poverty are exposed to trauma through another set of ACEs - Adverse Community Environments. These experiences range from being a potential threat of trauma to a severe threat - all of which increase the likelihood of negative outcomes throughout the lifespan (Esposito, 1999; Evans &. English, 2002; Hughes & Tucker, 2018).

Growing up in poverty has the potential to have pervasive, enduring, and sometimes lifelong, impacts on children which puts them at a significantly higher risk of experiencing behavioral, social, emotional, and health challenges. Childhood poverty also plays an instrumental role in impairing a child's ability and capacity to learn, build skills, and succeed academically. Children living in poverty are more likely than their peers raised in more affluent homes to be faced with a wide array of harmful stressors. These stressors can be due to the physical environment such as substandard housing or chaotic environments, as well as psychosocial influences such as family turmoil or separation from adult caregivers (Evans & Kim, 2013).

Evans and Kim (2013) postulate that childhood poverty has such pervasive detrimental effects on development due to three underlying "pathways" that explain the deficits that children in poverty experience compared to more affluent children. They provide the first harmful pathway as parental investment and explain that children in poverty generally come from less cognitively stimulating environments, have less access to print media and digital educational materials, have fewer age-appropriate toys, fewer informal learning venues, and are exposed to more television. Additionally, children in poverty tend to live in impoverished language environments with less exposure to spoken language and where parents read to them less frequently. Evans and Kim indicated the second pathway connecting poverty to child development is the tendency of parents in poverty to interact with their children in harsher and less responsive manners. They reference research indicating low-income families experience more conflict and hostile behaviors, and they are more likely to utilize physical punishment (such as spankings) than more affluent families. Additionally, poor families utilize a less responsive parenting style in which less attention and social support is given to the emotional needs of children and there is less involvement in helping children with school assignments. Furthermore, poor parents often have lesser ability, or availability, to provide information (such as help finding part-time work or applying to college) or material assistance (less available money) (Evans & Kim, 2013).

Children living in poverty contend with a variety of stressors that have the potential to strain and ultimately damage their biological and psychological regulatory systems. The enduring stress associated with poverty creates constant wear and tear on the body. This may dysregulate and damage the body's physiological stress response system and diminish the availability of cognitive and psychological resources necessary to cope with adversity and stress.

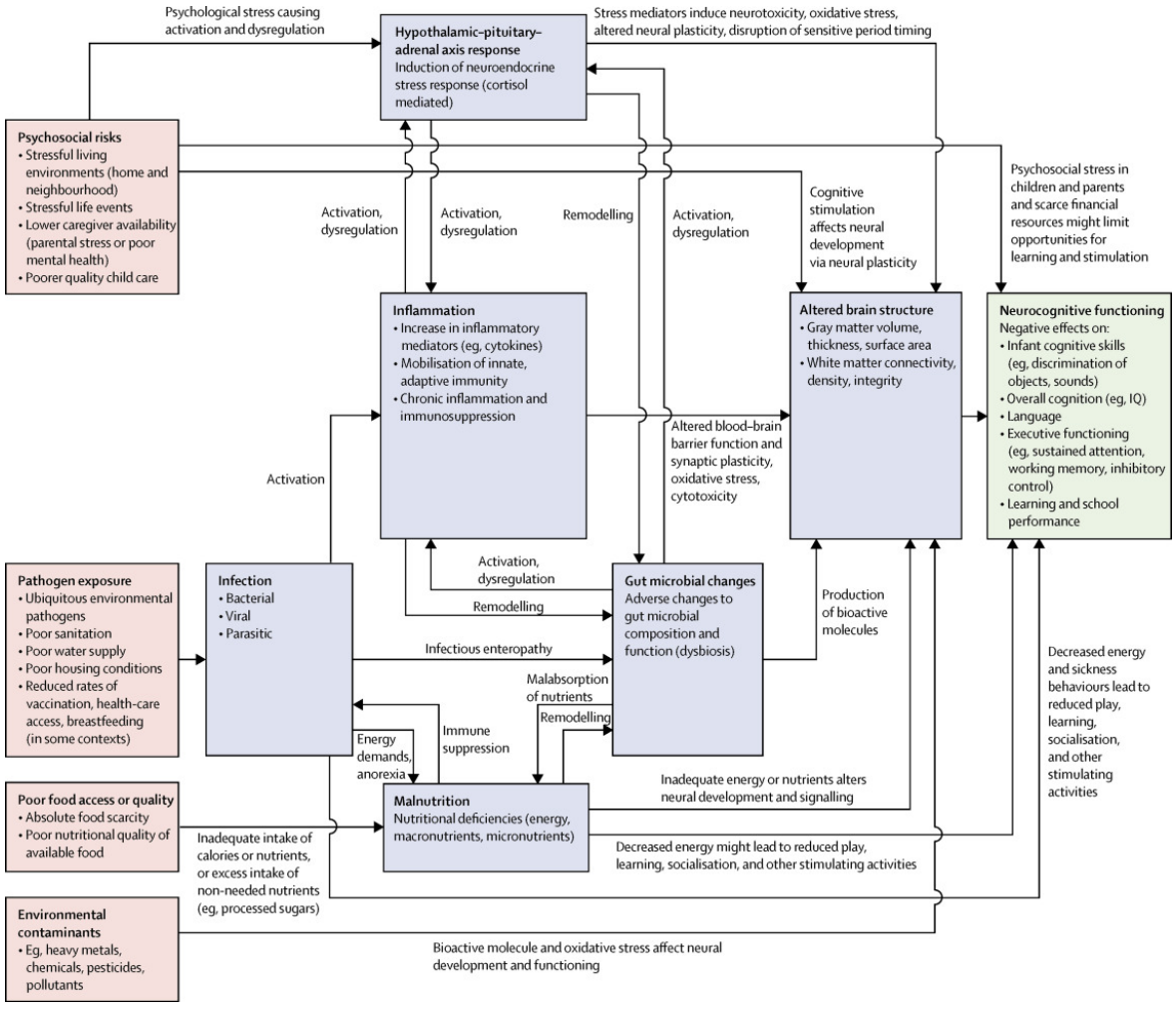
Particularly for children, the stress inherent to poverty is not simply worrying about money. Rather, poverty creates a "context of stress" - these are the distressing poverty-related experiences that are associated with subpar housing, housing insecurities and homelessness, hunger, inadequate childcare, unsafe neighborhoods, and under-resourced schools (Chaudry & Wilmer, 2016; Ralston et al., 2019; Wimer et al., 2016). According to researchers, poor children are more likely to live in homes that are chaotic, loud, crowded, have structural problems, as well as expose them to allergens and toxins. Additionally, conflict and turmoil within the family, family dissolution, maternal depression, violence exposure, and higher rates of harsh parenting and reduced responsive parenting are prevalent. As well, children in poverty tend to live in neighborhoods with less social capital (the communal values and resources that encourage individuals to work together to achieve a shared goal), less access to opportunities to participate in physical activity, less access to healthy foods, and increased exposure to pollutants, crime, and street traffic (Bradley & Corwyn, 2002; Conger & Donnellan, 2007; Grant et al., 2003; Evans & Kim, 2013; McLoyd, 1998).

Overall, a life in poverty increases exposure to "poverty-related stress" such as conflict, family dysfunction and violence, factors that impact quality of health, food insecurity and frequent changes in residence or housing insecurity (Wadsworth & Rienks, 2012)). In addition to the elevated volume of stressors created by the context of poverty, poverty can magnify the detrimental effects of other stressors. As exposure to poverty related stressors accumulates, the physiological response that is designed to handle relatively infrequent environmental demands is overwhelmed and the self-regulatory processes that help children cope with external demands are disrupted by the chronic cumulative stressors (Evans & Kim, 2013; Wadsworth & Rienks, 2012). Jensen et al. (2017) show the relationships between poverty-related stressors (psychosocial risks,

pathogen exposure, lack of access to food or quality food, and environmental contaminants) and key biological systems (neuroendocrine, infection and inflammatory, digestive) and the ultimate impact on neurocognitive functioning.

Figure 5

Effects of poverty on biological processes and neurocognitive outcomes.



Note. Representation of the pathways of how poverty-related risks interact across key biological axes that, in turn, can cause long-term adverse effects on children's neurocognitive development. From "Effects of poverty on interacting biological systems underlying child development" by

Jensen, S. K., Berens, A. E., & Nelson, C. A., 2017, *The Lancet. Child & Adolescent Health*, *1*(3), pp. 225–239 (doi.org/10.1016/S2352-4642(17)30024-X).

Adverse Childhood Experiences, Trauma, and Toxic Stress: Impact on Outcomes in High-Poverty Schools

Researchers believe that if children experience significant, chronic stress and trauma in childhood (particularly early childhood), it will undoubtedly compromise later developmental potential (Perry, 2002; Perry & Pollard, 1998; Shonkoff & Garner, 2012; Tomer, 2014). They understand that the very early years (0-5) are the highly sensitive period when the brain is becoming organized and regulated. According to Tomer (2014), if this process is disrupted in any way, children may experience a variety of reactions including:

> the child may enter school behaving badly due to exaggerated reactivity and sensitivity, and thus, they may not be able to have a good balance of cognitive and noncognitive behavior and learning, the kind that allows them to have a satisfactory schooling experience, and which provides the basis for their next learning stage… (p. 25).

Trauma exposure may cause children to develop psychiatric disorders such as posttraumatic stress disorder (PTSD), anxiety, or depression. Others with adverse experiences may not exhibit symptoms that meet the clinical diagnosis for any specific disorder, but may have serious physical, emotional, and cognitive impairments that can negatively affect their education, relationships, and overall health (Copeland et al., 2007). Persistent exposure to trauma (and the mental illness that can develop as a result of trauma exposure) often negatively impacts a child's education by adversely affecting attention, memory, and cognition leading to increased problems with concentration and learning at school; by reducing the ability to focus, process, and organize

information; and by creating difficulty in the child's ability to regulate emotions resulting in overwhelming feelings of frustration and anxiety (National Childhood Traumatic Stress Network, 2018). Research has shown that in comparison to students who have not experienced significant trauma, those who do have such experiences are at an increased risk of poor school attendance and lower school engagement, having lower reading ability, academic success and grade point averages, having more negative assessments in their school records, having higher suspension and expulsion incidences, and are at greater risk of repeating a grade or dropping out (Bethell et al., 2014; Bissonette & Shebby, 2017; Burke et al., 2011; National Childhood Traumatic Stress Network, 2018). Additionally, exposure to traumatic events may lead to increased reckless or physically aggressive behavior and increased health risk behaviors including smoking, substance use, and early initiation of risky sexual activity (Briggs et al., 2012a; Cohen et al., 2017; Felitti, et al., 1998; Shonkoff & Phillips, 2000).

Considerable research has been performed on the impact of childhood trauma on a child's development. As a result of the emotional and psychological difficulties that are associated with exposure to traumatic events often spilling over into children's educational experience, there is a significant need to emphasize a child's mental and emotional state just as much as their academic performance. This is of particular importance in high-poverty communities given the research that has demonstrated that children living in poor communities are both at an elevated risk of experiencing traumatic events and generally have fewer resources and supports available to buffer the traumatic stress and its impact on their well-being and academic success (Goodman, Miller, & West-Olatunji, 2012; McLoyd, 1998).

Goodman et al. (2012) found that students from families with a lower socioeconomic status (SES) persistently underachieve academically. They used regression analyses on a

nationally representative sample of fifth grade students from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 database to determine the impact of traumatic stress and SES on academic achievement. The results demonstrated that low SES and traumatic experiences did in fact predict lower educational outcomes for students.

The U.S. General Accounting Office (1994) provided data that one in six children had attended three or more schools by the end of their third grade year, demonstrating that mobility, which is highly associated with poverty, is correlated with poor attendance. Chang and Romero (2008) linked poverty to a variety of societal issues such as limited access to health care and quality housing, substance abuse, and food insecurity. These poverty related issues can lead to chronic school absenteeism, which as defined by Attendance Works (2013), means missing ten percent or more of a school year regardless of reason. They concluded that children who are chronically absent in kindergarten achieve at lower levels in math, reading and general knowledge during their first grade year. Additionally, chronic absenteeism in kindergarten predicts the lowest levels of educational achievement at the end of fifth grade for children experiencing poverty (Chang & Romero, 2008).

The negative impact of chronic absenteeism is that students have low academic achievement and can exhibit at-risk behavior at school. Research also shows that chronic absenteeism is more likely to occur in schools in urban communities in large cities than it is to affect more affluent suburban communities (Chang & Romero, 2008; Goodman, et al., 2012). A study conducted on the association of poverty on elementary school attendance and academic achievement in urban communities in California revealed a similar correlation as the number of students who were truant and received low test scores were significantly higher than students in more affluent communities (Jefferson, 2017). Research has shown that regular school attendance

in the early years is especially critical for children living in poverty because these particular families are less likely than their more affluent counterparts to have the necessary resources to help their children make up for lost classroom time (Chang & Romero, 2008).

Jimenez et al. (2016) set out to examine the relationship between early childhood adverse childhood experiences (ACEs) and academic and behavioral problems in kindergarten. The researchers used data on a national urban birth cohort from the Fragile Families and Child Wellbeing Study. They conducted a secondary analysis of the data which included subjects whose primary caregiver provided information on ACE exposures at postpartum, 1, 3, 5 and 9 years as well as in-home assessments and outcomes at five years (teacher ratings of academic skills, emergent literacy skills, and behavior) as reported by their kindergarten teacher at the end of that school year. Outcomes in kindergarten were the focus of the research because academic skills and behaviors at that age are strong predictors of educational trajectory (Rouse et al., 2005). The authors concluded that early childhood exposure to adverse experiences was associated with academic and literacy skills that were below average and behavioral problems in kindergarten.

In line with the findings of Jimenez et al, The National Education Association (Flannery, 2017) reported that traumatized five-year-olds are three times more likely to have difficulty paying attention and are two times more likely to exhibit aggressive behaviors. Jimenez et al. connected early childhood adverse experiences with low foundational skills, such as language and literacy, that lead to low educational attainment and adult literacy, which in turn are associated with poor health outcomes (Fiscella & Kitzman, 2009; Rouse et al., 2005). They made connections between ACEs and problems with attention, socialization issues, and aggressive behaviors which all have the potential to negatively impact a child's educational experience.

Additionally, the researchers found that 55% of participants had experienced one ACE, and 12% had an ACE score of three or more. They concluded that exposure to a higher number of ACEs was associated with more adverse outcomes (Jimenez et al., 2016).

Researchers from the Maryland Longitudinal Data System Center (MLDSC) point to decades of research highlighting what they claim is "the critical role of childhood poverty in creating, maintaining, and exacerbating inequalities in long-term outcomes" (Henneberger et al., 2019, p. 1). The impact of poverty on a child's early education, without intervention, can have significant long-term impacts on education and opportunity. Research has shown that children who experience persistent poverty have more detrimental outcomes than children who experience transitory, or short-term, poverty (McLoyd, 1998). Building on previous research, Henneberger et al. examined the association of individual student poverty, school-level poverty, and race/ethnicity on the long-term educational and career outcomes of students in Maryland. Examination of student outcomes from elementary through secondary schools show similarities in the impact that student poverty has on individual academic achievement. The researchers analyzed data of students in grades 6-12 from the Maryland State Department of Education (MSDE) and found that of the students in the class of 2017, students experiencing poverty:

> dropped out of school more frequently than students not living in poverty (14% vs. 5%), were less likely to graduate from high school within four years (79% vs. 92%), received lower mean total SAT scores (949 vs. 1113), and had lower rates of meeting college readiness benchmarks (22% vs. 56%; MSDE, 2018; College Board, 2018). Furthermore, Black (8%) and Hispanic (20%) students had higher dropout rates than White students (5%) and Black (85%) and Hispanic students (74%) had lower on-time graduation rates than White students (93%) (MSDE, 2018) (Henneberger et al., 2019, p. 1).

The research conducted by Henneberger et al. indicated that the academic and workforce outcomes for students experiencing chronic poverty were worse than the outcomes for similar students in similar schools who experienced poverty for shorter periods of time. They also found that student outcomes in schools with concentrated levels of poverty were typically lower compared to students with similar backgrounds attending similar schools that had lower concentrations of poverty.

These studies have implications for educators because trauma is often overlooked or misunderstood in children (Goodman et al., 2012). According to the National Child Traumatic Stress Network (2018), trauma and traumatic stress reactions can impact not only the child who experiences the trauma, but the larger school community of peers, teachers, and staff by disrupting the educational processes associated with teaching and learning. As reported by Chang and Romero (2008), national data show that chronic early absence affects an estimated one out of every ten children during their first two years of school. This is significant for all students during the early years of schooling because the educational experiences of children who attend school regularly can be affected when teachers are required to divert their attention to meeting the academic and social needs of children who missed substantial amounts of class time (Chang & Romero, 2008).

Furthermore, research has shown that due to neighborhood segregation and district attendance boundaries, students living in poverty tend to attend schools with other children who are also living in poverty, creating schools with high poverty concentrations (and higher incidences of trauma and lower overall academic achievement). The 2019 U.S. Department of Education's report on the condition of education covering the 2016-17 school year showed that 40% of urban schools were considered high poverty - defined as "public schools where more

than 75.0 percent of the students are eligible for free or reduced-price lunch" (McFarland et al., 2019, p. 70). Another 26% of urban schools were mid-high poverty - schools where 50.1 to 75.0 percent of the students are eligible for free or reduced-price lunch. In contrast, only 13% of city schools were low poverty, where 25.0 percent or less of the students are eligible for free or reduced-priced lunch. The overall percentage of public school students in high-poverty schools was higher than low-poverty schools (24% vs. 21%) - that is nearly one out of every four schools.

It is interesting to note the racial and ethnic demographics between high-poverty and low-poverty public schools. Forty-five percent of Hispanic students, 44% of Black students, 38% of American Indian/Alaska Native, 24% Pacific Islander, 17% of two or more races, 14% Asian, and only 8% of White students attended high-poverty schools. In contrast, 39% of Asian students, 31% of white students, 24% of students of two or more races, 12% of Pacific Islanders, 8% of both American Indian/Alaska Native Hispanic students, and 7% of Black students attended low-poverty schools (McFarland et al., 2019). Research has shown that exposure to traumatic events is even more profound for students who identify as Black/African American and/or Hispanic/Latinx, as they are more likely to witness and experience community violence and its associated adversities, including poverty, racism, and discrimination (Perfect et al., 2016; Roberts et al., 2011; Stein et al., 2003). As such, although not the focal point of this research, the racial and ethnic disparities between high-poverty and low-poverty schools must be considered when looking at academic achievement in high-poverty schools and approaches to improving student outcomes.

In summary, research has demonstrated that toxic stress in early childhood resulting from adverse experiences, including those experiences triggered by a life in poverty, has the potential

to significantly impact a child's brain development. This negative impact on brain development can ultimately have negative consequences on academic performance and educational outcomes. Children in poverty must contend with a number of environmental and psychological factors that can make attending school, doing well, and staying in school challenging. Correlations have been made between living in poverty and having higher ACE scores. Additionally, higher ACE scores have been linked to more negative life course outcomes indicating a strong correlation between low socioeconomic status, adverse childhood experiences, poor academic outcomes, and ultimately negative outcomes over the life course.

Outcomes in Trauma-Informed High-Poverty Schools

A recent study was conducted in which the Trauma Informed Elementary Schools (TIES) protocol was implemented in fifty-one classrooms throughout eleven schools over a period of two academic years (Rishel et al., 2019). This particular TIES program is an early intervention for students who show signs of chronic or traumatic stress. As part of the implementation of the program teachers are trained on trauma and trauma-informed practices, program consultants assist educators and school administrators, and therapeutic interventions are available to both students and families. The study determined that classrooms that implemented the TIES early intervention program demonstrated significant improvement in the areas of emotional support, classroom organization, and instructional support. In contrast, the control classroom not only didn't see improvement, there was a visible decline in those areas.

Blitz et al. (2016) conducted an action research study to determine the benefits of a professional development training designed for participants to gain an understanding of the intersection of trauma, toxic stress and race, of culturally responsive pedagogy, and of self-reported stress levels and teaching efficacy. The study utilized mixed study methods over the

course of a single school year including 425 students in pre-kindergarten through 5th grade. More than 90% of students were eligible for free and reduced lunch and over 50% identified as students of color. This research was conducted in part because the demographics (racial/ethnic and socioeconomic status) of the school were quickly changing. In spite of the rapidly changing demographics, the observable teaching practices were not adapting to the needs of the changing community.

In response to the professional development, the research results indicated that teachers and other educators reported increased success in helping sad or withdrawn students reengage in the learning process (Blitz et al., 2016). As well, they found fewer students leaving or being excluded from the classroom due to negative behavior. Lastly, they found there was increased follow-through on teacher recommendations to parents, indicating a higher teacher efficacy in their teaching practices. Understanding of trauma and toxic stress increased for all individuals participating in the training as well as their self-reported efficacy around responding to and mediating student disruptions and challenging behaviors (Blitz et al., 2016). As research has shown, increased time spent in the classroom and parental involvement are keys to student academic success.

In another study, Dorado et el., (2016) implemented the Healthy Environments and Response to Trauma in Schools (HEARTS) program and focused on creating a quality multi-tiered system of supports (MTSS). They implemented the HEARTS program in three elementary schools and one K-8 building during a two-to-five year span. Through the HEARTS program, a three-tiered approach was tested by implementing trauma-informed practices at the tier 1 (school-wide) level, the tier 2 (small group) level, and the tier 3 (targeted/intensive supports) level. Prior to implementation of the MTSS system, professional development was

administered to all stakeholders district-wide. The researchers sought to make several determinations. First, was there a correlation between an increased knowledge of trauma and trauma-informed practices and implementation of those practices? Second, was there an increase in student engagement and a decrease in behavioral problems as a result of the implementation of trauma-informed strategies? Finally, was there a decrease in trauma-related symptoms in students who received the HEARTS intervention?

Results from a pre and post survey showed that there was a 57% increase in the trauma knowledge by educators, a 61% increase in the understanding of best practices of how to engage with students who showed signs of trauma, an increase of 68% in educator knowledge of trauma-informed practices, and an increase of 49% in the implementation of trauma-informed practices (Dorado et al., 2016). Furthermore, there was a 28% reported increase in student engagement, a 34% increase in attendance, and reported on-task classroom learning time increased 27% (Dorado et al., 2016). The findings also showed that students spent 36% more time in class as a result of decreased behavioral disruptions, an overall decrease of 87% of behavior incidents, an 86% decrease in physically aggressive behaviors, as well as a 95% decrease in the exclusionary practice of out of school suspension (Dorado et al., 2016). The Child and Adolescent Needs and Strengths tool showed an overall improvement in the following measured areas: life functioning, behavioral/emotional, risk behaviors, caregiver resources and needs, and diagnosis and prognosis. Given the significant results, Dorado et al. recommended the replication of this study in broader, diverse settings.

Barsel and Curt (2022) reported on a district-wide “trauma-informed transformation” that produced incredible results. The transformation involved professional development for district teachers and staff including a full-day training and refresher training throughout the school year

by trauma specialists as well as weekly emails containing relevant tips to continue the trauma-informed work. The first five days of the school year were spent on relationship-building and teaching emotional regulation strategies district-wide. In an effort to create a welcoming atmosphere, the school day began with a morning greeting routine where each student received a greeting from at least five adults. Each day, a morning circle followed to build connections and practice self-regulation strategies, students had access to water, snacks and a wellness room, classrooms had "calm corners", and physical activity and movement breaks were structured throughout the school day. Teachers were encouraged to discontinue the practice of removing recess as a punishment and posters with self-regulation techniques lined hallways. Rather than traditional discipline methods (like behavioral charts, public discipline, and retributive punishment), students were taught how they could have behaved differently. As well, they practiced the desired response, apologizing, and reinforcing self-regulation. Suspensions were used as a last resort. Prior to the 2017-2018 school year, one particular elementary school in this district had consistently failed state exams, saw constant explosive behavior in the classroom (fighting, throwing chairs, meltdowns), and had high rates of students both walking out of and being removed from class. It was reported that 67% of students had experienced trauma and many were experiencing difficult home lives and food insecurity. That year, the school decreased suspensions from an average of 445 a year to just 19, and for the first time, the school passed the state mandated tests. Additionally, the school experienced a dramatic increase in teacher retention and a calmer school climate (Barsel & Curt, 2022).

In an attempt to disrupt the school-to-prison pipeline, improve the future career prospects of its students, and decrease suspensions, a district in Hawaii began to implement trauma-informed approaches. Training was provided to administrators, faculty, staff, families,

and other school partners in an attempt to address and modify behaviors that resulted from trauma and intergenerational poverty. The individuals were trained in restorative practices, de-escalation strategies, restraint and security, trauma-informed practices, self-care, and youth mental health first aid. Additionally, school policies shifted from a disciplinary and exclusionary approach to an approach that was relationship-based and inclusionary. Over a five year period, the district reduced the number of reported behavioral incidents 2,260 to a single incident and reduced out-of-school suspensions from 2,277 to zero. Student-reported bullying and harassment decreased from 60 to 36 percent. Additionally, student graduation rates increased from 65 to 85 percent and early college enrollment increased. Furthermore, as a result of the climate and culture shift, the teacher vacancies were cut in half from 119 vacancies to 57 (Barsel & Curt, 2022).

An urban Ohio school that has received recognition for its implementation of a trauma-informed approach to support students and families demonstrates the success that intentional changes in policy and mindset can have on academic achievement. This school is located in an urban neighborhood with alarmingly high crime rates that are 206% higher than national averages and violent crimes that are 229% higher than national averages. Reports indicate that an individual in this community has a one in fourteen chance of becoming a victim of crime (Thomas, 2021). In 2019, 98.4% of students lived in poverty, there was a 23.8% rate of chronic absenteeism, and a mobility rate (students leaving the district) of 11.9%.

Tier Two and Tier Three MTSS supports (including a comprehensive school-based health center; a community learning center to provide recreational, educational, and cultural opportunities; and a community mentoring program) were implemented in an effort to mitigate the deleterious effects of poverty and trauma on students. The study of this urban school

measured five factors of a trauma-informed school: school-wide policies and practices, classroom strategies and techniques, connections and collaborations with mental health services, family partnerships, and community partnerships. Since 2010, the graduation rate in this school has been gradually rising. Between 2010 and 2020, the four-year graduation rate increased an astonishing 73 percent. The researcher found a strong correlation between the implementation of trauma-informed approaches and the increased four-year graduation rates (Thomas, 2022).

The research on schools that implemented trauma-informed approaches shows that there is a measurable benefit to acknowledging the traumatic experiences of students and working to both address the related behaviors as well as prevent retraumatization. Training staff on trauma and trauma-informed approaches, updating policies and procedures to be trauma-sensitive, and creating a school culture and environment that is safe, stable, and relationship-based can improve academic outcomes for students.

Mitigating the Impact of Poverty Related Trauma on Outcomes in High-Poverty Schools

The developmental and educational outcomes of children occur in the context of multiple, persistent influences within children themselves, their environments - including family, school, and peer group -, and their larger environments which include their neighborhood, community, cultural groups, and larger society. Regular school attendance reflects whether children's environments – which include their family, schools, community, culture, and society – adequately address their specific needs (Chang & Romero, 2008). Chang and Romero found that chronic absenteeism (and consequently, low academic achievement) in early childhood was influenced by a number of maternal and family risks. These included poverty, teen motherhood, single motherhood, low maternal education level, receipt of welfare, maternal unemployment, food insecurity, poor maternal health, and multiple siblings. In isolation, each risk factor had

some impact on chronic absence, but, when faced with three or more risks, rates of absenteeism significantly increased. Although it is ultimately the parents' responsibility to ensure daily school attendance, it is imperative that schools and the larger community recognize and address the obstacles that may prevent them from doing so. This is especially important as it pertains to children living in poverty as large numbers of chronically absent students could indicate systemic problems that affect the quality of the educational experience and/or the healthy functioning of an entire community (Chang & Romero, 2008; Goodman et al., 2012; Henneberger et al., 2019; National Child Traumatic Stress Network, 2018).

Mitigating the impact of poverty and the associated toxic stress on children comes down to increasing protective factors including, but not limited to, caregivers who can provide a positive, stable, and nurturing environment, access to high-quality healthcare, and early intervention. Additionally, targeted supports like mental health services and schools that take a trauma-informed approach to learning can also make a significant difference and promote healthy growth, well-being, and academic achievement. According to a National School Boards Association (2019) resource on Adverse Childhood Experiences (ACEs), "childhood trauma is among the most relevant and significant psycho-social factors affecting education today (p. 1)" and "the most important thing that schools can put into place is a caring, safe environment that is supportive of and sensitive to students, allowing them to develop resiliency, self-confidence and trust" (p. 10). In order to provide an environment that addresses the impact of childhood trauma and meets the psychological, emotional, and academic needs of students, schools and school districts must understand how trauma impacts individual students as well as the school community as a whole. It is imperative to approach the education of students from a perspective that is both trauma-aware (being aware of and sensitive to trauma) and trauma-informed (being

informed about how to engage with individuals that have experienced trauma (National School Boards Association, 2019).

Trauma research has pointed to two certain conclusions. First, given that more than half of all Americans have reported experiencing at least one ACE, trauma is prevalent in today's society. Second, an individual's potential and quality of life can both be impacted at any time due to trauma exposure. Despite the high prevalence of traumatic experiences and consequences among students, trauma-informed approaches have not been mainstreamed across American schools (Ko et al., 2008; Overstreet and Chafouleas, 2016), although it is increasing. As well, according to Guevara et al. (2021), the school system has been recognized as one of the primary sources of identification of student behavior reflective of their traumatic experiences, yet, most school's mental health professionals do not systematically screen for trauma. Additionally, staff within the school system, including administrators and educators, receive limited formalized training on trauma-informed approaches. In an effort to combat the effects of trauma on students and student academic outcomes, organizations across the nation are researching and promoting the value of an approach that considers the potential traumatic experiences of all students. This is a relatively new concept and there is still a lack of consensus on terminology. Some organizations use trauma-informed, while others use trauma-sensitive to talk about this concept. Despite there being different terms and definitions used to discuss a trauma-informed approach, the underlying premise is that schools, administrators, and educators must create an environment that acknowledges and responds to the needs of students who have been impacted by trauma (SAMHSA, 2014; NCTSN, 2018).

According to the Substance Abuse and Mental Health Services Administration (SAMHSA) (2014), trauma-informed systems integrate practices that incorporate the following

elements: safety; trust; peer support; collaboration; empowerment; and culture. The National Childhood Traumatic Stress Network (NCTSN) defines a K-12 trauma-informed school system as "one in which all teachers, school administrators, staff, students, families, and community members recognize and respond to the behavioral, emotional, relational, and academic impact of traumatic stress on those within the school system" (2018, p.2). Barsel and Curt (2022) contribute to the NCTSN definition by adding "trauma-informed schools are not about a specific program or curriculum; but rather an ongoing process that is individualized for each school community" (p.3). Integral to building a trauma-informed school with a climate that is sensitive to students with trauma are policies and procedures that address the direct impact of exposure to traumatic experiences on students and school staff, respond to undesirable behaviors that are non-punitive, and provide access to supports and the opportunity to build practical skills to help manage traumatic stress reactions (NCTSN, 2018). A trauma-informed approach "infuses and sustains trauma awareness, knowledge, and skills into organizational culture, practices, and policies" (Donisch, 2022, p.1) by way of strategic planning, staff professional development, direct interventions by qualified staff, and an effort to increase knowledge and communication with an emphasis on fostering environments that support and enhance academic achievement.

The implementation of trauma-informed methods into all aspects of school creates the environment to allow educators to prevent the re-traumatization of students and provides the vision for a safer and more positive school climate that focuses on the whole child. One of the goals of implementing a trauma-informed program is minimizing the ongoing trauma exposure while increasing the student's ability to manage their traumatic stress with self-regulation strategies (Herrenkohl, Hong, & Verbrugge, 2019; NCTSN, 2018; SAMHSA, 2014). Archibold (2014) concluded that educators should seek to invest less effort in reacting to discipline or

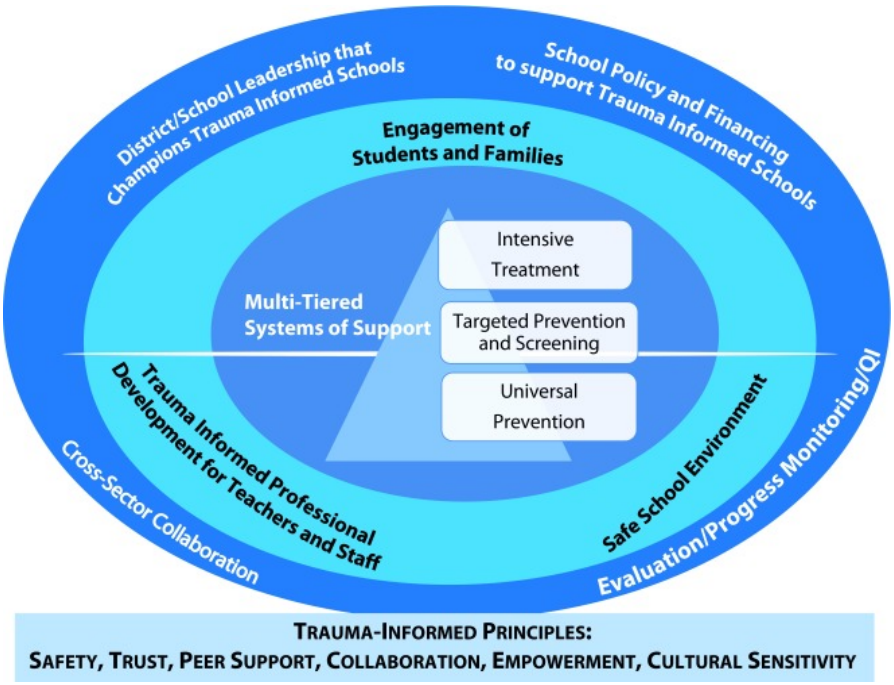
behavior problems of students, and allocate more time to establishing an environment that creates a positive and motivating learning experience. When educators start focusing their energies on creating safe environments and ways to motivate their students they are also creating a safe space that is conducive to learning, thus an environment where academic achievement can occur.

Trauma-Informed Approaches to Improve Academic Outcomes

Given the high percentage of public school students, as well as the opportunity for a service delivery approach that is holistic and can address multiple areas of need, schools have been identified as the setting where the implementation of trauma-informed programs can have maximum impact (Bloom & Sreedhar, 2008; Chafouleas et al., 2008 as cited in Thomas, 2022). The two most frequently described trauma-informed, school-based interventions are the collaborative model and the trauma-informed model that integrates into existing multi-tiered systems of support (MTSS) within the school (Frankland, 2021). According to SAMHSA (2014) trauma-informed approaches include not only specific interventions, but the integration of key assumptions into the culture of the organization. These assumptions are collectively referred to as the "Four R's" and include realization about trauma, recognition of the signs and symptoms of trauma, responses that incorporate knowledge of trauma, and resistance to retraumatization. These four assumptions inform the six underlying principles of a trauma-informed approach: safety; trustworthiness and transparency; peer support; collaboration and mutuality; empowerment, voice, and choice; and cultural, historical, and gender issues. Using SAMHSA's six trauma-informed principles, Kataoka et al. (2018) created a visual representation of a trauma-informed school system to demonstrate how a trauma-informed approach could be implemented.

Figure 6

Representation of a trauma-informed school system.



Note. Adapted from SAMHSA's 2014 Concept of Trauma and Guidance for a Trauma Informed Approach. From "Applying a Trauma Informed School Systems Approach: Examples from School Community-Academic Partnerships," by Kataoka, S. H., Vona, P., Acuna, A., Jaycox, L., Escudero, P., Rojas, C., Ramirez, E., Langley, A., & Stein, B. D., 2018, Ethnicity & disease, 28(2), 417–426 (https://doi.org/10.18865/ed.28.S2.417). Copyright 2018 by Ethnicity & Disease, Inc.

According to Frankland (2021), a school implementing the collaborative model provides the opportunity for independent mental health practitioners (i.e. psychologists and clinical mental health counselors) to provide services throughout the academic day to students who have been identified as at-risk by parents and/or school staff. Schools implementing trauma-informed

approaches into their existing MTSS program are delivered using three tiers of intervention. Tier 1 interventions provide universal support to all students and, in general, are sufficient for 80-90% of students. Tier 2 interventions provide group support and interventions to students who demonstrate behaviors deemed high-risk and comprises about 5-15% of the student population. Tier 3 interventions are reserved for students at the highest-risk and provide individualized services to those students (Frankland, 2021; Positive Behavioral Interventions and Supports, 2018). A tiered approach, rather than targeting specific students, is able to reach all students who will benefit according to their need. In contrast to the collaborative model which pulls the student from class for services, the integration of trauma-informed approaches into an existing MTSS infrastructure and building culture allows interventions to be provided without a reduction in instructional time, a deficit of the collaborative model.

Given the need for qualified mental health professionals to implement the trauma-informed interventions in a collaborative model, it is imperative in a school that has not implemented this model that administrators, teachers, and other district level and school staff who serve students (i.e. custodians, paraprofessionals, cafeteria staff) receive training in trauma-informed practices. Training in trauma-informed approaches empowers educators to identify signs of trauma as well as how to create a learning environment that does not trigger traumatic feelings, retraumatize the student, or impede their healing and recovery. As a teacher, it is important to understand what trauma is and how trauma-informed teaching can help students achieve academically, but it is not enough to just be trauma-aware.

The Substance Abuse and Mental Health Services Administration (2014) recommends that trauma-informed approaches represent a continuum of strategies that cultivate a systematic response to the needs of students exposed to trauma. For many students who have experienced

trauma, the classroom may provide the most consistency and stability in their world and must be seen as “therapeutic milieu wherein the structured environment itself is the most consistent and effective intervention” (Brunzell, Waters, & Stokes, 2015, as cited in Thomas, 2022). Forman et al. (2009) emphasized that simply understanding trauma is not sufficient to effect change, because, according to SAMHSA (2014), “the context in which trauma is addressed or treatments deployed contributes to the outcomes for the trauma survivors, the people receiving services, and the individuals staffing the systems” (p. 9).

Not all students arrive at school from the same starting place. Understanding the role of attachment in the classroom and emphasizing the teacher–student relationship is fundamental to raising achievement (Bergin & Bergin, 2009). Research on attachment (as cited by Jamieson, 2021) demonstrates that the quality of adult connections a child experiences during childhood sets them up for success or challenges throughout their lives. Secure attachments provide children the best opportunity for a healthy start in life by offering a solid sense of security; by helpling learn to regulate emotions, experience happiness, and self-soothe; and by providing a safe place from which to investigate the world. Conversely, a child without secure caregiver attachments may show neurological and behavioral developmental impairment, may demonstrate learning difficulties, and have difficulty forming relationships with adults and other children. Unfortunately, children living in poverty are especially at risk for attachment issues due to the elevated risk of ACEs - both adverse childhood experiences and adverse community environments (Jamieson, 2021). Although children may not have formed primary caregiver attachment early on, positive relationships with caring adults can be instrumental in buffering the impacts of toxic stress and helping them rebuild early neural connections and catch up developmentally (Jamieson, 2021; Pickens & Tschopp, 2017; Tomer, 2014). Educators are

increasingly becoming a “secondary attachment” figure for students, making true the African proverb “it takes a village to raise a child”.

Being a trauma-informed educator first and foremost means being curious about what student behavior says about what the student has experienced and what it says about what they need in the moment. It also means using knowledge of brain development to build relationships with students, knowing and applying specific strategies and techniques to help students self-regulate, and creating a safe space and community to help students be ready to engage in learning. There is a variety of multi-tiered and tier 1 (universal supports for all students) training currently being provided on trauma-sensitive, trauma-responsive, and trauma-informed practices for schools and educators wanting to transform their practice including, but not limited to, the following programs: Healthy Environments and Response to Trauma in Schools (HEARTS); Project Linking Action to Unmet Needs in Children’s Health (LAUNCH); Heart of Learning and Teaching (HLT); Resilience Classroom Curriculum (also known as FOCUS); Supportive Trauma Interventions for Educators (STRIVE); Animating Learning by Integrating and Validating Experience (ALIVE); Student Assistance Program (SAP); and Trauma-Informed Educator Skills (TIES) (Regional Educational Laboratory, 2019). An effective professional development program or curriculum will:

- allow educators to identify the traumatic behaviors with which students arrive at school;
- provide suggestions on creating a classroom structure and routine that is safe, consistent and predictable;
- encourage educators to establish relationships and a learning environment that

meets the needs of all students; and

- give educators the skills to educate students on self-care, self-regulation, and coping strategies.

Additionally, an effective professional development will educate the educator on strategies to prevent a secondary traumatic stress response or compassion fatigue which can help prevent staff burnout and retention rates, it will provide ongoing coaching or consultation, as well as foster social networks and peer support (Koslouski & Chafouleas, 2022; Thomas, 2022).

Chapter III: Discussion & Conclusion

Summary of Literature

Numerous negative life outcomes have been associated to adverse childhood experiences including behaviors that put an individual's health at risk, diseases like diabetes and ischemic heart disease, problematic behavior, and social, emotional and cognitive impairment (Burke et al., 2011; Felitti et al., 1998; Flaherty et al., 2013). Research on early childhood brain development demonstrates that healthy brain development can be interrupted when the body's stress response is activated for prolonged periods of time by toxic stress. In turn, overall health, behavior, and the ability to learn can be negatively impacted (National Scientific Council on the Developing Child, 2014; Shonkoff & Garner, 2012; Teicher et al., 2002). The brain grows and develops at a rapid rate in early childhood and is sensitive to the environment and experiences of early childhood. An environment and experiences that are positive and stimulating influence a positive brain architecture whereas exposure to a negative, dysfunctional environment or adverse experiences leads to a less optimal brain architecture (National Scientific Council on the Developing Child, 2007; Shonkoff & Garner, 2012; Teicher et al., 2002). When activated frequently and for extended periods of time, the body's stress response system gets overwhelmed. The very system designed to protect the body from threat is unable to do so in the presence of constant adversity and toxic stress (Shonkoff et al., 2009; Teicher et al., 2002).

As described by Shonkoff and Garner (2012), the essential characteristic of toxic stress is the disruption of the architecture of the brain, as well as organ and metabolic system alterations during critical stages of early development. The physical structure and neural connections of the brain are modified and develop along a stress-responsive pathway as a result of toxic stress. This results in a constant state of hyperarousal and hypervigilance. This frequent activation of the

stress response system weakens various other systems in the body and increases an individual's risk of experiencing disease, social problems, depression and anxiety, substance abuse, cognitive impairments and other issues that affect long-term health and well-being (Cook et al., 2003; McEwen, 2007; Shonkoff & Garner, 2012). Research on adverse childhood experiences supports those findings as it has been shown that individuals with an ACE score above four are more likely to experience problems with their health, health risk behaviors such as alcohol and drug abuse or risky sexual practices, as well as depression and internalizing and externalizing behaviors (Cook et al, 2003; Felitti et al., 1998; Flaherty et al., 2013; Greeson et al., 2014).

The Centers for Disease Control and Prevention (2019) indicate that children living in poverty are more likely to experience a traumatic event than children from more socioeconomically advantaged families. More disturbing is that families raising children in low-income, urban neighborhoods are exposed to multiple, persistent traumas ranging from being a potential threat to a severe threat - all of which increase the likelihood of negative outcomes in adulthood (Evans & English, 2002; Esposito, 1999; Hughes & Tucker, 2018). A childhood in poverty can have pervasive and enduring impacts on children, putting them at a significantly higher risk of experiencing behavioral, social, emotional, and health challenges. The stress from cumulative exposure to adverse experiences related to a childhood in poverty acts as a toxin in the developing brain and has been shown to negatively impact a child's ability and capacity to learn, build skills, and succeed academically (Chang & Romero, 2008; Evans & Kim, 2013; Goodman, et al., 2012; Greeson et al., 2014; Hughes & Tucker, 2018).

Once children reach school age, the consequences of childhood trauma and toxic stress can begin to present themselves in the classroom. Traditional school environments can be stressful and provide constant reminders of traumatic experiences, potentially retraumatize the

student, and invoke a constant state of survival mode in the student. In this state, the numerous areas of functioning that are essential to academic success can be very difficult to manage such as the ability to concentrate and pay attention, the ability to establish positive, healthy relationships, as well as organization and planning capacities (Pickens & Tschopp, 2017). Research has demonstrated that children with multiple trauma exposures experience negative school outcomes (some as early as kindergarten) such as challenging behavior, high rates of chronic absenteeism, lower academic engagement and grade point averages, higher incidents of suspension and expulsion, higher rates of retention and dropping out, as well as increased referrals to special education and lower levels of resiliency (Bethell et al., 2014; Jimenez et al., 2016; Perfect et al., 2016; Rischel et al., 2019).

Considering the research on adverse childhood experiences, brain development, and toxic stress and the associations with individuals living in poverty, it is imperative that educators, specifically in areas of high-poverty, engage in quality professional development. An effective professional development program or curriculum is trauma-aware, trauma-responsive, and trauma-informed. It allows educators to identify behaviors that may indicate trauma exposure, it provides ideas to foster a safe classroom, it emphasizes building positive teacher-student relationships, and provides educators with the skills to both educate students on self-care, self-regulation, and coping strategies and prevent their own secondary traumatic stress response or compassion fatigue, as well as continuous professional support (Koslouski & Chafouleas, 2022; Thomas, 2022).

Additionally, understanding that a trauma-informed approach is not a “one size fits all” intervention is essential to ensure maximum impact on student growth and academic achievement. Rather than being an intervention that can be implemented in isolation, a

trauma-informed approach is a framework that guides systems. According to SAMHSA (2014), a trauma-informed approach can include trauma-specific interventions, but those specific interventions are not enough for optimal results as the system as a whole must adopt trauma-informed approaches.

Professional Application

Given the high number of children living in poverty in the United States, it is imperative that educators understand the extent to which it can impact not only the individual, but society as a whole. Childhood poverty can have devastating life-long effects on the individual who experiences it, but the repercussions can extend to the communities in which they live. Research has shown that poor children are more likely to become poor adults, have an increased risk for antisocial behavior, have higher rates of unemployment and criminal behavior, and other issues once they reach young adulthood (Ratcliffe & McKernan, 2010). Research has also concluded that one reason for the negative outcomes of a life in poverty is that poverty can change the way the brain develops in young children because of the exposure to trauma and toxic stress. This can have significant consequences on the academic, social, and health outcomes of children that continue into adulthood and strain community, social service, and healthcare systems (Blair & Raver, 2016).

Minnesota as a state has the fifth lowest poverty rate in the country at 8.9 percent, but rates climb as high as 23 percent when broken down by county. That is nearly one in four children living in poverty and potentially exposed to a myriad of issues that can impact their development as well as their capacity and skills for academic success. Systematic changes will require more research, financial investment, time, and a significant change in mindset from poverty and ACEs being an individual problem to them being a larger social problem. Mitigating

the negative impact of poverty and ACEs begins with policy at the local, state and federal levels. Policy with more specific guidance for districts on the implementation of trauma-informed approaches accompanied with the financial resources to ensure full-implementation would be instrumental in ensuring that schools can meet the needs of all students and improve outcomes. Specific policy would encourage system-wide transformation, include trauma-informed professional development that would deepen an educator's understanding of trauma and aid in honing their skills to better work with students who have experienced trauma, and prevent secondary traumatic stress or compassion fatigue (giving rise to increased teacher retention).

Given district financial constraints and buy-in to trauma-informed approaches, the quantity and quality of professional development offered to educators may be limited. In the meantime, frontline educators can begin to take steps to realize the impacts of trauma, recognize the signs of trauma, respond to trauma, and resist the retraumatization of students by realizing the impact that a positive relationship with students can have on their sense of safety, security, belonging and, ultimately, their academic success. Being a trauma-informed educator means adjusting the way one thinks about and responds to student behavior. Rather than focusing on the frustrating and undesirable behaviors, it is helpful to reframe thinking to ask "what happened to you?" instead of "what's wrong with you?" Being loving, kind, and genuinely interested in students and creating a space where they feel safe enough to share their experiences uniquely positions educators to be the buffer necessary to interrupt the impact of trauma and toxic stress. Educators can do this by listening to (not just hearing) students, celebrating their achievements however big or small, providing them comfort and safety, helping them learn to collaborate with peers and develop a sense of belonging, helping them learn and practice optimism, encouraging positive healthy relationships, and inspiring and encouraging them with words of affirmation

(Jamieson, 2018).

Limitations of the Research

Research on Adverse Childhood Experiences (ACEs), brain development, and trauma-informed approaches to education provides good insights into the impact of childhood trauma on learning and development. However, as in any field of research, there are certain limitations that should be considered when interpreting the findings and applying them to future research or programs and policy. Research on the sensitive topic of adverse childhood experiences and trauma can present several limitations. One limitation is that research on ACEs often relies on retrospective data that is self-reported. Over time, memories of traumatic experiences may become skewed or forgotten which can lead to data inaccuracies. Additionally, an accurate representation of both the frequency and category of ACE can be difficult to fully ascertain due to possible underreporting by primary caregivers who have feelings of shame, fear of potential consequences, or cultural norms discouraging the sharing of private information with those outside the home (Saunders et al., 2014).

Additionally, although there is quality research on the impact of adverse experiences and trauma on the developing brain and the impact on school performance, the research on the impact of trauma-informed approaches on academic achievement is fairly new and not as robust. Research has shown connections between trauma in childhood and poor educational, health, and workforce outcomes over the lifespan, but the research on trauma-informed school-based interventions is still developing. Although trauma-informed approaches are receiving increasingly more attention, there is not enough research evaluating and demonstrating the effectiveness of these interventions and their long-term impact on student outcomes. Furthermore, given the concept of trauma-informed practices is fairly new, terms related to a

trauma-informed approach are often used without a clear definition and there is not yet a clear consensus of the specific terminology to use when discussing a trauma-informed approach in the school setting. Terms like trauma-aware, trauma-sensitive, trauma-responsive, and trauma-informed have all been used; some individuals have used the terms interchangeably, while others have made distinctions between the terms. Perhaps more importantly, trauma-informed approaches are being integrated without concrete and specific strategies to ensure that practices are in fact trauma-informed (Guevara et al., 2021).

Another limitation is there is an argument to be made regarding the "deficit" mindset that can be present when implementing a trauma-informed approach. Stearns (2020), discusses the systemic problem of viewing children as "traumatized", as having something "wrong", or of the belief that parents of color or those living in poverty don't value education. These viewpoints can actually work to undermine the efforts that trauma-informed approaches attempt to address. Focusing on ACEs and trauma is intended to help students who may need additional support to be successful, but there is a risk that students can be stigmatized and labeled (Saunders et al., 2014). This could have unintended consequences for students already trying to maneuver difficult experiences.

Finally, there are practical barriers and challenges faced by educators when attempting to effectively implement trauma-informed approaches. These include district, state, and federal policies; financial capacity of a school or district to adopt a school or district-wide implementation plan; and interdisciplinary collaboration (such as psychology, education, social work, and healthcare systems).

Implications for Future Research

Despite the limitations of current research on adverse childhood experiences and

trauma-informed approaches, the existing literature has raised awareness of the impact of childhood trauma on brain development and academic achievement. The research has provided insight for educators and policymakers which can be used to establish learning environments that are inclusive, supportive, and safe for all students. In regards to the mitigation of the impact of childhood trauma on academic outcomes, research that examines the impact of interdisciplinary collaborations, longitudinal studies that examine the impact of trauma on academic outcomes from early childhood through high school, and studies that address outcomes in high-poverty schools in a broader geographic context including urban and rural schools would enhance the existing research. Other focuses that would complement the research include studying the influences that cultural and racial identities have on the effectiveness of trauma-informed approaches, as well as the effectiveness of trauma-informed interventions in relation to the timing, frequency, and duration of the trauma exposure.

Conclusion

Adverse childhood experiences are traumatic events that can negatively impact development as a result of the frequent and intense stress caused by the body's stress response system being overactivated and overwhelmed. These experiences have been associated with increased negative impacts on children resulting from the toxic stress produced by the overactivation of the stress response system disrupting normal brain development. This interruption of normal brain development has been associated with numerous undesirable outcomes including social, emotional and cognitive impairment, behavioral challenges, the adoption of health risk behaviors, and disease. The consequences of a disrupted development can have a negative impact on a child's educational achievement.

Children living in poverty are at an increased risk of experiencing numerous adverse

experiences putting them at greater risk of learning and behavioral problems, decreased executive functioning, decreased school engagement and academic performance, higher rates of absenteeism and exclusion from school, and lower social competencies. A trauma-informed approach to educating children in high-poverty schools has shown positive results. Schools that have implemented trauma-informed programs and policy changes that seek to answer the question “what happened to you” rather than “what is wrong with you”, that focus on building relationships with students and creating a safe, stable, predictable environment have shown increases in desirable outcomes and decreases in undesirable behaviors and outcomes.

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